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DP/2/1998

Financial Repression and Credit Rationing under Currency Board Arrangement for Bulgaria

Nikolay Nenovsky, Kalin Hristov

Abstract. This paper reviews the following theoretical relationships: availability of credit channel, currency board asymmetric effects on private and state-owned firms; credit rationing and commercial bank interest rate spread; commercial bank excess reserves dynamics and interest rates. Monetary restrictions under a currency board regime are approximated with government deposit growth in the balance sheet of the Issue Department. The paper assumes low interest rates as financial repression in the context of McKinnon-Shaw hypothesis. Furthermore, it examines the influence of government deposit on commercial bank excess reserves, reserve money and money supply. VAR models are introduced with focus on two basic tests in modern econometric studies: variance decomposition and impulse response function. The analysis is based on BNB weekly monetary statistics and covers the period from the launch of currency board on 1 July 1997 to end-April 1998.

Резюме. Изследвани са следните теоретични връзки: наличието на кредитен канал; асиметричността на въздействието на паричния съвет върху частните и държавните фирми; рационирането на кредите и лихвеният марж на търговските банки; динамиката на свръхрезервите на търговските банки и лихвените проценти. Паричната рестрикция след въвеждането на паричен съвет е апроксимирана с нарастването на депозита на правителството в баланса на управление „Емисионно“. Ниските лихвени проценти са разгледани като финансова репресия в смисъла на хипотезата на McKinnon Shaw. Изследвано е влиянието на депозита на правителството върху свръхрезервите на търговските банки, резервните пари и паричното предлагане. Използвани са VAR-модели, в рамките на които се се акцентира на два основни за съвременните иконометрични модели тестове: декомпозиране на вариацията (variance decomposition) и рреакция на щоковете (impulse response function). Анализът се основава на седмичните данни от паричната статистика на БНБ и обхваща периода от въвеждането на паричния съвет в България на 1 юли 1997 г. до края на април 1998 г.

Contents

I. Objects of the Study and Working Hypotheses

The first year since currency board introduction in Bulgaria pro vides sufficient ground to draw theoretical conclusions, which other wise would have been only intuitive, and give some practical recom mendations to facilitate currency board operation.

The *object* of this study is to analyze the effects of currency board operation on money supply and commercial bank lending activity.

The present paper builds on the following *working hypothesis*: within the context of the model of currency board introduced in Bulgaria, a possibility for a quasi monetary policy (conscious or unconscious) ex ists based on the specific structure of the Issue Department balance sheet. The latter reflects on money and credit supply. Major tools of this policy are the government's deposit on the Issue Department li abilities side, commercial bank required reserves with the BNB and the base interest rate. Currency board transmission channels imply the classical models of asymmetric information, credit rationing and finan cial repression.

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The hypothesis focuses on the following *tasks*: analysis of currency board effects on credit in the economy (sort of a modified credit chan nel); financial repression under currency board arrangement and credit rationing (through interest rates below their natural levels and com mercial bank required reserves with the BNB), and finally on the pos sibilities of manipulating money supply through government deposit at the central bank's Issue Department.

This study builds on the fundamental assumption that *imperfect in formation and uncertainty underlie financial relations.*

Information problems derive primarily from the lack of channels for transmission of information, its asymmetry, as well as from significant transaction costs associated with its processing and transmission. Im balances in money, credit and financial markets are information imbal ances, and crises in these markets are information crises. Uncertainty comes secondary and it cannot be described by probability distribution: objective and subjective (Knight, F., 1923).

These two fundamental aspects of business activity imperfect in formation and uncertainty underlie the Austrian analysis of money, credit and finance (Bom Baverk, E., 1888; Menger, K., 1892; Mises, L., 1912; Hayek, F., 1931, 1933; Lahman, L., 1986)[1]. Modern analyses of financial systems are in the paradigm of 'asymmetric information' (Mishkin, F., 1996, 1998)[2].

[1] See the fundamental article, based on imperfect information and uncertainty, on the natural evolution and biological dynamics of institutions (Alchian, A., 1950). See also Goodhart, Ch., 1989.

[2] For a detailed review of the mechanisms of asymmetric information, see Nenovsky, N., K. Hristov, 1997.

Box 1

Asymmetric Information

Asymmetric information is generally a situation in which one party to a financial contract possesses less information than the other. For example, borrowers know more about potential returns and risks associated with projects undertaken by them than creditors. Asymmetric information poses two major problems for the financial system: the *moral hazard prob lem* and the *adverse selection problem*.

Adverse selection arises prior to contractual execution. Borrowers who are ready to assume greater risks seek credit more actively. Those willing to assume greater risks are ready to obtain credit under any terms, as they perceive their probability of repaying the loan to be low. Thus borrowers who are less likely to fulfil their obligations need be selected. In this case, due to adverse selection problem and increased probability of extending credits to more risky borrowers, creditors may decide to refuse credits even to low risk borrowers. To minimize the problem of adverse selection, therefore, creditors should be able to distinguish between 'good' and 'bad' credit risk.

While the problem of adverse selection arises prior to contractual ex ecution, *moral hazard* derives from post contractual relations. The moral hazard problem is induced by borrowers having incentives to invest in high risk projects. If the project generates higher profits, they will then benefit more, while creditors will suffer heavier losses if the project fails. Moreover, borrowers are encouraged to use extended funds for purposes other than those agreed upon under the contract. The conflict of interests between creditors and debtors arising from the moral hazard problem im poses constraints on creditors' lending activity. This leads to levels of credit and investment below the optimal level for the economy. Creditors impose constraints on borrowers' behavior so that the latter should not in crease the risk of default on the loan. In this case creditors may monitor borrowers' activity and control the observance of constraints when bor rowers fail to perform.

The paper is organized as follows: the theoretical basis of analysis and relevant literature are presented at the beginning. Then it proceeds with data, models and empirical research. Finally conclusions are drawn and recommendations for the better operation of the currency board are given.

II. Theoretical Basis of the Study

1. Credit Channel and Credit Rationing

The credit channel of monetary policy transmission became very popular in the mid 80s as an alternative and supplement to the trans mission mechanism through interest rates or through the exchange rate. In practice, it is deeply woven into the texture of liberal tradition of economic thought. In his book on the business cycle entitled 'Prices and Production' (1931) F. Hayek relates business cycles to the effects of money on the real economy, in particular emphasizing its effect through consumer and investment credits. He was inspired by the works of Menger, K. (1892), Wicksell, K. (1898, 1913 1922) and Spietnoff, A. (1923) who argued that interest rates, saving and invest ment were the backbone of business activity.

Later on Bernarke, B. (1983), Bernarke, B., M. Gertler (1995) re vealed the existence of a monetary transmission mechanism concen trating on asymmetric information and transaction costs of managing financial contracts (the classical agent principal relationship). Mon etary transmission through the credit market involves two major chan nels: the *bank lending channel* and the *balance sheet channel.*

The bank lending channel is based on commercial banks' special role in the financial system in view of the advantages the banks have in their relations with small firms, whereby asymmetric information is most clearly displayed. Commercial banks have specific advantages to other financial intermediaries in collecting information on borrowers: they establish long term relationships with their clients and are able to monitor borrowers' accounts. Diamond (1984) shows that banks are capable of monitoring borrowers at lower costs than individuals, which enables them to fight more successfully with moral hazard problems. In addition, Stiglitz and Weiss (1981) argue that banks have additional advantages in curbing risks assumed by borrowers: they induce changes in borrower behavior as they threaten to reduce the provision of funds in the future.

Natural advantages of banks in collecting and processing informa tion and reducing the moral hazard problem explain the importance of banks in the financial markets. *Moreover, the harder the gathering of in formation from private firms in so called emerging financial markets, the more significant the banks become for the financial systems of these countries.*

Information problems explain why securities markets are often a rather insignificant source of external financing for nonfinancial enter prises. The better the quality of information about firms, the higher the probability of getting finance through securities issue. As the countries with emerging financial markets have significant difficulties in collect ing information on private firms, the securities markets play an insig nificant role in corporate financing.

The credit channel of monetary policy transmission (through com mercial banks) emphasizes the fact that money supply contraction leads to a more sizable contraction of bank credit supply relative to contraction of other types of debts.

This transmission mechanism is based on the dual nature of com mercial banks which hold reserve backed deposits and provide credit to the economy. Contraction of commercial bank reserves induced by monetary authorities policy reduces their lending ability. In practice, banks cannot eliminate the effect of the shock on reserves by restruc turing their portfolios and preserving the level of credit unchanged. Thereby small and medium size firms, being strongly dependent on bank credit, cannot ensure other sources of funding and reduce their investment.

There is another form of a credit channel concentrating on the sup ply of funds from all financial institutions and markets without stress ing the special role of commercial banks (Oliner, S., G. Rudebusch, 1996). The so called *broad credit channel* confirms the assumption that all forms of external financing of firms are imperfect substitutes for in ternal funds (contrary to the theorem on neutrality of different types of financing (Modilliani, F., M. Miller, 1958).

Asymmetric information between creditors and debtors leads to a premium paid for external financing over the price of own funds (eq uity). The premium is designed to make up for creditors' expenses on evaluating investment projects, monitoring borrowers and giving effect to contract execution. The price of own (internal) funds of the firm $\mathbf{r_1}$ may be decomposed:

$$\mathbf{r_1} = \mathbf{r_f} + \Theta,$$

where $\mathbf{r_f}$ is the risk free interest rate (often employed as a monetary policy tool) and Θ is *the risk premium which is specific for a given firm*.

In 'perfect' capital markets with external funds being the 'marginal' source of financing, investments exceeding internal funds **F** should also be accessible at an interest rate of $\mathbf{r_1}$. Firms tend to default on loans ex

tended by external creditors rather than on those made by sharehold ers. This moral hazard demands that the price of external funds be higher than $\mathbf{r_1}$ and include a risk premium $\mathbf{\Omega}$ (*general premium for all firms reflecting the risk of change in post contractual borrower behavior*).

The dynamics of the risk premium $\mathbf{\Omega}$ depends on two factors. First, $\mathbf{\Omega}$ increases with the amount of credit. Other conditions being equal, the bigger debt amount increases the moral hazard. The relationship between the premium $\mathbf{\Omega}$ and the size of the debt determines the up ward slope of the credit supply curve $\mathbf{S_1}$ (see Chart 1). Let the total amount of external financing be **B**, that is investments **I** less own funds, then $\mathbf{B = I \quad F}$.

Second, the risk premium $\mathbf{\Omega}$ also increases with the increase in risk free interest rate (Gertler, M., G. Hubbard, 1988). This relates to the fact that an increase in interest causes a decrease in the discount value of debtor collateral which increases the moral hazard.

These two factors may be written as: $\mathbf{\Omega = = \Omega\ (B, r_f)}$ where $\mathbf{\partial\Omega/\partial B}$ and $\mathbf{\partial\Omega/\partial r_f}$ are positive.

Dependence of risk premium $\mathbf{\Omega}$ on risk free interest rate in the economy means that disturbances in the credit market enhance mon etary shocks in the economy (underlying assumption in the broad credit channel theory). Chart 1 shows that an increase in risk free in terest rate raises the cost of external financing by $\partial\mathbf{r_1/\partial r_f} + \partial\mathbf{\Omega/\partial r_f}$, where the second term of the expression is the amplifying effect itself. An increase in the risk free interest rate shifts the funds supply curve from $\mathbf{S_1}$ to $\mathbf{S_3}$ and investments contract from $\mathbf{I_1}$ to $\mathbf{I_3}$. The fall in invest ment is accelerated by the increase in $\mathbf{\Omega}$ for external funds. It is this factor that shifts the funds supply curve to $\mathbf{S_3}$, not to $\mathbf{S_2}$. Thus widening of the spread between bank interest rate and the interest rate on other external funds for the firm amplifies the effect of change in $\mathbf{r_f}$.

We can summarize that, given a broad credit channel, the price of external financing relative to that of internal financing increases with money supply contraction. This change in the relative price of credit makes investment more vulnerable to fluctuations in internal funds with contracted money supply. As a result, under a broad credit chan nel the correlation between investment and internal (own) funds of firms facing the imperfections of credit markets increases with money supply contraction.

The *balance sheet channel* of monetary policy transmission is based on the assumption that the financial premium paid by the borrower is

determined by his financial position. The bigger the borrower wealth, defined as a sum of his liquid assets and collateral, the lower the risk premium. The higher net worth of borrowers allows for potential con flict of interests with creditors to be reduced. This is possible either by financing most of the projects with equity, or by putting up more collat eral as a guarantee provided by the recipients of loans. As the financial position of borrowers affects the size of risk premium and general loan terms, fluctuations in borrower balance sheet become a determinant of investment decisions.

Changes in money supply affect not only the market interest rate but also reflect, directly and indirectly, on borrower financial position. Money supply contraction worsens firms' balance sheets in two ways.

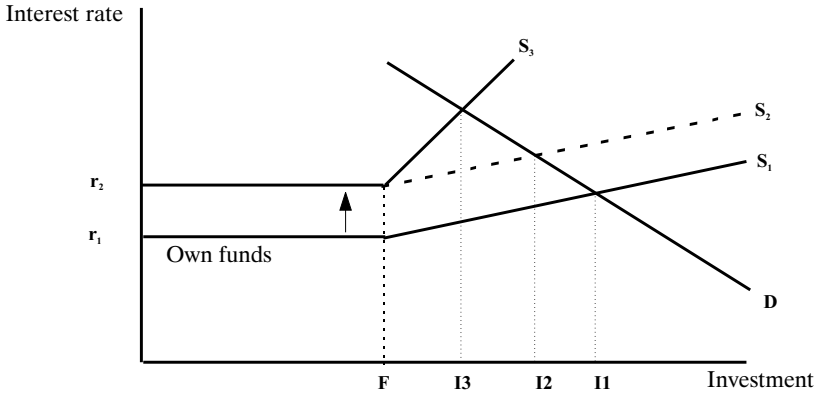
First, as firms hold short term or floating rate debts, increasing in terest rates directly increase their interest expenses, reduce net cash flows and worsen their financial position.

Second, increasing interest rates are associated with falling asset prices, thus reducing the collateral value put up by the recipients of loans.

Furthermore, money supply contraction may reduce cash flows and collateral value indirectly by lowering consumer spending which leads to a fall in a firm's sales revenue. As fixed and quasi fixed expenses (wages, interest payments, rents) adjust rather slowly in the short run, financial gaps emerge. This lessens a firm's value and worsens its bal ance sheet.

Chart 1

BROAD CREDIT CHANNEL



The monetary policy credit channel is very closely associated with the understanding of credit rationing based on uncertainty. Financial markets and financial intermediaries play a critical role in the economy, shifting financial flows from individuals to firms with good investment prospects. If the financial markets and financial intermedi aries fail to do this effectively, sources of economic growth will be un dermined.

The classical basis of credit rationing is developed by Modigliani, F., D. Jafee (1969), and also by Stiglitz, J., and Weiss, A. (1981). Asymmetric information and the adverse selection problem associated with it result in isolating a fraction of borrowers from the credit market, even if they indicate a willingness to pay a higher interest rate and put up more collateral than demanded[3].

Increasing interest rates on credits and increasing collateral require ments both increase the risk to bank portfolios since low risk investors are isolated, on the one hand, and borrowers have incentives to invest in more risky projects, on the other. This lowers bank profits. In these circumstances there will be no market instrument capable of equating the demand for loanable funds with the supply of loanable funds.

Credit restrictions imply reducing the number of credits made by banks, not reducing the amount of credits or setting the interest rate as an increasing function of the loan amount. With a change in money supply, credit rationing affects the level of investment not through the interest rate mechanism but through the availability (accessibility) of credit.

The existence of spontaneous (unplanned) and forced (planned, segmented) rationing is shown in Charts 2 and 3,

where

$\mathbf{C}^{\mathbf{d}}$ is demand for credit;

$\mathbf{C}_{\mathbf{1}}^{\mathbf{s}}$ is supply of credit under uncertainty for risk free clients;

$\mathbf{C}_{\mathbf{2}}^{\mathbf{s}}$ is supply of credit under uncertainty for risky clients;

$\mathbf{C}^{\mathbf{s}}$ is supply of credit under complete information and sound credit market.

The credit supply in a setting of uncertainty and asymmetric infor mation is cubic shaped, derived by Stiglitz and Weiss (1981).

With *spontaneous rationing* (Chart 2) credit clients are not distin guished, but at a given level of the interest rate $\mathbf{i}_1$ banks will reduce credit, consistent with asymmetric information the supply of credit

[3] See the innovative study by Akerlof, G. (1970).

Chart 2

SPONTANEOUS RATIONING

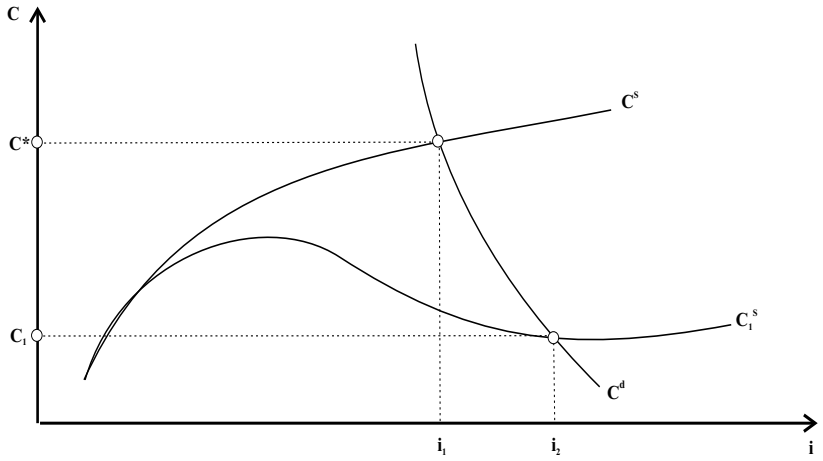
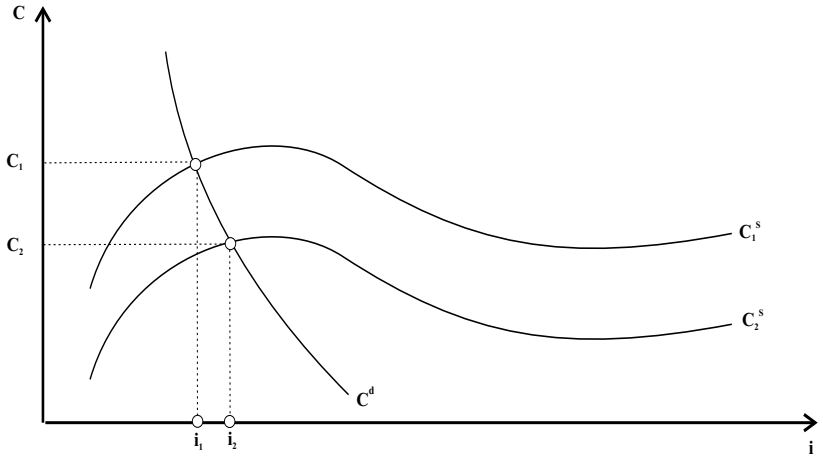


Chart 3

FORCED RATIONING



breaks into $\mathbf{C_1^s}$ instead of following the classical trajectory $\mathbf{C^s}$. This re lates to the fact that high interest rates attract high risk projects. For credit demand $\mathbf{C^d}$ loans will be made at $\mathbf{i_2}$ and rationing is expressed in the quadrant $\mathbf{C^*C_1}$.

The other alternative is for the bank to set *different levels* of interest rates depending on the riskiness of individual clients. This is shown in Chart 3 where credit supply is distinguished between two groups of cli ents: risky $\mathbf{C_2^s}$ and risk free $\mathbf{C_1^s}$. Therefore commercial banks use dif ferent interest contracts for different clients $\mathbf{i_2}$ for risky clients and $\mathbf{i_1}$ for risk free clients. If the bank is able to set an interest rate according to an individual client's risk, then there will be no rationing. This is im possible, however, as credit supply curves are a discrete multitude and the element of rationing is always present.

2. Financial Repression and Interest Rates

Economic history reveals that financial intermediation and the fi nancial sector have been growing at faster rates than the growth rate of the economy as a whole, their relationship is positive and the passage through particular stages of financial growth is indispensable (Gurley, J., E. Shaw, 1960; Goldsmith, R., 1968; Cameron, R., 1972). A delay in the development of the financial sector means an even *more significant* overall delay in the development of a given country (Coricelli, F., 1996).

The paradigm of financial repression (Shaw, E., 1973; McKinnon, R., 1973; Kapur, B., 1976) became very popular in developing coun tries in the 80s as an alternative to the Keynesian view on the role of the state in generating economic growth. The theory of financial re pression provides a convenient starting point to explain the problems of countries in transition to a market economy.

Generally, financial repression or suppression of the financial sector is a result of state interference in monetary and financial relations. Fi nancial repression is expressed in three directions: artificially low inter est rates, high commercial bank reserve requirements and quantitative credit restrictions. Actually the *Shaw McKinnon* approach is very close to the liberal view on finance and money in the context of which au thors like Wicksell, K. (1898), Fisher, I. (1911), Hayek, F. (1931), Salin, P. (1990) have always stressed the risks of manipulating nominal interest rates and their being segregated from the natural level[4]. The

[4] Immediately we avail of the opportunity to refer to the 'pernicious' and widely used *IS LM macromodel*, which assumes that interest rates can be manipulated so as to influence

latter results from a dynamic consumer choice, different psychological propensity to current consumption or, to put it in other words, from the free choice to spend or save[5].

Interest rates below their natural levels encourage forced consumption, limit investment in qualitative and quantitative terms, and suppress economic growth. The interference of the state is accomplished in three ways: by manipulating nominal interest rates (modification of money supply at short term static prices), by administrative control on deposit rates or by nationalizing financial intermediaries (primarily banks). This relates to the fact that the state apparatus is assumed to know better what should be the amount of investment and where to place forcibly accumulated savings. Low real interest rates impede monetization of the economy and development of the financial system.

If the actual interest rate is below the natural level, credit is rationed both qualitatively and quantitatively. Less attracted funds in the banking system result in less credits in general. Besides, the banks, by maximizing profits and market share, ration credit themselves and selection of projects deteriorates. In the models of Stiglitz, J. and Weiss, A. (1981), the interest rate applied is the major signal of project riskiness; thus it serves as a filter for projects. If it is not consistent with the market interest rate, however, its information power loses significance.

High commercial bank reserve requirements are another component of financial repression. This is an extra expense which stalls bank lending activity. In the spirit of liberal tradition the latter may be viewed as an unjustifiable[6] confiscation of private resources. Hypothetically it is assumed that central bank bureaucracies have better knowledge and

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human choice of consumption and saving. It should be mentioned here that it is impossible to determine whether an interest rate is above or below its natural level. This would mean that we outweigh the market. The same is true for our estimate of the base interest rate in Bulgaria. Apriori we cannot argue that it is below its natural level as much as we cannot assert that it is at natural levels. We can judge it aposteriori based on credit rationing.

[5] When financial repression and credit rationing dominate, *self financing* becomes a major financial source of growth. Money enters *directly into the production function and becomes a necessary and supplementary factor* for growth. The production function will be: $\mathbf{Y=\alpha_0 K^{\alpha 1} L^{\alpha 2} M^{\alpha 3} \epsilon^{\varepsilon}}$, where **Y**, **K** and **L** are the traditional designations for income, capital and labor, and **M** is an approximation of money (a monetary aggregate, monetization indicator, etc.). In this context monetization of the economy is a prerequisite for economic growth.

[6] The only arguments in support of minimum required reserves are usually related to maintaining the stability of the banking system which is assumed to be not self regulating.

skills than private institutions[7].

Credit supply is in general a function of the demand for household deposits and of the dynamics of commercial bank required reserves. The latter lower the credit to money ratio and slow economic growth (Kapur, B., 1976, Mathieson, D., 1980). According to McKinnon, R. (1982), economic growth is maximized when reserve requirements are completely eliminated (the two studies by Sellon, G., S. Weiner, 1996, 1997, are in the same vein). Elimination of minimum required reserves would raise commercial bank profitability and help them optimize re source allocation. Thus reserves allocated by the banks themselves will reflect the state of the money market and their settlement needs. Prac tice shows that elimination of required reserves and/or their replace ment by other liquidity requirements is the exclusive result of political will (Rich, G., 1998).

Here may come the traditional arguments for the banking system and money as public utility, of banking system *integration* and exter nalities. Without discussing in detail these arguments, we would like to note that *even if all of these arguments were true the state interference in the banking sector intensifies externalities, asymmetric information, its channels and provokes systemic financial crises. In this sense elimination of commercial bank required reserves would ease the banking system, making it more stable and effective.*

3. Monetary Policy under Currency Board Arrangement

The classical currency board involves abandonment of monetary policy and discretion. This is a specific form of monetary constitution where money supply is determined by the automatic mechanism of the balance of payments dynamics. In the case of the Bulgarian model of currency board this is only partly true.

It may be argued that there exists a specific type of transmission mechanism in the context of the Bulgarian currency board. Monetary

[7] The problem with bureaucracy is that besides pursuing common goals it strives to maxi mize its principal function (in this context is the desire for reelection), particularly serious with monetary and issuing activities (Niskanen, W., 1983). Definitely one may argue that monetary bureaucracy increases as the central bank expands its goals and available tools. *In this sense the currency board is a step forward to reducing bureaucracy.* There exists a counter tendency, however, of a self protecting bureaucracy in the sense that by reducing its monetary functions the central bank concentrates more on its internal and administra tive structure.

Box 2

Monetary Policy through Government Deposit

The aggregated balance sheet of the Issue Department includes the fol lowing items:

Assets	*Liabilities*
F	**C**
	R
	G
	B

where

F are foreign exchange reserves of the Issue Department;

C is currency in circulation;

R are commercial bank reserves;

G is the government deposit;

B is the Banking Department deposit (net value of the currency board);

Let **H** be reserve money, then **H = C + R = F G B**.

The classical form of money supply is:

$M^s = m\,H = m\,(F - G - B)$,

where **m** is the traditional multiplier, $m = (1+c)/(c+r)$.

Differentiating the partial derivative, showing the response of money stock to government deposit growth, is written as:

$\partial M^s/\partial G = -m < 0$.

This indicates unequivocally that, other conditions being equal, govern ment deposit growth reduces money supply by the value of the multiplier[8].

The full model of money supply is as follows:

$M^s = m\,H = m\,[F(G) - G - B(G)]$,

where net foreign assets and the Banking Department deposit are also a function of the government deposit. Then the derivative is:

$\partial M^s/\partial G = [(\partial F/\partial G) - 1 - (\partial B/\partial G)]m < 0$.

The general effect of **G** on money stock depends on the joint responses of **F** and **B** to changes in **G**.

[8] The Banking Department deposit will be the object of another study to analyze its role of a supplementary variable in the money market, besides the interest rate, that balances money demand and supply.

policy is taken over by fiscal policy and the government has the possi bility of manipulating money supply through its deposit at the Issue Department. The dynamics of this deposit may be interpreted as an *in dicator (measure) of the government's monetary policy* and plays the role of a buffer between changes in the monetary base and foreign ex change reserve dynamics. A growth in this deposit constrains reserve money and its dramatic fluctuations cause sharp changes in reserve money dynamics. Essentially it performs sterilizing functions and in jects or withdraws liquidity in and out of the economy.

The existence of this deposit gives advantages of the public sector to the private sector because only the former is backed by the reserves of the Issue Department which constitute public wealth[9].

The government's deposit at the Issue Department reflects budget ary dynamics and receipts from the IMF. Also it is the result of govern mental policy in the government securities market (the volume of is sues). The deposit affects money supply in two ways: through volumes by reducing reserve money, and through prices by the impact of the nominal base interest rate[10]. This directly reflects on real interest rates (Fry, M., 1995) and, in turn, on motives for saving and investment, on the quantity and quality of investment, and hence on economic growth.

In this mechanism we may *discover* the two classical transmission channels of monetary policy under a central bank: directly through the monetary base and through the interest rate (Mishkin, F., 1996, 1997).

III. Models

1. Variables and Statistical Data

The paper examines the period from the introduction of the cur rency board in Bulgaria on 1 July 1997 until April 1998 inclusive, es sentially *the first year of currency board operation*. *Weekly* indicators from BNB monetary statistics and the balance sheets of the Issue and

[9] A similar phenomenon of covert monetary policy through the budget existed at the early stage of operation of the Hong Kong currency board, Walters, A. (1989). Of note is the extremely strong *variance of government deposit* at the Issue Department: 48.64%. Even though such a dynamics is conceivable, it may be dangerous.

[10] The base interest rate, given the peculiarities of Bulgaria's currency board, does not perform the typical functions under a discretionary central bank. Pursuant to Article 35 of the Law on the BNB, the Managing Board of the BNB determines only the method of set ting the base interest rate. Actually, the level of this rate depends on the primary market of government securities.

Banking Departments have been used 43 observations in total. Be cause of the different dates of publication of monetary statistics and the Issue Department balance sheet, indicators were to be reprocessed to make them compatible on a weekly basis. The following variables have been used:

DC domestic credit
DB Banking Department deposit at the Issue Department
CF credit to private sector
CG credit to government
CFG credit to state owned firms
NCF newly extended credits (short and long term) to private sector
NCH newly extended credits (short and long term) to households
NCFG newly extended credits (short and long term) to state owned firms
e BGL/USD exchange rate (weekly adjusted)
d1 interest rate spread the difference between interest rates on long term credits and interest rates on time deposits **(d1 = ilcr irtd)**
d2 interest rate spread the difference between interest rates on short term credits and interest rates on time deposits **(d2 = iscr irtd)**
i base interest rate
m money multiplier
M0 reserve money
M3 broad money (money supply)
QM quasi money
irtd interest rate on one month deposits
iscr interest rate on short term credits
ilcr interest rate on long term credits
er excess reserves of commercial banks
irdd interest rates on demand deposits
im interest rate in the interbank money market
DG government deposit at the Issue Department
CH credit to households
FR foreign exchange reserves of the Issue Department

2. Econometric Techniques

The econometric methodology used in this paper is presented on page 20. Over recent years almost all studies have been based on these techniques as they overcome restrictions of classical econometrics. Espe cially representative are the models which examine the effects of mon etary policy on the other macroeconomic variables (Barran, F., V. Coudert, B. Mojon, 1995; Grilli, V., N. Roubini, 1996; Cochrane, J., 1998, Christiano, L., 1997, etc.). Within the framework of this tradition are the fundamental works of Bernarke, B., I. Mihov, 1995, 1998, which present measures of monetary policy and the so called 'liquidity effect' of the monetary shock through a structural VAR model.

Box 3

Econometric Techniques and Types of Models Used

In testing for a unit root the **PP** (Phillips Perron) test is used, which cap tures the break in the trend, while **ADF** assumes that the trend is linear and without break (Perron, P., 1989). In the **PP** test there is no need to test for trend break, contrary to **ADF**.

Three groups of models have been used: cointegration and error correc tion, VAR and GARCH models. Their logical order is as follows: 1) The first group involves the models of cointegration and error correction. The method of determining the number of cointegration vectors is given by Johansen, S., K. Juselius (1990). 2) If there is no cointegration relationship established, then the VAR models are used where all variables are endogenous. With VAR models (Sims, C., 1972, 1980; Cochrane, J., 1994) it is important to fol low the proper order of variables in the vector: first come the most exogenous or controlled variables (Kamas, L., 1995). Within the VAR models two tests are emphasized, considered of major importance in modern econometric re search: *variance decomposition* and *impulse response function*. *Variance de composition* (similar to Granger causality) is used to make it clear how far certain variables can account for changes in the other variables. It evidences what percentage of changes in a variable is accounted for by shocks to the other variables. On its part, *impulse response function* gives indication of the magnitude of this effect. It shows how a given variable responds over time to shocks triggered by another variable. 3) The third group of tests is based on GARCH models (see the fundamental article by Bollerslev, T., 1986), de signed to capture the development of the variance of the variable itself, that is its memory. Some modifications are possible here, such as to incorporate the levels in the variance equations or to incorporate the variance or the mean square deviation in the levels' equations.

It is presumed that the variance of the residual in the structural equation is an indicator of the error made by economic agents in formulating their expecta tions of a given variable on the basis of a given model. In traditional GARCH models good news and bad news receive equal treatment. In practice, however, this is not the case. This peculiarity is better captured by so called asymmetric models (AGARCH, TARCH (GJR), EGARCH). Engle, R. and V. Ng (1993) have constructed a news model (*news impact curve*). According to these mod els, bad news (major fluctuations) have a stronger impact on the dynamics of variables in the future than good news (minor fluctuations). A comprehensive survey is presented in Bollerslev, T., Chou and Kroner (1992), Joyce, M. (1995, 1997) and Duan, J. (1997).

The present paper uses GARCH models to generate conditional variances of the variables under review.

Unit Root Test

Before continuing to modeling, we test variables for stationarity and integration (Table 1). Critical values (*McKinnon critical values* **PP**) without constant and trend are as follows: for 1% (2.62), for 5% (1.95), and for 10% (1.62). First order integrated variables with con stant and trend are designated with *, and their respective critical val ues are: for 1% (4.19), for 5% (3.52), and for 10% (3.19).

Table 1

Variable	*PP test*		*Integration and lags*	
	levels	*1*Δ	*I*	*lag*
DC	-0.76	-6.64	1	3
DB	-0.16	-5.99	1	3
CF	1.16	-7.04	1	3
CG	-2.09	-7.08	1	3
CFG	0.45	-5.1	1	3
NCF	-0.87	-68.83	1	3
NCH	-2.35	-8.91	1	3
NCFG	0.08	-7.41	1	3
e	0.29	-5.44	1	3
d1	0.85	-9.68	1	3
d2	-0.04	-8.18	1	3
i	-1.62	-3.79	1	3
m	-1.27	-18.82	1	3
M0	1.93	-8.93	1	3
M3	2.14	-5.48	1	3
QM	1.86	-7.97	1	3
irtd	-1.79	-8.18	1	3
iscr	-0.56	-6.49	1	3
ilcr	0.12	-8.15	1	3
er	-0.58	-9.45	1	3
irdd*	-11.5		0	3
im*	-15.53		0	3
DG*	-2.8	-11.23	1	3
CH*	-2.95	-9.89	1	3
FR*	-2.57	-4.7	1	3

The results from testing show that most series are first order inte grated, with the exception of **im** and **irdd** which are zero order station ary. This allows to continue modeling with first differences and loga rithms.

3. Charts of Variable Variances

On the basis of GARCH models we derived *conditional variances* of basic variables: domestic credit variance, base interest rate variance, government deposit variance, broad money variance, Banking Depart ment deposit variance, interbank interest rate variance, variance of credit to private sector. The dynamics of variances are presented in the charts below[11]:

Chart 4

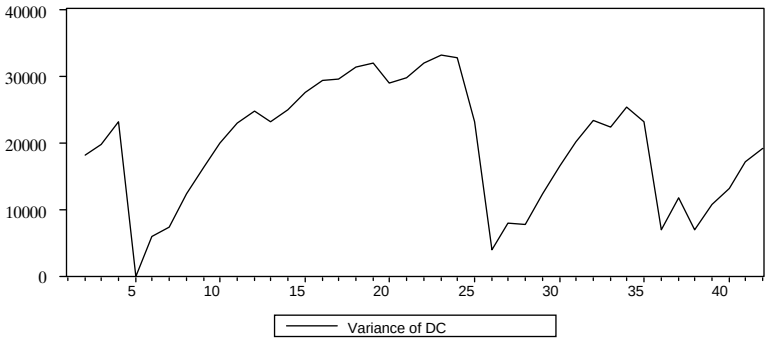
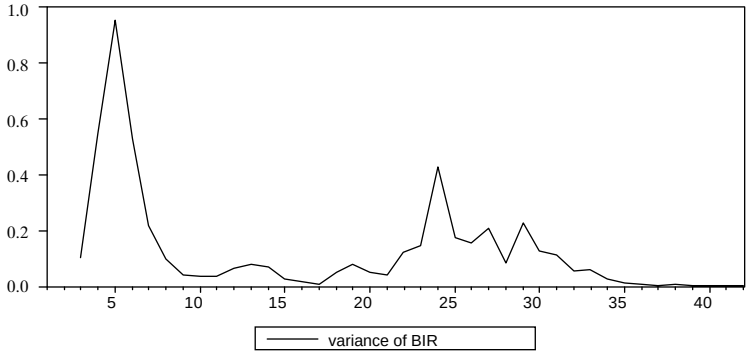


Chart 5



[11] The horizontal scale shows the weeks since currency board introduction on 1 July 1997 and the vertical shows differently normalized scales so that an indicator's dynamics is best described. Thereafter variances of variables are designated as **V** in front of the variable (i.e. **VDC** means variance of domestic credit).

Chart 6

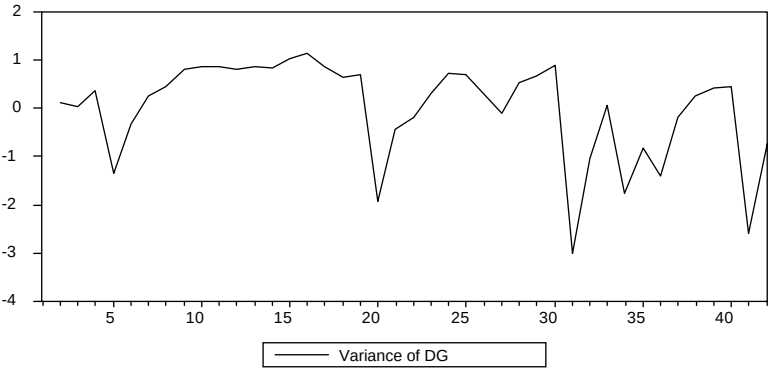


Chart 7

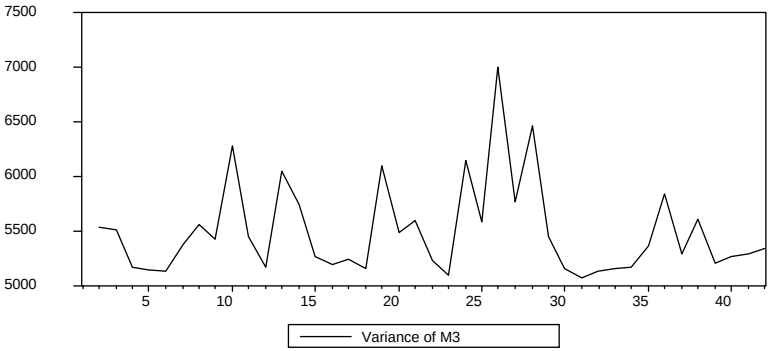


Chart 8

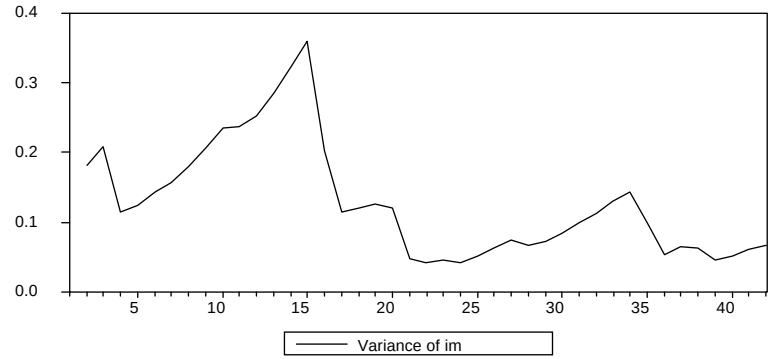


Chart 9

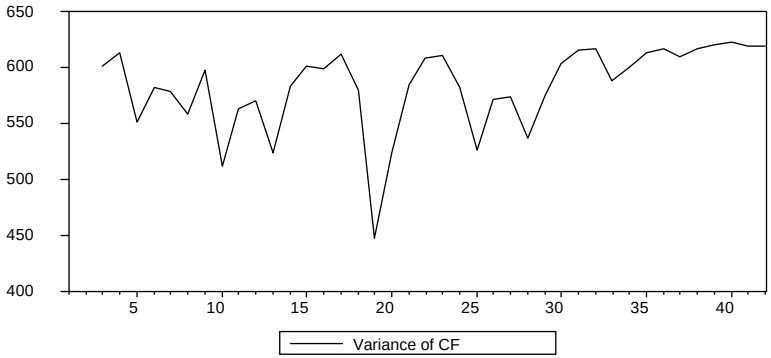
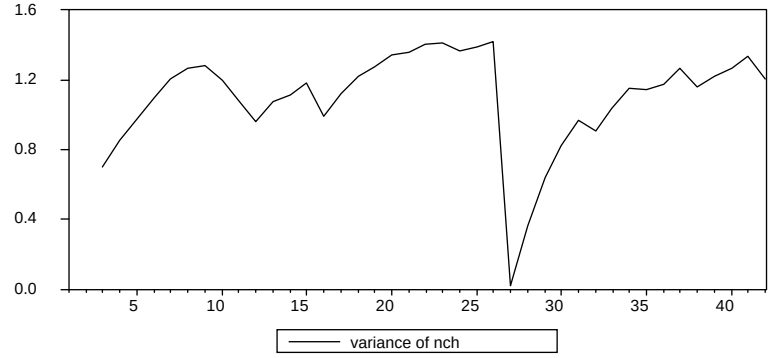


Chart 10



It should be noted that domestic credit, credit to the private sector, newly extended credits and broad money M3 display strong volatility. Credit volatility is dangerous because it usually creates problems in the balance sheets of commercial banks and provokes systemic financial crises (Hayek, F., 1931; Minsky, H., 1977; Bernarke, B., 1992; Aglietta, M., 1993).

4. Relations between Variances of Basic Variables (normalized scale)

Chart 11

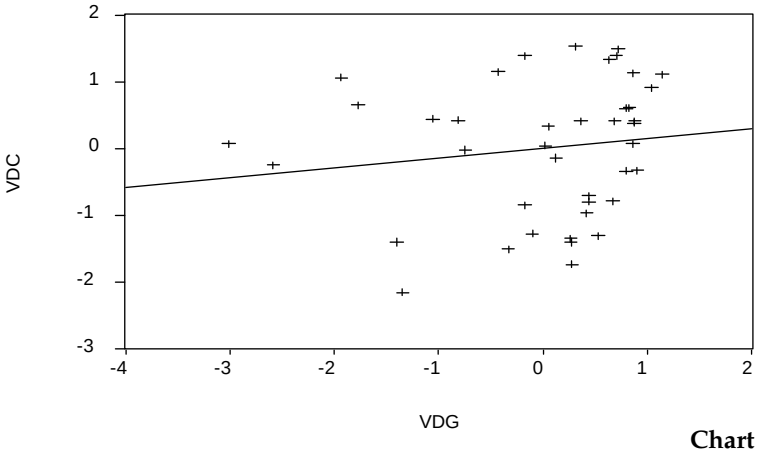
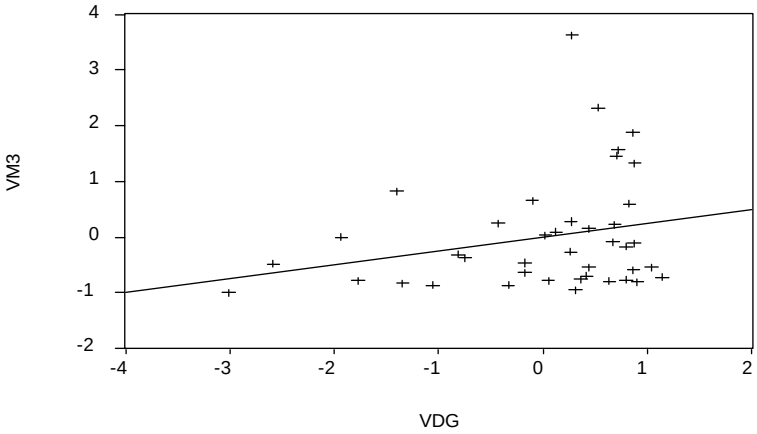


Chart 12



The two charts above show the *positive relation* between government deposit variance and variances of broad money and domestic credit. This indicates that money stock volatility and domestic credit volatility are provoked by government deposit volatility.

Chart 13

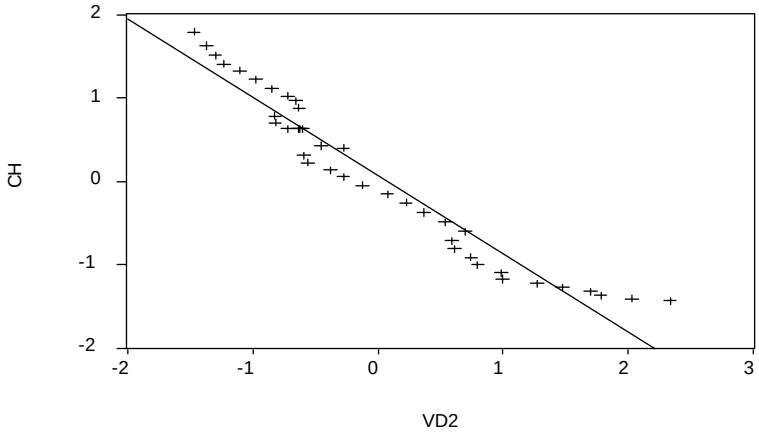
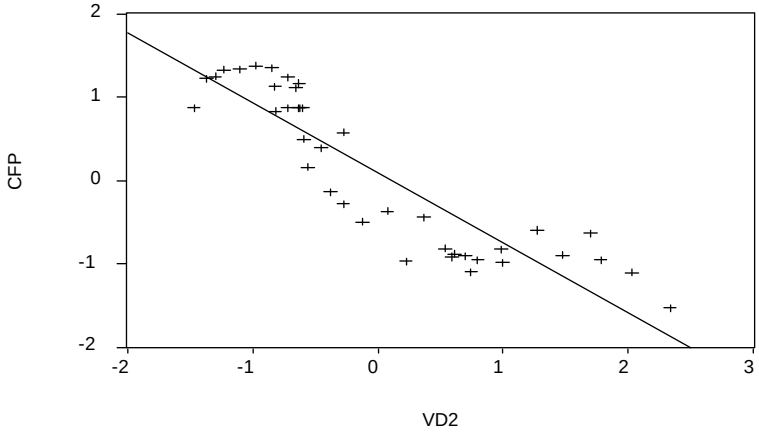


Chart 14



The two charts above show clearly that volatility of commercial bank interest rate spread (defined as **d2**) causes contraction of credit to households and private sector. Variance of interest rate spread creates uncertainty among households and private firms, thus affecting *their investment decisions*. In the setting of uncertainty households and pri vate firms are forced to resort to self finance.

5. Table of Models

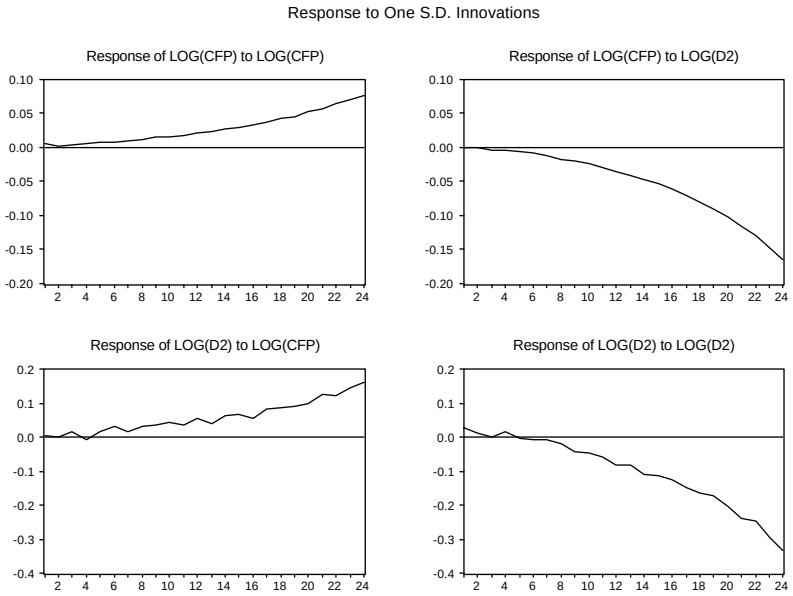
The table below summarizes the basic, tested VAR models. Vari ables are given in logarithms.

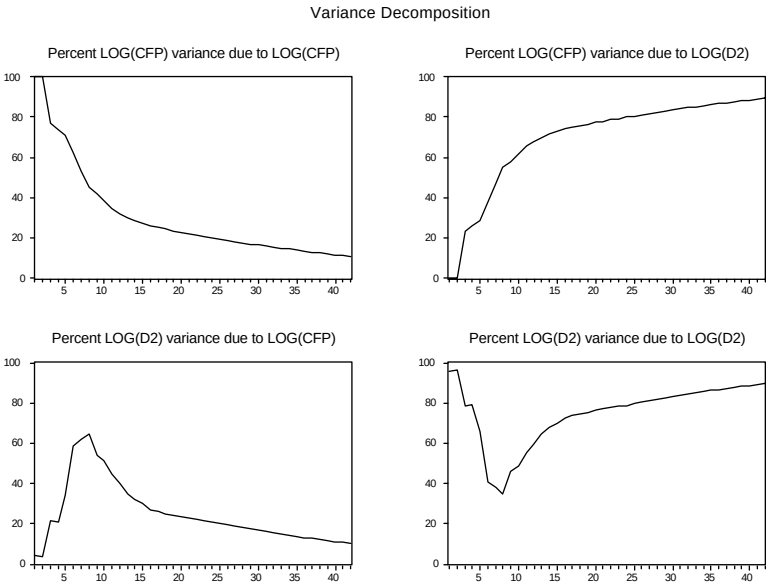
Table 2

	Dependent variable	Vector	Lags	R^2 adjusted	AIC	log likelihood
Model 1	CFP	(CFP, D2)	12	0.93	8.87	114.49
Model 2	CFG	(CFG, D2)	2	0.89	8.04	109.09
Model 3	CH	(CH, D2, E)	8	0.99	7.7	107.67
Model 4	i	(i, DG)	5	0.82	6.31	75.27
Model 5	ER	(ER, CF, CG)	4	0.93	8.81	127.61
Model 6	VDC	(VDC, VDG, VI)	6	0.87	16.38	307.71
Model 7	M3	(M3, DG, M0)	2	0.97	8.56	121.62
Model 8	NCF	(NCF, D2, DG)	2	0.94	4.08	31.83
Model 9	NCH	(NCH, D2, DG)	2	0.94	4.09	32.2

6. Variance Decomposition and Impulse Response Function for Different Models

Model 1





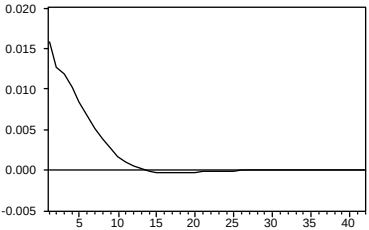
In Model 1 we measure the relation between credit to private firms and interest rate spread **d2** (the difference between interest rates on short term credits and interest rates on time deposits). The results from the model *confirm* the thesis for commercial bank credit rationing. Widening of the interest rate spread leads to contraction of credit to private firms, consistent with asymmetric information between firms and the banks. Commercial banks reduce credit to private firms due to insufficient information and the high cost of accessibility. Thus they solve the adverse selection problem, being unable to distinguish be tween 'good' and 'bad' borrowers.

The analysis based on *impulse response* shows that changes in inter est rate spread have a permanent effect on credit to private firms. The shock from widening of the interest rate spread does not subside over time and provokes a continuous decline of credit to the private sector. Concurrently, variance decomposition shows that 80% of variance of credit to the private sector is due to changes in the interest rate spread of commercial banks.

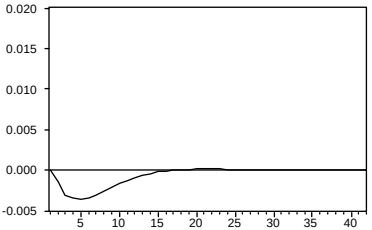
Model 2

Response to One S.D. Innovations

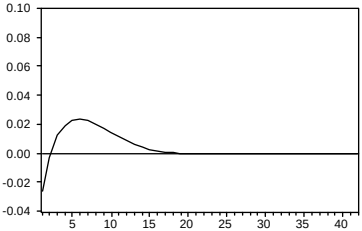
Response of LOG(CFG) to LOG(CFG)



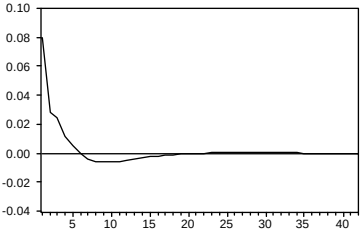
Response of LOG(CFG) to LOG(D2)



Response of LOG(D2) to LOG(CFG)

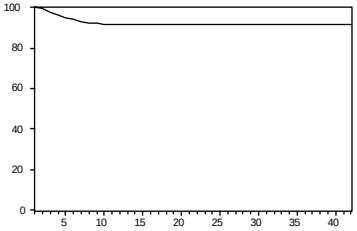


Response of LOG(D2) to LOG(D2)

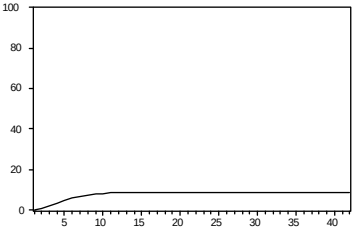


Variance Decomposition

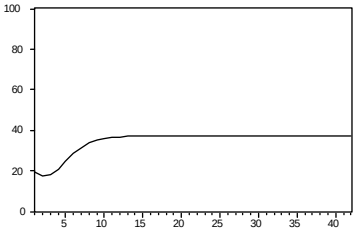
Percent LOG(CFG) variance due to LOG(CFG)



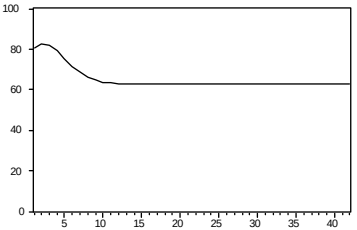
Percent LOG(CFG) variance due to LOG(D2)



Percent LOG(D2) variance due to LOG(CFG)



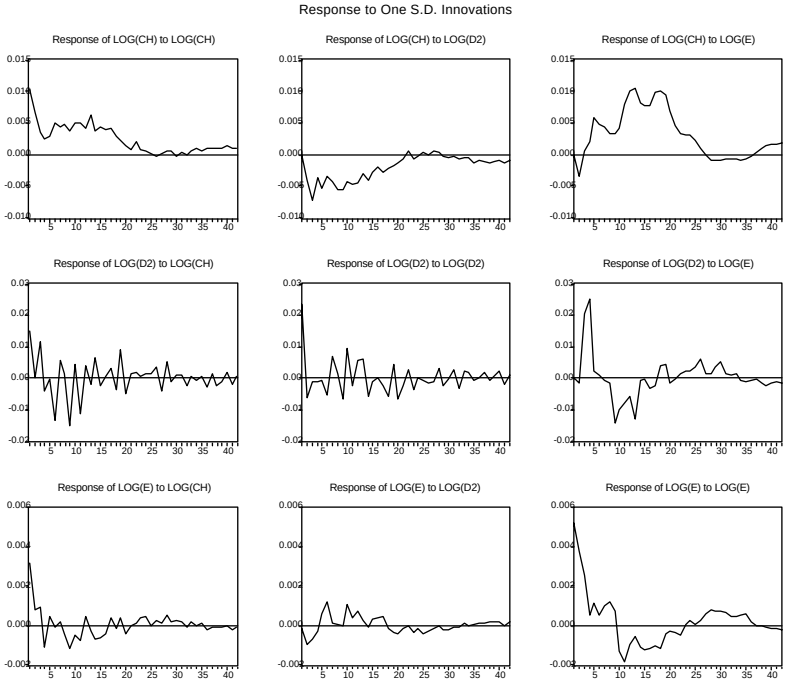
Percent LOG(D2) variance due to LOG(D2)

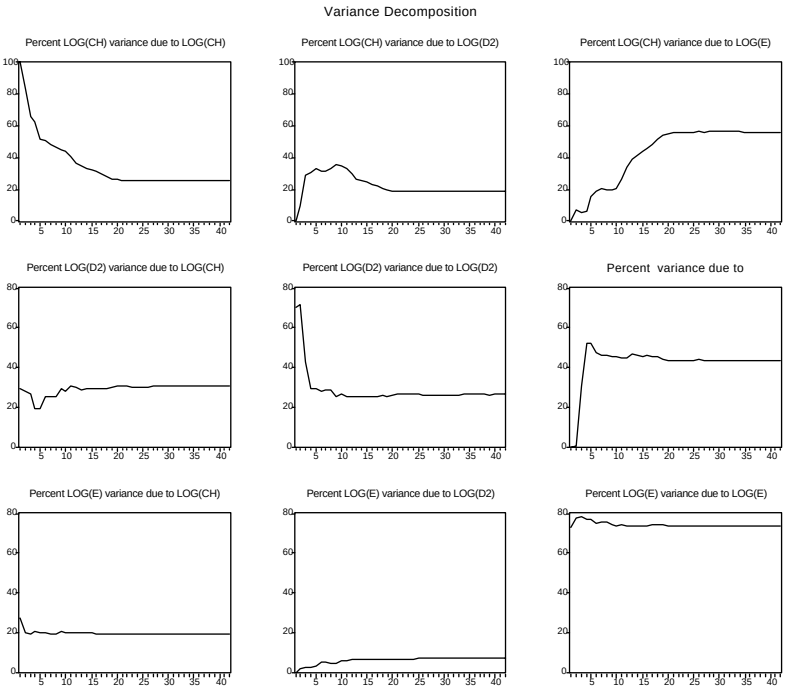


Testing the relation between credit to public sector firms and inter est differential **d2** *does not confirm* the thesis for commercial bank credit rationing to these firms. This is explained, to a great extent, by the fact that banks extend credits primarily to big state owned firms as they possess more information about them, consistent with established long term relationships. On the other hand, it is a well known fact that big firms are less sensitive to changes in interest rates than small ones.

The results from model 2 show that changes in the interest rate spread initially lead to a temporary reduction of credit to state owned firms. However, the effects of this shock subside fast afterward. Con currently, variance of credit to state owned firms is mainly accounted for by changes in credit to these firms over past periods (95% of vari ance), while changes in interest rate spread account for just 5% of vari ance.

Model 3



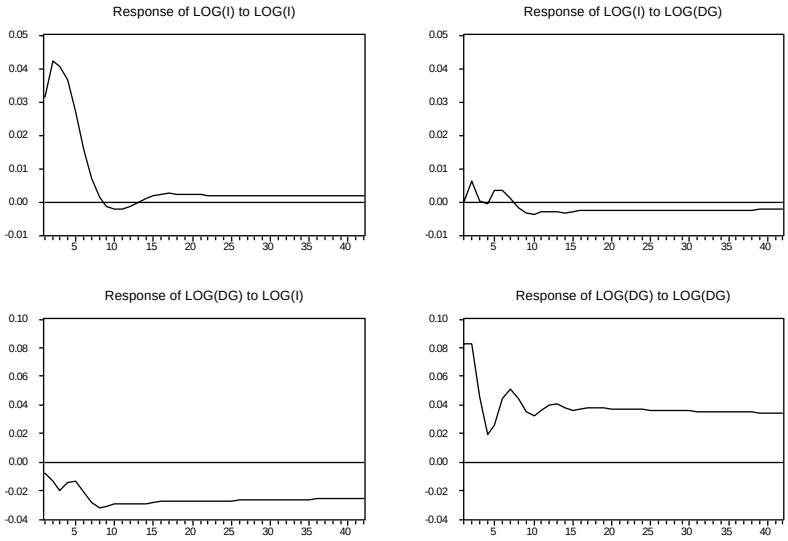


The results from model 3 show that widening of interest rate spread results in reduced credit to households. The effect of this shock is tem porary and subsides in four months. The BGL/USD exchange rate also affects credit to households and the initial impulse from an appreciat ing exchange rate results in credit reduction. This trend is quickly neu tralized and in two weeks the relation is already positive.

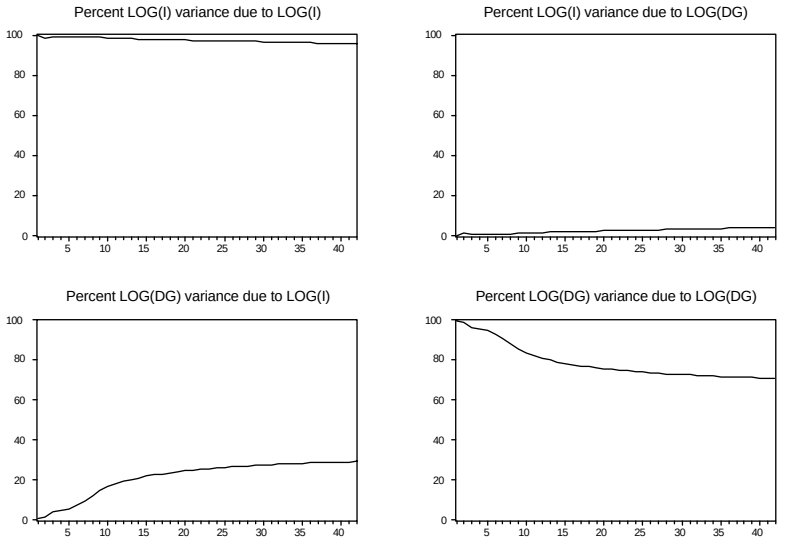
Variance of credit to households is primarily accounted for by the exchange rate (60%), which explains its decisive influence on house holds' expectations. The interest rate spread accounts for just 20% of the variance of credit to households. The strong impact of the BGL/USD exchange rate can be explained by the low interest rate spread between lev interest and interest on dollar denominated depos its, and reflects still unabated fear that the fixed rate might be aban doned. Moreover, with the bulk of trade flows being effected in US dollars the significance of currency risk is preserved.

Model 4

Response to One S.D. Innovations



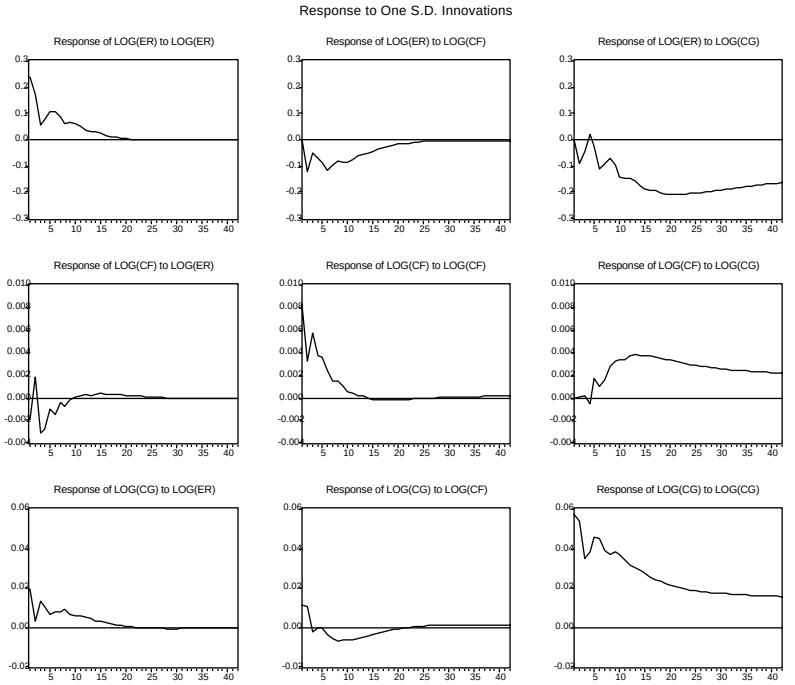
Variance Decomposition

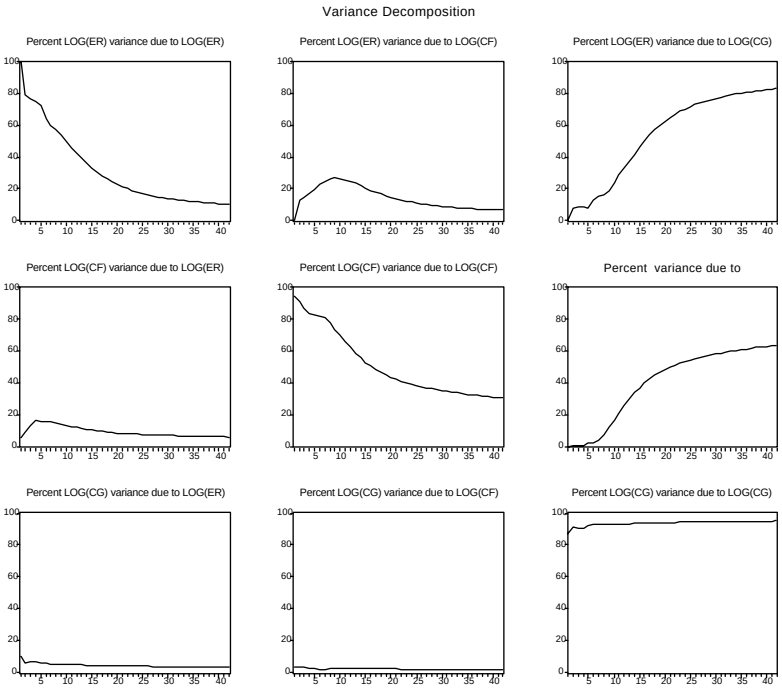


Model 4 examines the relationship between the interest rate and the government deposit at the Issue Department balance sheet. The results show that the initial impulse from increasing the government deposit leads to higher interest rate. This shock is rapidly offset, however; in practice the government deposit does not have a long term effect on the interest rate (the effect of monetary policy through the budget is insignificant). On the other hand, interest rate variance is accounted for only by changes in the interest rate in previous periods.

Actually, there exists a price mechanism whereby the government impacts reserve money. Maintaining an artificially low interest rate leads to reduced interest expenses on debt service and by increasing the government deposit at the Issue Department monetary constraints are further tightened.

Model 5





Model 5 examines the relationship between commercial bank ex cess reserves, credit to the government and credit to firms in the economy. The results confirm the thesis that an increase in excess re serves is accompanied by reduced credit to the government and firms. A difference appears in the effect of the impulse from increasing excess reserves. In terms of credit to firms it is only temporary, while in terms of credit to the government its effect is permanent. Excess reserve vari ance accounts for 80% of changes in credit to the government.

Model 6

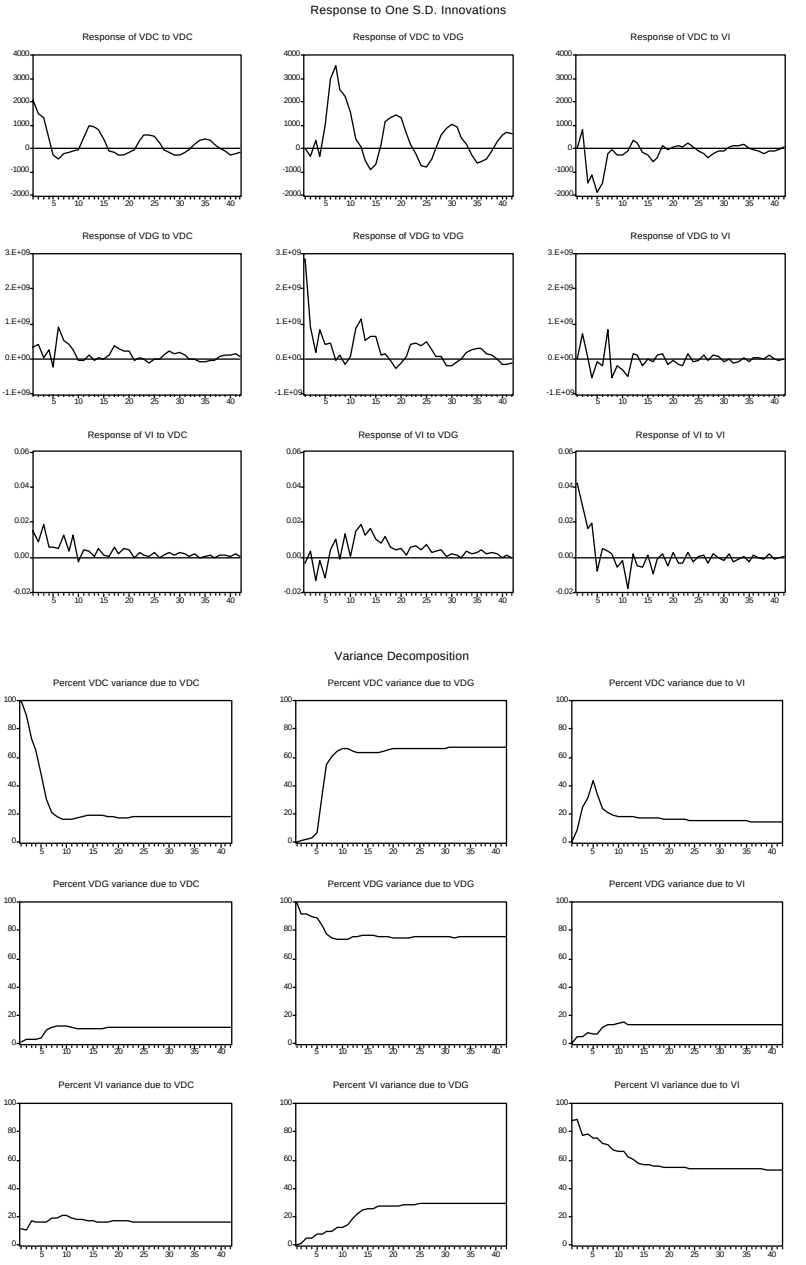
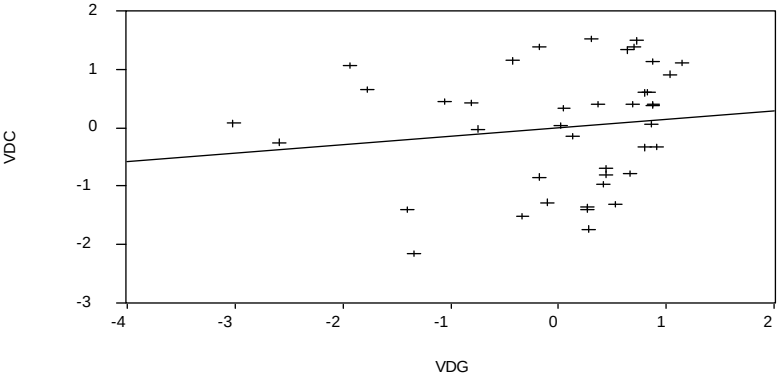
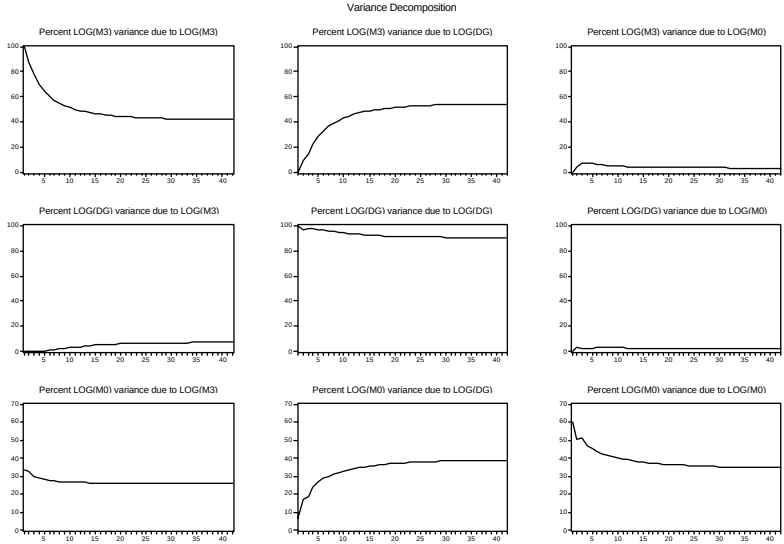

Response to One S.D. Innovations
Response of VDC to VDC
Response of VDC to VDG
Response of VDC to VI
Response of VDG to VDC
Response of VDG to VDG
Response of VDG to VI
Response of VI to VDC
Response of VI to VDG
Response of VI to VI
Variance Decomposition
Percent VDC variance due to VDC
Percent VDC variance due to VDG
Percent VDC variance due to VI
Percent VDG variance due to VDC
Percent VDG variance due to VDG
Percent VDG variance due to VI
Percent VI variance due to VDC
Percent VI variance due to VDG
Percent VI variance due to VI

Chart 15



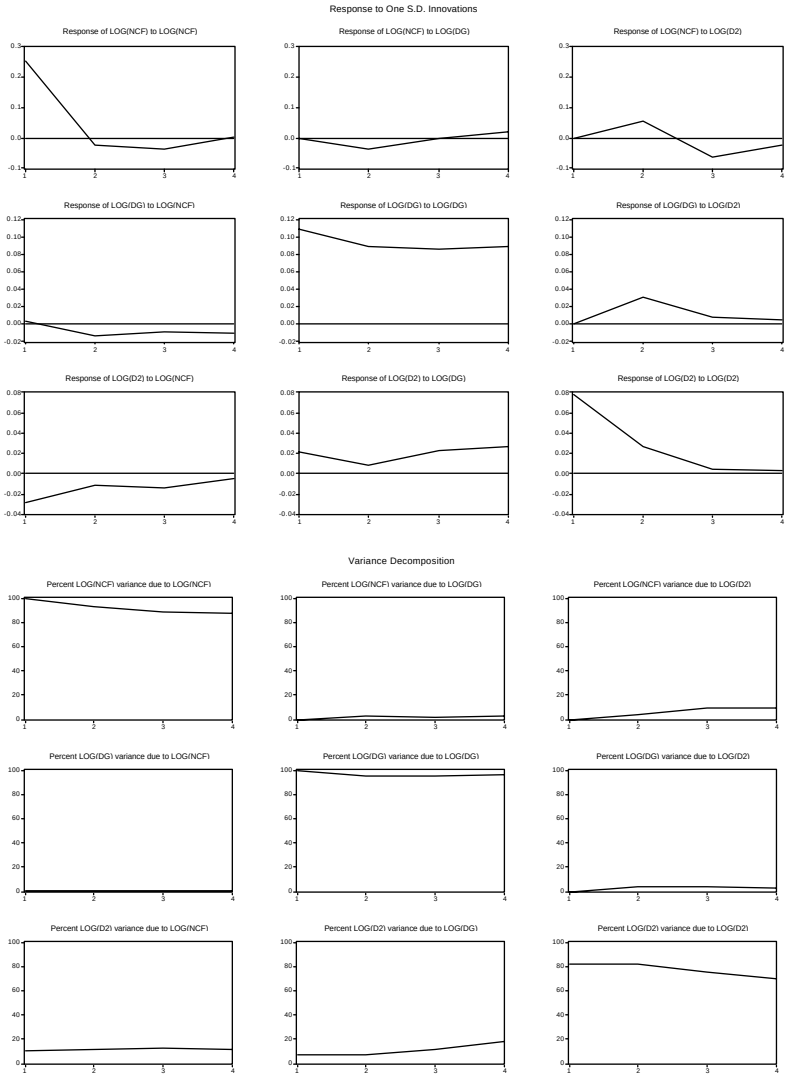
Model 6 examines the relationship between domestic credit vari ance, government deposit variance and interest rate variance. The re sults show that 60% of domestic credit variance is accounted for by government deposit variance. We discover a positive relationship be tween domestic credit variance and government deposit variance. Ac tually the government affects domestic credit through changes in its deposit at the Issue Department balance sheet, i.e. monetary policy is being conducted through this instrument.

Model 7

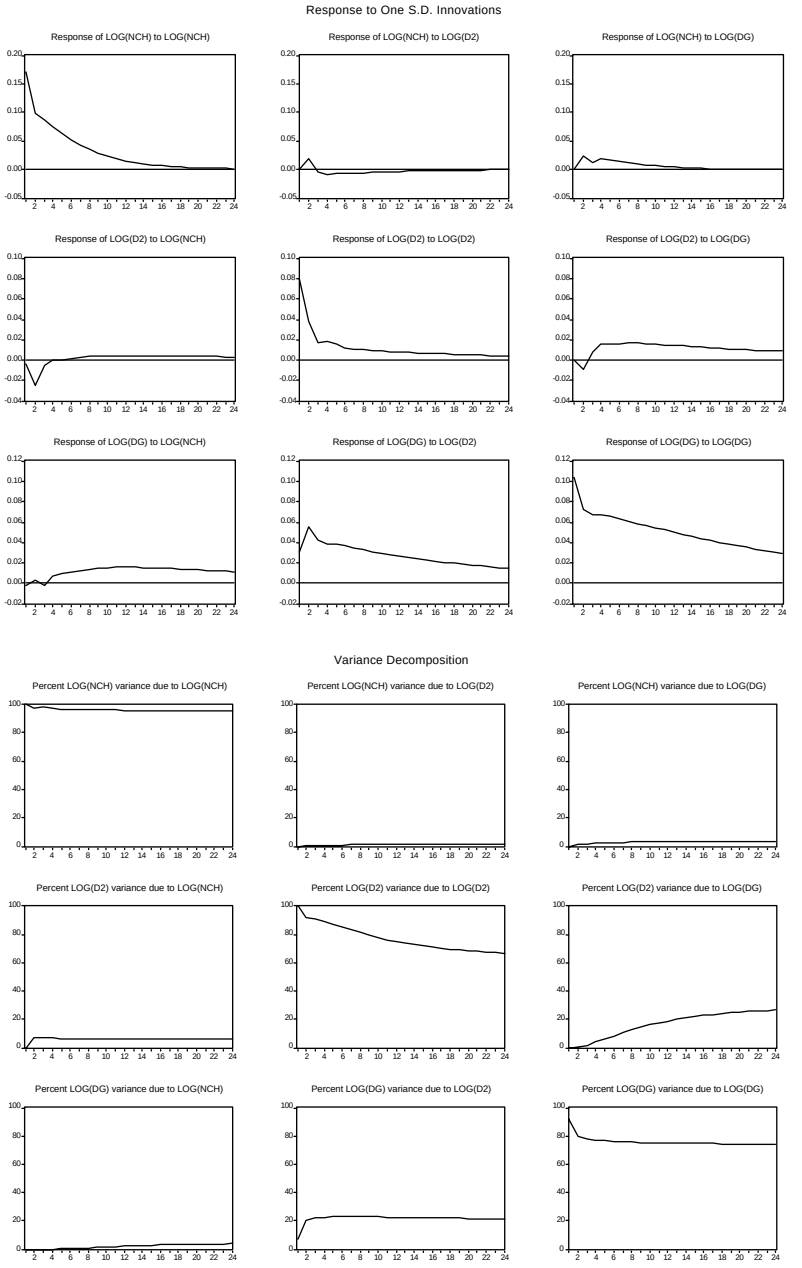


From model 7 it becomes clear that about 50% of broad money and monetary base variance is due to fluctuations in government deposit. Again this model confirms the thesis for the government's monetary policy (conscious or unconscious) being conducted through changes in its deposit at the Issue Department balance sheet.

Model 8



Model 9


Response to One S.D. Innovations
Response of LOG(NCH) to LOG(NCH)
Response of LOG(NCH) to LOG(D2)
Response of LOG(NCH) to LOG(DG)
Response of LOG(D2) to LOG(NCH)
Response of LOG(D2) to LOG(D2)
Response of LOG(D2) to LOG(DG)
Response of LOG(DG) to LOG(NCH)
Response of LOG(DG) to LOG(D2)
Response of LOG(DG) to LOG(DG)
Variance Decomposition
Percent LOG(NCH) variance due to LOG(NCH)
Percent LOG(NCH) variance due to LOG(D2)
Percent LOG(NCH) variance due to LOG(DG)
Percent LOG(D2) variance due to LOG(NCH)
Percent LOG(D2) variance due to LOG(D2)
Percent LOG(D2) variance due to LOG(DG)
Percent LOG(DG) variance due to LOG(NCH)
Percent LOG(DG) variance due to LOG(D2)
Percent LOG(DG) variance due to LOG(DG)

Models 8 and 9 test the relationship between *newly extended* credits to private firms and households, the government deposit (as an ap proximation of monetary restriction) and the interest rate differential (as an approximation of credit rationing).

By using newly extended credits repayment of credits to commer cial banks is not taken into account. It is assumed that this model can also incorporate well the effects of the interest rate and the government deposit. The results show that increasing the government deposit ini tially causes a reduction of newly extended credits to private firms but this impulse rapidly subsides and its trend changes over three periods' time.

On the other hand, the government deposit has no effect on credit to households. Measuring the response of newly extended credits to in terest rate differential **d2** does not confirm the thesis for credit ration ing to firms and households. This is explained by the fact that commer cial banks can gather better information about households, on the one hand, and in case of default on the credit the procedure for collateral realization is fast. The variance of newly extended credits to private firms and households is entirely accounted for by the past values of these variables, indicating the model's *restrictive* character by using only newly extended credits (because it does not incorporate the effect of repaid old credits).

IV. Theoretical Conclusions and Practical Recommendations

The results from the study lead to a number of theoretical conclu sions and practical recommendations designed *to improve* the opera tion of the Bulgarian currency board, making its modus operandi more transparent and based on simplified rules.

Within the Bulgarian model of currency board, there exists a *spe cific form of financial repression*. Major instruments of this repression are the government deposit within the Issue Department liabilities, commercial bank minimum reserve requirements and the existence of base interest rate.

Changes in government deposit affect money supply through re serve money. These changes can be interpreted as an indicator of quasi monetary policy under currency board arrangement. An increase in this deposit causes contraction of the monetary base and is con ceived as a specific form of monetary restriction.

Fluctuations in government deposit also influence commercial bank lending behavior through traditional channels of asymmetric informa

tion and credit rationing. Private firms are most seriously affected by credit rationing. This confirms the existence of a credit channel within the monetary transmission mechanism.

Retention of *the base interest rate*[12] (Article 35 of the Law on the BNB) and the way of its setting violate the principal requirement of the currency board for market flexibility of interest rates. With interest rates below natural levels (induced by preference to saving and investment), the traditional mechanism of financial repression in the meaning of McKinnon Shaw is derived. Availability of a base interest rate under a fixed exchange rate constitutes a *de facto* second nominal anchor which makes the economic structure *over identified* without equilibrium solution.

Minimum reserve requirements, whose setting is left within BNB powers, are the *third* major instrument inducing distortions in the money market and the banking system.

Possibilities exist for the currency board operation to be improved.

With regard to *government deposit*, two alternative solutions are possible. The first is for the government to abandon money supply regulation[13] by withdrawing its deposit from the liabilities of the Issue Department, to be deposited with commercial banks. The second is for the government deposit to be separated in an independent institution. This way the currency board will be released from atypical functions and money supply will become transparent and automatic. The assets of the Issue Department will include net foreign assets, and within the liabilities will remain only currency in circulation (consistent with currency board underlying principles).

The switch of government deposit to *commercial banks* would shift the effects of government deposit on money supply from reserve money to money multiplier. The impact through the multiplier will depend on commercial bank behavior (particularly on assets in which government funds will be invested), as well as on the public propensity to hold banknotes. Anyway, the deposit's influence will be based on market principles, will reflect commercial bank behavioral preferences

[12] See footnote 10.

[13] In actual fact monetary policy will always exist in one form or another, while the currency issuer is a monopolist. Monetary policy may be based on discretion or rules, consciously constructed or being partially spontaneous but it will never be able to solve the problem of the optimal quantity of money meeting the spontaneously arising demand for money.

and will depend on the state of the credit and interbank money mar kets[14].

If government fund management is framed into a *separate institu tion*, to be governed by general rules applicable to commercial banks, the government would be facilitated in managing its own funds. Thus the government will be put on an equal footing with other financial in stitutions and will have to follow more closely market behavior.

The second principal recommendation that should be discussed is the *elimination* of commercial bank reserve requirements with the BNB. This way the *banks themselves* will determine the level of re serves with the central bank necessary for settlement. This would be in line with modern trends of liberalizing financial relations and banking. It is possible to switch to liquidity requirements as in Argentina, or at worst, reserves may accrue interest equal to the interest accrued on funds attracted in the interbank market.

The third suggestion concerns the abolition of the *base interest rate*. This issue has been discussed from the outset of currency board opera tion. Despite some technical arguments for the retention of the base interest rate voiced by the BNB, the effects of its elimination would be much more beneficial for the economy. Some countries with currency boards (Estonia, Argentina) do not announce base interest rates.

Finally, above three improvements would make the banking system more efficient and stable, contributing to greater transparency and au tomation in currency board operation. This would facilitate money sup ply adaptation to money demand and would help 'touch' the optimum quantity of money needed for growth, opening room to reduce credit rationing and asymmetric information in the credit market. Relations between the central bank, commercial banks and the state budget will be put on a market basis and their efficiency will be judged by their fund management abilities.

[14] At this point one may formulate the argument that by going to commercial banks the government's funds will increase money supply and a portion of these funds will flow back to the balance sheet of the Issue Department in the form of larger reserve requirements. The second part of this argument would be irrelevant once reserve requirements are eliminated.

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Two Approaches to Fixed Exchange Rate Crises

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Abstract. This paper presents two approaches to the analysis of fixed exchange rate crises. The first is dubbed monetary or canonical and considers a fixed exchange rate crisis as triggered by money market imbalances and imitative behavioral dynamics of the public, firms and banks. The second is more widely applied as it builds on the construction of a system of indicators for early warning and is based on a synthetic index of uncertainty. The two approaches summarize major contributions in the sizeable volume of literature on fixed exchange rate crises as well as some specific conclusions of the authors prompted by Bulgaria's experience with a fixed exchange rate under a currency board arrangement. The two approaches have been applied to Bulgaria in the wake of currency board introduction. Literature on attacks on fixed exchange rates is presented in two extensive appendices. The first appendix reviews the contagion model under currency panic, and the second describes possible early warning indicators applied to countries having opted for a fixed-exchange-rate stabilization.

Резюме. В настоящото изследване са предложени два подхода към анализа на кризата на фиксираните курсове. Първият е наречен паричен, или каноничен, и разглежда кризата на фиксирания курс като резултат от неравновесията на паричния пазар и имитационната поведенческа динамика на населението, фирмите и банките. Вторият е по-приложен и се основава на изграждане на система от индикатори за ранно предупреждение и базиран на тях синтетичен индекс на несигурност. Двата подхода обобщават както основните постижения на многобройната литература, посветена на кризите на фиксираните курсове, така и определени собствени изводи, предизвикани от практиката на фиксирания курс при паричния съвет в България. Представените подходи са приложени за България след въвеждането на паричен съвет. В трите обширни приложения е обобщена литературата по проблемите на атаките срещу фиксираните курсове. Първото приложение представя еволюцията на тези модели. Във второто е разгледан моделът на „зараза" при валутна паника, а в третото са описани възможните индикатори за ранно предупреждение, прилагани към страни, избрали стабилизация на базата на фиксиран курс.

Contents

Le matin du 16 avril le docteur Bernard Rieux sortit de son cabinet et buta sur un rat mort, au milieu du palier. Sur le moment il écarta la bête sans y prendre garde et descendit l'escalier. Mais, arrivé dans la rue, la penseé lui vint que ce rat n'était pas à sa place et il retourna sur ses pas pour avertir le concierge[1] *.*

Camus, La peste, 1947, ed. 1997, Gallimard, p. 15

La mort du concierge, il est possible de le dire, marqua la fin de cette période remplie de signes déconcertants et le début d'une autre, relativement plus difficile, où la surprise des premiers temps se transforma peu à peu en panique[2] *.*

Camus, La peste, 1947, ed. 1997, Gallimard, p. 28

I. Objects of the Study and Methodology

The literature on fixed exchange rate attacks has grown tremendously in recent years. While publications tend to be standardized, it is difficult to single out a specific contribution. This imitative dynamics amongst economists was prompted by the problems of countries implementing exchange-rate-based stabilization programs, as well as by the magnitude of financial crises in emerging markets.

In this paper we rather eschew traditional presentation of speculative attacks on fixed exchange rates as first and second generation models. We have prepared a special appendix for Bulgarian readers. We see *our contribution* in the following: presentation of a monetary model of attack and defense against a fixed exchange rate under a currency board arrangement, emphasis on imitative currency crisis (appendix 1), construction of a system of indicators and a synthetic indicator of uncertainty, in particular application of this methodology to Bulgarian conditions. A detailed description of the system of possible indicators for observation of fixed exchange rate stability is presented in appendix 2.

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[1] *16 April in the morning, on the way out of his cabinet, Dr Bernard Rieux came across a dead rat in the middle of the stairs. The next instant he got it out of his way without giving a second thought and went down the stairs. But as he went out into the street, a thought occurred to him that the rat was not on the right place and he returned to warn the janitor.* ***(Camus. The Plague, 1947, p. 15.)***

[2] *The janitor's death put an end to the period full of contradictory signs and marked the beginning of another, harder one where initial surprise turned little by little into panic.* ***(Camus. The Plague, p. 28.)***

First of all we would like to emphasize the great difficulty of predicting a fixed exchange rate crisis in a specific country.

This can be explained by two peculiarities. *First*, besides fundamental causes of a crisis (which can be approximated with the so-called early warning indicators) there exist domestic imbalances and shocks which provoke a systemic collapse. *Second*, once triggered, the fixed exchange rate crisis follows an imitative multiple equilibria dynamics whereby information is transmitted through panic participants. Monetary authorities' reactions in defending the exchange rate depend not only on economic factors but on political factors as well.

It is assumed that the *currency board* imposes an additional limitation on the fixed exchange rate arrangement. It is expressed in money supply automation and the absence of an alternative for sterilization, that is substitution of external for internal sources of reserve money and vice versa. While this makes the budget the center of fiscal power, it provides options to conduct quasi-monetary policy as well.

It is critical to construct crises response and management program. Exit strategies for fixed exchange rate attack still need be explored and summarized (Eichengreen, B., P. Masson, 1998).

In the spirit of *Lucas critique* (1976), we focus on another specific aspect: constructing a *system of early warning indicators* and its publicizing lessens its efficiency (because once made known to economic agents, it causes changes in their behavior)[3].

Attack on a fixed exchange rate is largely unpredictable. Once started, panic follows its contagious dynamics. The 'contagious' effect is stopped by external constraints or by the process itself. The form of this dynamics has not yet been fully explored – it may be both random (sensitive to initial conditions/fundamentals and self-fulfilling), and stochastic. In both cases, however, the period of *predicting is limited*.

II. The Canonical Monetary Model of an Attack on a Fixed Exchange Rate under a Currency Board

Currency crisis mechanics can be described in different ways (Krugman, P., 1979, Azariadis, C., 1981, Azariadis, C., R. Guesnerie, 1982, Flood, R., P. Garber, 1984, Grilli, V., 1990, Goldberg, L., 1991,

[3] *The market, taking into account these indicators' dynamics and the risk of a currency crisis induced by a change in economic agents' behavior, would accelerate the crisis. On the other hand, authorities would take actions to prevent a currency crisis. Changes occur both in terms of attack and defense of the fixed exchange rate.*

Miller, V., 1996, 1996a, Obstfeld, M., 1994, 1996, Velasco, A., 1996, Claessens, S., 1991, Flood, R., N. Marion, 1998).

We have restricted ourselves to the following basic assumption: *attack on a fixed exchange rate is triggered by imbalances between reserve money demand and supply*. The latter incorporates all shocks and imbalances spilling over from other markets. The reserve money market can be described as the clash between the *attack* (***A***), concentrated in the demand for reserve money, and the *defense* (***D***), induced by reserve money supply and monetary authorities' decisions.

Attack

Initially an attack is launched by the public and businesses, then spills over to the banking system and ultimately to the currency board. The public converts its deposits into banknotes (an element of reserve money) and subsequently into the reserve currency. Demand for banknotes and foreign currency will invariably pass through the imitative dynamics of panic which incorporates individuals' expectations.

Individual behavior is determined by its intertemporal utility function which is strongly dependent on anticipations of devaluation.

$$U_P = U(c_t, m_t) + \phi\, U(c_{t+1}, m_{t+1}) + \phi^2\, U(c_{t+2}, m_{t+2}) + \ldots + \phi^h\, U(c_{t+h}, m_{t+h})$$

$$m_t = m_t\, [E_t(e_{t+1}) - e_t]$$

$\phi < 1$ – discount factor,

where c is consumption, m is money stock of the public, a function of expected devaluation of the exchange rate $[E_t(e_{t+1}) - e_t]$.

Furthermore, the attack incorporates *bank* behavior and the banking crisis. Banks have to optimize intertemporally their profits π and reserves R_t (an element of reserve money). The utility function takes the form:

$$U_b = U(\pi_t, R_t) + \psi\, U(\pi_{t+1}, R_{t+1}) + \psi^2\, U(\pi_{t+2}, R_{t+2}) + \ldots + \psi^m\, U(\pi_{t+m}, R_{t+m})$$

$\psi < 1$ – discount factor.

As a whole, the attack is *endogenous* and is determined by the interacting behavior of the public, companies and commercial banks. Panic, being a collective mass process, is included in the dynamics of the attack. *The attack is concentrated on the demand for reserve money*, in particular *the gap between demand for and supply of reserve money*.

Contagion

Before proceeding to fixed exchange rate defense we will outline the root sources of panic (in this case currency) which forms an integral part of the attack on the fixed level. It poses specific requirements to its defense.

Whether starting unexpectedly or not, the attack on a fixed exchange rate enters a panic path. *Panic* is a mass behavioral process which is well studied by cognitive sciences (Le Bon, G., 1895, Tard, G., 1890, Blumer, H., 1951, Moskovici, S., 1981, etc.). Recently it has attracted economists' attention (Banerjee, A., 1992, 1993, Topol, R., 1991, Orléan, A., 1990, 1992, 1993, Guttentag, J., R. Herring, 1986, Shiller, 1986, Torjman, 1997)[4].

Imitation or mimetic behavior is at the heart of human activity. This basic assumption of Girard, R. (1972) helps to explore panic dynamics. Imitation and conformism form the crowd or 'herd bahavior' (term of Banerjee, A., 1992). Everyone does what the others do even when one's own information suggests the contrary. The object on which individual reactions are focused becomes more valuable when it is desired by everyone else.

This is a new variety of rationality (Bayesian rationality[5]) assuming that the person who is being imitated is in possession of information which you do not possess. From an individual point of view, it is optimal to join the 'herd'. Thus multiple equilibria dynamics is formed. In equilibria agents follow other signals even if they are unsure about their reliability. Banerjee, A. (1993) shows that mechanisms of constraint need be found at the break-even point to make people follow their own information, otherwise there exist external negative information effects which precipitate welfare reduction. Ignoring one's own information has an additional externalizing effect on subsequent participants in the process of contagion. If everyone chooses one's own signal, this would encourage the others to follow him.

At the time of panic *rumors* spread, a specific form of information transmission mechanism. The probability to succumb to rumors is an increasing function of the number of persons having succumbed to them.

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[4] *See also the detailed description of the psychological basis of systemic financial crises in Nenovsky, N. Systemic Financial Crises, BNB Monthly Bulletin, issue 3, 1997.*

[5] *The term 'Bayesian rationality' is derived from Bayesian statistics, a branch of applied statistics based on analysis of conditional aposteriori probability capturing apriori information (see Wonnacott, R., T. Wonnacott, 1985).*

The attack on a fixed exchange rate is a special case of a mass behavioral process of panic. This attack is self-fulfilling. The level of the exchange rate to be predicted by agents is the result of their joint actions. The state of complete uncertainty, when agents cannot or have partial knowledge of the actual level of the exchange rate, results in imitative behavior. The subsequent result is a new type of convention and a new level of the exchange rate.

Defense

Defense is largely static and exogenously set (this is particularly true for a currency board because there is no possibility for response).

Reserve money supply is determined by the dynamics in the structure of the currency board balance sheet and mostly by foreign exchange movements (i.e. balance of payments). The only behavioral element stems from the government which has to minimize the selected loss function[6], a result of the utility function of the government, trading off between loss of confidence and the need of flexibility.

The *utility function* of the government is:

$U_G = U_G$ [confidence (approximated with the fixed exchange rate), flexibility]

The loss function of the government to be minimized by it is:

$$L = (a/2)(e - e^*)^2 + (b/2)(f - f^*)^2 + (c/2)(y - y^*)^2 + Cost\ [(e^e - e)/e]$$

where:

e is the current level of the exchange rate;

e^* is the fixed level of the exchange rate;

f is the current level of international reserves;

f^* is the desirable level of international reserves by monetary authorities;

y is the current level of income;

y^* is the potential level of income;

$cost\ [(e^e - e)/e]$ are expenses incurred by the government on abandoning the fixed exchange rate;

a, b, c are the weights selected by the government and reflecting its preferences in terms of deviations of listed variables from their desirable levels.

[6] *The loss function is employed to express public preferences for major macroeconomic variables. It is based on the understanding that the central bank strives to achieve optimal levels of major macroeconomic indicators through its policy from a public point of view. The loss function shows loss of public welfare due to deviation of certain variables from their desirable levels (see Walsh, C., 1998).*

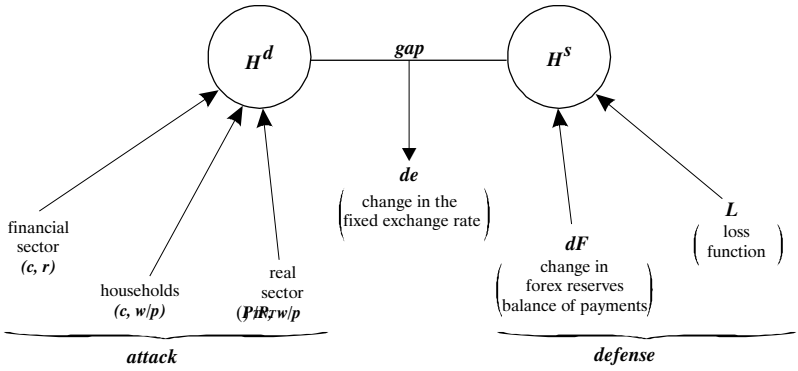
The probability of an exchange rate crisis is a function of the imbalance between demand for and supply of reserve money. Thus an exchange rate crisis and the probability of an attack can be interpreted as a result of uncooperative game between attack and defense or supergame with training[7]. *Uncertainty and asymmetric information* underlie the clash between attackers and defenders. Uncertainty arises both in terms of reserve money demand and supply and the loss function (it is not known for how long the government will defend the exchange rate)[8].

Diagram

Chart 1 outlines a speculative attack on a fixed exchange rate arising from the gap in the reserve money market.

Chart 1

MODEL OF AN ATTACK ON A FIXED EXCHANGE RATE THROUGH THE GAP IN THE RESERVE MONEY MARKET



c is the *banknotes and coins in circulation/deposits* ratio;

r is the *CB reserves/deposits* ratio;

w/p is the real wage;

P_T/P_{NT} is the ratio between prices of international tradable goods and prices of nontradable goods in international markets.

[7] *Supergame with training means a dynamic, recurring uncooperative play as a result of which individual rationality of players make them to cooperate, to adopt a common strategy (see Guerrin, B., 1997).*

[8] *The contagious dynamics of currency panic and spreading rumors reflect the necessity of monetary authorities' information policy and the need of destroying harmful information.*

We can approximate the attack with ***dg***, i.e. the change in the gap between demand for and supply of reserve money, and defense with the change in forex reserves ***dF***. The probability of an attack on the exchange rate is p_g, and the probability of a defense of the exchange rate is p_F. Then the total probability of attack and defense of the exchange rate is:

$$p = p_g dg + p_F dF$$

The derivative ***dg/dF*** is a specific indicator of the stability of the fixed exchange rate. It should tend to unity. There exists a critical threshold in the direction above the bisector in the area of equilibrium ***(dg, dF)*** at which an attack on the exchange rate actually occurs whereas the defense is unable to sustain the level of the exchange rate.

The Model

Before we proceed to empirically testing for reserve money demand and supply, we will present a *generalized theoretical model* which, in our opinion, embodies separate behavioral paths. We do not measure behavioral processes separately (they interact) because the whole set of information on their dynamics is *concentrated in* reserve money demand and supply.

The model can be defined using the following system of equations:

(1) $(H/P)^d_t = \alpha_1 y_t^{\alpha 2} i_t^{-\alpha 3} [E_t(e_{t+1}) - e_t]^{-\alpha 4} e^{\varepsilon t}$

(2) $H^s_t = F_t - G_t - B_t = \beta_1 r^{\beta 2} c^{\beta 3}$

$r = R/D,\ c = C/D$

(3) $r = r\,(r^d - r)$

(4) $c = \hat{c} + \rho(F),\ \ \rho(F) \geq 0$

(5) $P_t = Q_t^{\lambda} (Q_t * e_t)^{(1-\lambda)}$

(6) $\lambda = (X+M)/Y$

(7) $i_t = i_t^* + [E_t(e_{t+1}) - e_t]$

(8) $g = (H/P)^d_t - (H/P)^s_t$

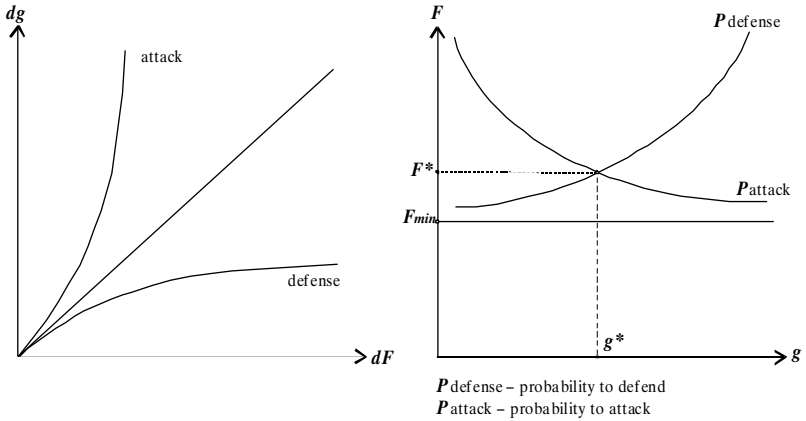
(9) $dg(t)/g(t) = \mu dt + \sigma_m dz_m(t)$

(10) $\hat{e} = \hat{e}\ (dg/dt)$

(11) $Pb(de/e) = Pb(\hat{e})$

Equation (1) is the function of real demand for reserve money $(H/P)^d_t$, where ***y*** is approximator of the real sector, ***i*** is the interest rate, $[E_t(e_{t+1}) - e_t]$ is the anticipated devaluation of the fixed exchange rate

Chart 1a



e, and ***P*** is the price index. Equation (2) features reserve money supply H^s, which can be viewed as accounting identity (reserve money is defined as the difference between currency board assets and government and banking department deposits, ***F*** are foreign exchange reserves of the issue department, ***C*** is currency in circulation, ***R*** are commercial bank reserves, ***G*** is the government deposit at the Issue Department balance sheet, and ***B*** is the deposit of the Banking Department. Equation (2) can be featured as a function incorporating individual and banks' behavior which depend on the commercial bank *reserves/deposits* ratio ***r*** and the public's propensity to hold banknotes, i. e. the *banknotes/deposits* ratio ***c***. Commercial banks accomodate changes in the *reserves/deposits* ratio by trying to direct it to the level desired by them r^d (3). Propensity to hold banknotes ***c*** is described in (4), where $\hat{c}$ is the long-term trend, and $\rho(F)$ is an increase in the *banknotes/deposits* ratio before the attack as an increasing function of the volume of issue department foreign exchange reserves ***F***. The price index is a weighted average of the prices of nontradables ***Q*** whose share is λ, and tradables with a share of $(1-\lambda)$. Prices of nontradables are multiplied by the exchange rate at direct quotation (5). The weight λ is the proportion of the sum of exports ***X*** and imports ***M***, divided by the gross domestic product ***Y*** (6). Equation (7) features uncovered interest-rate parity, where ***i*** is the domestic interest rate, ***i**** is an exogenously set interest rate abroad, and $[E_t(e_{t+1}) - e_t]$ is the level of anticipated devaluation of the national currency.

Equation (8) is *basic* in the model. It shows the gap between reserve money demand and supply, i. e. the deficit or surplus of 'central' (reserve money) liquidity in the economy. Its behavior is described by a process of diffusion in (9) (a constant process, an analogue of random walk). Its second part contains a Vinerian process thus synthesizing uncertainty in the money market. In (10) the shadow exchange rate $\hat{e}$ is defined as the level of the exchange rate after the attack on the fixed exchange rate. This level is a function of the money market gap. The conditional probability of a speculative attack depends on the level of the shadow exchange rate (11).

Empirical Test

To study the gap dynamics in the reserve money market, we first estimate the *demand for reserve money.*

Different approximators of transaction variables were used in the equations: households' incomes and expenses and wages.

The model employs monthly data for the period starting after currency board introduction in July 1997 till October 1998.

The equation below has the best specifications:

$$dlog(H/P)^d_t = \underset{(0.29)}{0.01} - \underset{(-1.59)}{0.24}\, dlog\,(H/P)_{t-1} + \underset{(4.83)}{1.23}\, dlog\,(W/P)_t + \underset{(3.22)}{3.5}\, dlog\,(e)_t + MA\,(1) + MA\,(2)$$

$$R^2 = 0.85 \quad R^2_{adj} = 0.74 \quad DW = 2.1 \quad F = 0.008,$$

where variables are:

H – reserve money;

P – consumer price index;

W – average monthly wage;

e – average monthly exchange rate of the lev against the US dollar.

Chart 2 shows the dynamics of the observed and generated value of reserve money from the above equation.

Let us denote the generated series of reserve money demand with h^d, and supply, which is set by the Issue Department balance sheet, with h^s.

The difference between the two is just what we are interested in – the gap:

$$g = h^d - h^s.$$

Its dynamics is featured on Chart 3 where the zero line shows reserve money market equilibrium. Its volatility is also evident from its statistical distribution (Chart 4).

Chart 2

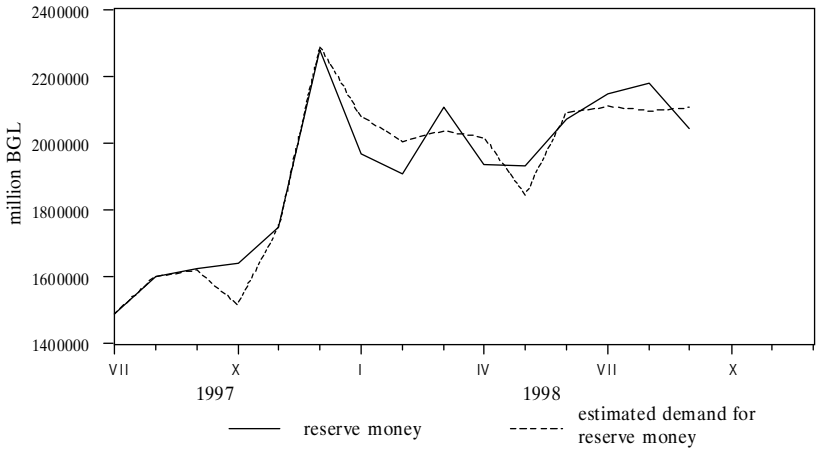


Chart 3

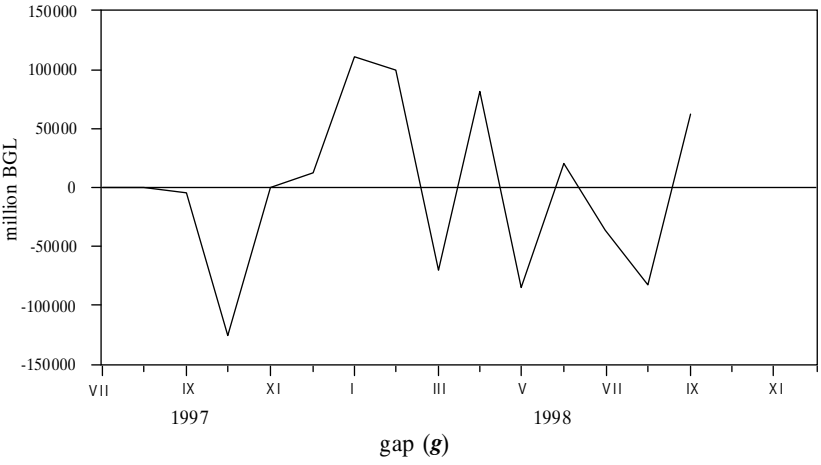
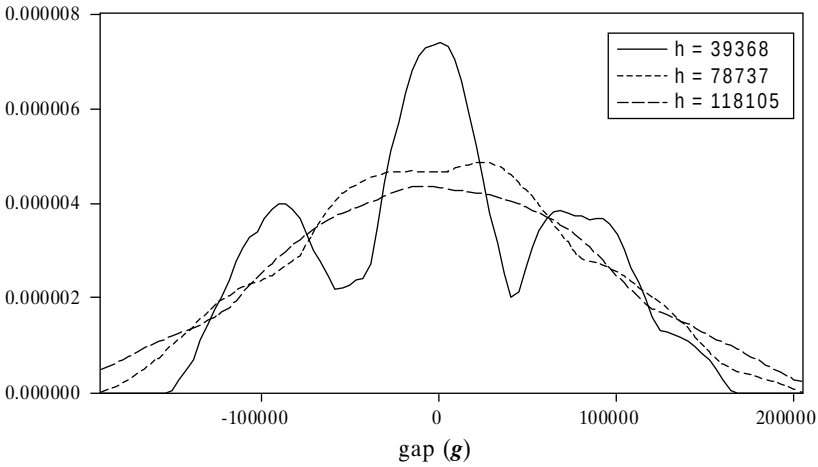


Chart 4

KERNEL DENSITY



The 'peaks' of distribution show several equilibrium positions around which the market oscillates. This is typical of the volatility of multiple equilibria dynamics when a given variable's behavior leaves its fundamental factors and is based on imitation of economic agents. The theoretical basis for such dynamics is presented in appendix 1.

III. The Indicator Approach to Speculative Attacks on Fixed Exchange Rates

There are two basic methodological interpretations of the indicator approach. The first uses the deviation between indicators' values immediately before an attack is launched in a period of tranquility to estimate the probability of a speculative attack. In the second one indicators are independent variables in probit and logit models to assess the probability of a speculative attack.

Kaminsky and Reinhart seminal study (1997) lists indicators employed in the models of different authors. Depending on the results displayed by a specific indicator, it is estimated based on the proportion between the number of studies in which it was used and the statistically significant results displayed.

As we have already used some of these indicators in other studies

on Bulgaria, here we concentrate on the probit model with monthly data (Nenovsky, N., K. Hristov, 1998, Yotzov, V., N. Nenovsky, K. Hristov, I. Petrova, B. Petrov, 1998).

Defining the Concept of a Speculative Attack

A speculative attack is a more general concept than a currency crisis since it occurs if there is a successful speculative attack followed by depreciation of the national currency. Reversely, if the speculative attack is unsuccessful and no devaluation occurs, but there is a massive loss of central bank foreign exchange reserves or a dramatic increase in interest rates (both in support of the exchange rate), a currency crisis is in place.

Therefore, to define the term speculative attack or pressure it is necessary to take into account changes both in the levels of the exchange rate and foreign exchange reserves of the central bank (Sachs, Tornel, Velasco, 1996; Kaminsky, Reinhart, 1996) and interest rates (Eichengreen, Rose, Wyplosz, 1996).

The first group of cited authors construct an index comprised of the weighted average values of the exchange rate and foreign exchange reserves, while the second group include the interest differential between the reserve currency and the local currency. The weights are selected so that both components of the index should have equal values of conditional volatility. If the value of the index exceeds a given threshold value of the standard deviation plus the mean value, it is assumed that a currency crisis is in place (in Kaminski, Reinhart, 1996, three times the standard deviation plus the mean). In Eichengreen, Rose, Wyplosz (1996) this threshold is one and a half the standard deviation plus the mean value in the series.

There is a *second approach* applied in Frankel and Rose (1996). In their view, for the countries in the emerging markets group different components of the speculative attack indicator must be used consistent with nonmarket setting of interest rates and imprecise information on foreign exchange reserves in the relevant country (since it does not capture a fixed exchange rate defense in the form of emergency rescue loans from the IMF, bilateral agreements with donor countries or private financial institutions). An additional benefit of their approach they see in the example that in protecting the exchange rate monetary authorities often impose capital controls (tightening of the existing regime respectively) and/or raising the minimum reserve requirement ratio.

Above specifications lead to redefinition in Frankel and Rose of the

index of Eichengreen, Rose, Wyplosz (1996) and the adoption of a new definition. They define a currency crisis as a decrease in the value of the local currency of at least 25%. In countries with annual rate of inflation above this percent an additional requirement is included – the decrease in the value of the local currency not only exceeds 25%, but exceeds the previous year's decrease by a margin of 10%.

Choice of a Speculative Attack Index

In constructing a speculative attack index we decided on applying the methodology used in Eichengreen, Rose, Wyplosz (1996) consistent with the use of two major tools in the defense against speculative attacks in the period 1991 –1997: central bank intervention in the foreign exchange market and interest rates set by it. For the sample period, changes in the forex regime were not used to defend the exchange rate, while changes in the level of minimum reserve requirements had rather strategical than operational functions. This entails limitations in using the methodology applied to emerging markets.

For the purposes of our study, we include three variables in the speculative attack index. They synthesize information about interest rates, central bank foreign exchange reserves and the level of the exchange rate.

Two indices are constructed – the first (I_0) employs the percentage change in the exchange rate (based on the previous month's exchange rate) and the interest differential of the lev against the US dollar, de_0 and di_0 respectively; the second, I_1 is comprised of the same variables but in terms of the Deutschemark, de_1 and di_1 respectively; dF reflects the percentage change in central bank foreign exchange reserves from the previous month.

Indices are composed as follows:

$$I_0 = (di_0/\sigma_{di_0}) + (de_0/\sigma_{de_0}) - (dF/\sigma_{dF})$$

$$I_1 = (di_1/\sigma_{di_1}) + (de_1/\sigma_{de_1}) - (dF/\sigma_{dF}).$$

Weights of individual variables reflect standard deviations in corresponding series of data and are included to obtain equal values of total conditional volatility. Calculated standard deviations of selected variables are:

$$\sigma_{dF} = 13.064, \quad \sigma_{di_0} = 9.146, \quad \sigma_{de0} = 0.208$$

$$\sigma_{de_1} = 0.1998, \quad \sigma_{di_1} = 14.612,$$

where

di_0 is the interest differential between investment in levs and in US

dollars;

di_1 is the interest differential between investment in levs and in Deutschemarks.

Interest differentials are computed according to the method used in the compilation of BNB Monthly Bulletin.

de_0 и de_1 are percentage changes in the exchange rate for the US dollar and the Deutschemark from the previous period.

$CRISE_0$ and $CRISE_1$ are selected critical values of the index for which a speculative attack on the fixed exchange rate takes place.

The Data Set

The sample of monthly data covers the period from early 1992 through October 1998.[9] All the data are reported on the last business day of the corresponding calendar month.

After the method of setting the base interest rate was modified in early 1997 the interest rate on the respective currency used in the computation of interest differential had to be adjusted. Thus, for the period prior to 1997 effective end-of-month US discount rate and German repo rate are used as analogues of the base interest rate set by the BNB over the same period. Since early 1997 the yield on three-month treasury bills and the three-month FIBOR[10] are used. Changes made in the method of computing interest differential aim to eliminate the impact of such factors like certainty and maturity of the respective security on the size of the differential. These factors determine credit and liquidity risks.

Critical Threshold of the Index Recording a Speculative Attack

A critical threshold is that value of the index beyond which a speculative attack occurs. The critical value of the index should be selected so as to minimize the probability of receiving false signals. Therefore, to find the variant that suggests the lowest probability of error, we need to compare several options.

The method of computing the critical threshold is that used in Eichengreen, Rose, Wyplosz (1996). It is computed using the following equation:

[9] *The period of floating exchange rate and discretionary monetary policy is up to June 1997.*

[10] *FIBOR – interest rate on three-month interbank deposits set in the Frankfurt money market.*

$$CRISE_{ij} = \mu(I_i) + X\,\sigma(I_i)$$
$$i = 0, 1 \qquad j = 0, 1, 2.$$

If we take the exchange rate of the lev against the US dollar and the interest differential between them, i takes the value of 0, and 1 for the exchange rate of the lev and the interest differential against the Deutschemark. The mean of the index is $\mu(I)$, and $\sigma(I)$ is its standard deviation; X takes values respectively of 1, 1.5 and 2. To each of these correspond values of ***CRISE*** denoted as a second index j, 0, 1 and 2 respectively. The choice of an X value is directly dependent on the preferred level of choice between the likelihood of making error of type one[11] and type two[12]. A comparison of the results shows that a lower value of X will make the indicator more sensitive to capturing speculative attacks but at the cost of higher probability of false signals, and vice versa.

Table 1

NUMBER OF REPORTED DEVIATIONS FROM THE CRITICAL LEVEL FOR DIFFERENT VALUES OF X OVER THE SAMPLE PERIOD

X	**1.0**	**1.5**	**2.0**
I_0	9	8	3
I_1	10	8	5

The number of recorded deviations from the critical level for $X = 1$ is 9 and 10 respectively.

The Binary Dependent Probit Model

To estimate the probability of the speculative attack index to overshoot the critical value, we use a binary dependent probit model with a binary variable denoted as CR_i, and independent variables listed below:

$CR_i = 1$, if $i_i \geq CRISE_i$ and $CR_i = 0$, if $i_i < CRISE_i$ $(i = 0, 1)$.

In contrast with regression, in the probit model the dependent variable takes binary values of 0 or 1 depending on whether the index exceeds the critical value ***CRISE*** or not.

[11] *Type one error involves an actually occurring currency crisis but not recorded.*

[12] *Type two error involves recording of a crisis by the indicator without actually occurring.*

Independent Variables in the Binary Dependent Probit Model

Independent variables are those indicators that take values having a statistically significant effect on the estimated variable. As indicators are assumed to flash signals before the crisis erupts, they are examined with a lag.

In determining the optimum set of indicators to explain the behavior of the speculative attack indicator we use the following variables:

monthly change in the real effective exchange rate (***DREER***, see Chart 6);

monthly change in imports and exports;

monthly change in the capital account (***KA***) (see Chart 7);

monthly change in the current account (***CA***);

monthly change in credit aggregates;

monthly change in the ratio of ***M2*** to BNB forex reserves;

monthly change in budget deficit;

monthly change in unemployment.

As monthly balance of payments statistics has been compiled since early 1997, the set of indicators does not cover the whole period between 1990 and 1998. This entailed limitation of its length to 28 observations.

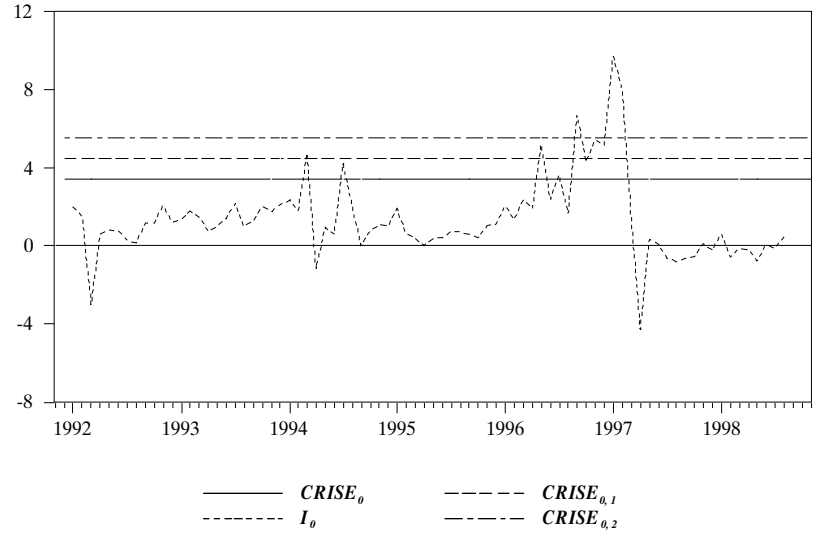
What Do the Results Show?

Application of the binary dependent probit model (models 1 and 2 in appendix 3) shows strong statistical significance of the indicators for the capital account, the real effective exchange rate, and the speculative attack in the preceding period (all variables with one month lag).

Interpretation of the signs of the coefficients for independent variables shows less likelihood of an attack against the fixed exchange rate as the capital account balance increases and the real effective exchange rate volatility decreases. The higher the value of the speculative attack index in the transition period, the higher the probability of an attack is.

Chart 5

INDICES OF A SPECULATIVE ATTACK ON THE EXCHANGE RATE



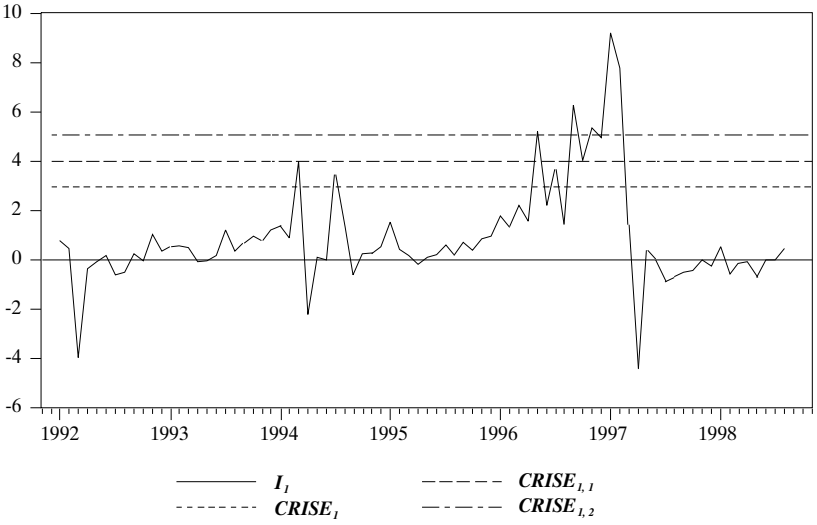


Chart 6

REAL EFFECTIVE EXCHANGE RATE (BASED ON PRODUCER PRICE INDEX) AND CHANGE IN THE REAL EFFECTIVE EXCHANGE RATE

(November 1991 = 100)

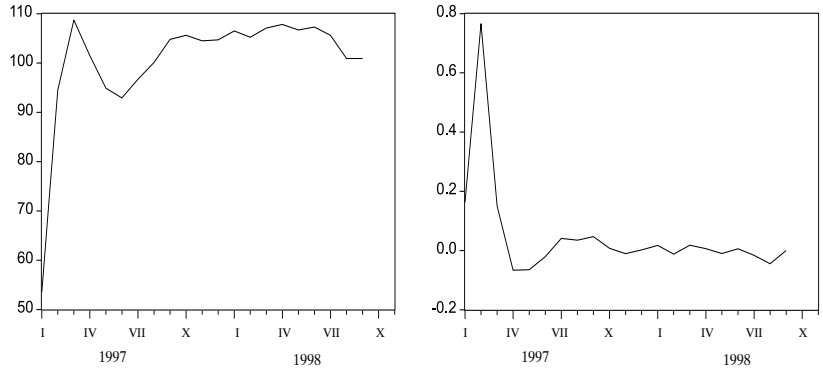


Chart 7

CHANGE IN THE BOP CAPITAL ACCOUNT BALANCE

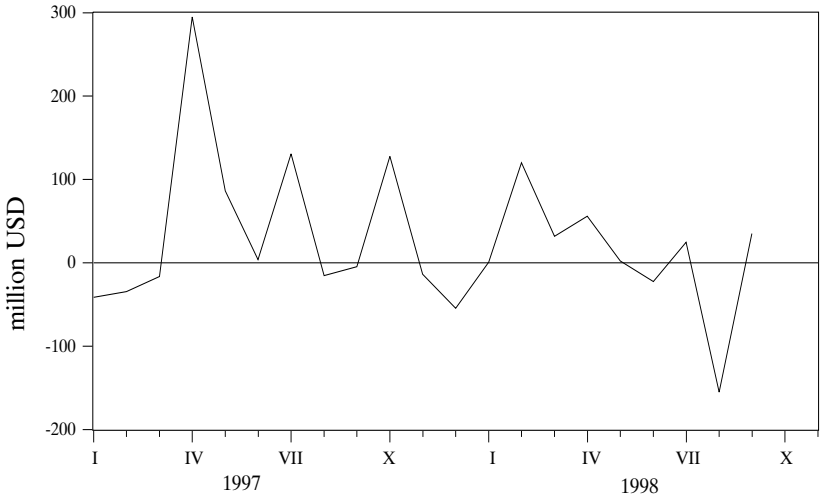


Chart 8

DEPENDENT VARIABLE VALUES
(PROBABILITY OF CURRENCY CRISIS REALIZATION)

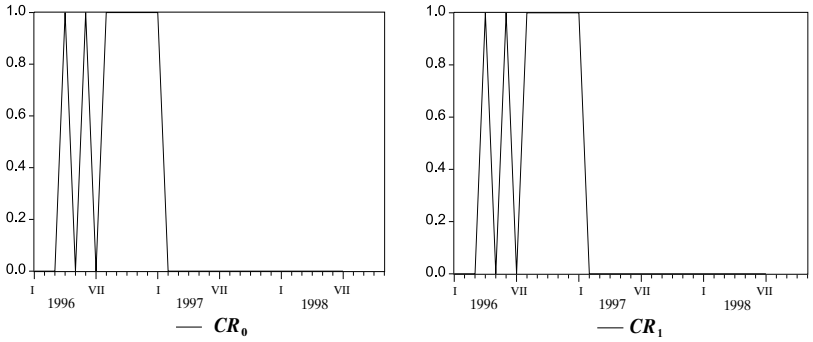


Chart 9

ESTIMATED AND ACTUAL VALUES

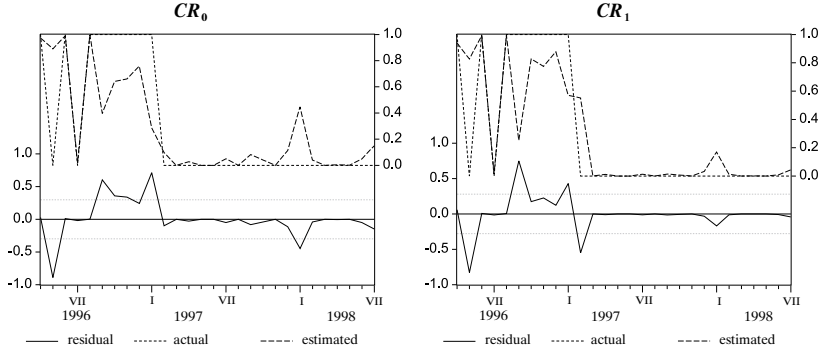


Chart 8 exhibits the periods of attack on the exchange rate in the past. Chart 9 shows the explanatory strength of the models.

IV. Conclusion

The present study pursuits two goals. *First*, to present two possible approaches to the analysis of eventual attacks on the fixed exchange rate, called in this paper monetary and indicator approaches (a synthetic indicator of Bulgaria's currency crisis is defined). *Second*, a detailed survey of the literature on attacks on fixed exchange rates is reviewed in the two appendices.

Theoretical results may be presented as follows.

Attacks on fixed exchange rates are unpredictable to a great extent as they combine both fundamental imbalances in the economy and a reversal in the expectations of economic agents.

The bigger the macroeconomic imbalances, the more favorable the environment for successful speculative attacks is.

The assumption that money demand and supply under a currency board are always balanced is not absolutely true. A speculative attack on the fixed exchange rate is possible as a result of disequilibrium between supply of and demand for reserve money. In general, the more stable the money market (particularly reserve money market), the less probable the successful attack on the fixed exchange rate is.

Speculative attacks represent mass herd behavior and *may occur even under good macroeconomic indicators*. Foreign exchange panic has its own information dynamics and may be stopped by external constraints, or by a mechanism forcing economic agents to follow their own information, not to imitate each other.

Protection of the exchange rate depends to a great extent on the *government loss function*, i. e. trade-off between flexibility and credibility. The choice to protect the exchange rate is largely political.

Experience shows that if the crisis *is self-fulfilling, normal fiscal and monetary policy tightening proves inefficient*. Crisis dynamics reflects entirely economic agents' expectations. Measures intended for structural changes in the economy are more efficient, but they cannot be implemented in the short run.

Changes in the capital account balance under the constructed index of a speculative attack show that capital account *liberalization enhances* the probability of self-fulfilling currency crises *due to increased mobility of portfolio investments*[13]. Changes in investors' expectations result in multiple equilibria under a fixed exchange rate.

[13] *On the other hand, free capital movement helps improve diversification of economic agents' portfolios, thus protecting economic agents from unfavorable price movements in financial assets.*

Indicators of an attack on the fixed exchange rate have sufficient explanatory power relative to previous currency crises. Observation of capital account developments, changes in the real effective exchange rate dynamics and the previous period's value of the speculative attack index prove to be of key importance in determining the probability of a future speculative attack on the fixed exchange rate.

Appendices

Appendix 1

The Model of Foreign Exchange Market Contagion

This paper presents briefly a summarized model. This model is an adaptation to the financial market model made by Orléan, A. (1992). We consider this model as one of the best in the economic literature dealing with herd behavior and critical phenomena. This type of model is based on Bayesian rationality of economic agents, i. e. the behavior of other economic agents is taken into account in decision-making. Actually, any rational agent interprets other forex market participants' purchases and sales as resulting from hidden information. The Bayesian rule defines a law on interdependence between economic agents in the form of a ratio of the personal opinion (apriori) of a particular agent to the average opinion of market participants. These weights result from the accuracy in associating signals obtained from both types of information.

We assume the state of the forex market as an arbitrary value which may take two values (+) and (-) with probability p_+ and p_-. The attack on the fixed exchange rate is (+) and the lack of attack is (-). The exchange rate fundamental characteristics takes values R equal to V_- (no attack, the level of the fixed exchange rate is sustained) and V_+ (there is an attack, a new level of exchange rate fixing or free floating of the exchange rate). Thus, $EV = P_- V_- + P_+ V_+$.

Each agent has two sources of information: fundamental signal σ (this may be the real effective exchange rate or the state of the balance of payments current account) and study of the forex market. The state of the forex market may be defined as f, for instance the proportion of agents who have chosen (–). According to the Bayesian rule, there is a probability $p(-/+)$, i. e. an agent with a personal choice (+) who has changed his opinion and reacts as (–):

(1) $p(-|+)\,(f) = [T/(T+R)]\,f + [R/(T+R)]\,p_- = [1/(1+r)]f + [r/(1+r)]\,p_-$,

where R is the accuracy derived from the fundamental factor, and T is the accuracy of the forex market assessment. The principal parameter is the degree of credibility of each agent in his own opinion related to that in the market $(r = R/T)$. The weaker the proportion, the stronger the interdependence between forex market agents is. Similarly, the change from (–) to (+) may be determined as follows:

(2) $p(+|-)(f) = [T/(T+R)](1-f) + [R/(T+R)]p_+ = [1/(1+r)](1-f) + [r/(1+r)]\ p_+$.

According to equations (1) and (2) the probability one agent to be in (+) or (–) state depends on the fundamental factor ***f*** which determines the maintenance of the fixed exchange rate.

Each agent $a \in A$ is characterized by state ***s(a)***. This state is identified with the expected future value of the exchange rate or the choice of foreign exchange strategy (based on the fundamental factor or simply on the forex market state). If E_a is the environment of the agent ***a***, the environment is defined as reflection (application): $E_a: A - \{a\} \rightarrow S$, which determines the state of all other agents besides ***a***. This is formulated as $\pi_a(S|E_a)$, i. e. the probability that $a \in A$ is in state ***S*** under environment E_a. This conditional probability is microeconomic.

The most essential in this model is the transition from micro to macro. The microeconomic structure is defined as ***P*** – a set of conditional probabilities π_a. The macroeconomic behavior determined by the general probability μ (called phase), caused by ***P***, is:

$\mu[s(a) = s|E_a] = \pi_a(s|E_a],\ s \in S,\ a \in A.$

When the set ***P***, indicating microconditions in the forex market, has many global phases, the process π_a is called *nonergodic* (Orléan, A., 1992). In other words, the microeconomic characteristic of the market is not sufficient to determine the macroeconomic state. The nonergodic process reflects the fact that interaction dynamics plays a key role at a macrolevel: one and the same set of microeconomic characteristics may result in different macroconditions. In the economic literature this phenomenon is known as *multiple equilibria dynamics*. Where ***P*** is nonergodic, one exogenous shock may cause a specific dynamics of the system (phase transition characterized by a sharp shift from one equilibrium into another).

In this case equations (1) and (2) determine ***P***. The set of states contains two states $S = (-, +)$. The environment is indicated only through ***f***; ***R*** depends on the characteristics of financial assets (in this case the currency); ***T*** depends to a great extent on an agent's idea of other agents' behavior. If each of the agents presumes that other agents' opinion is based on independent observations of the fundamental signal σ, then ***T*** – the accuracy (by definition it is opposite to the variation) is: $N/V(\sigma)$, where ***N*** is the number of forex market participants and $V(\sigma)$ volatility of the signal.

According to Kahneman, D., P. Slovic, A. Tversky (1982), ***T*** displays the following dynamics:

(3) $T(f) = hf^2$

(4) $T(1-f) = h(1-f)^2$.

The bigger f (in this case the state of the current account is improving or foreign exchange reserves are growing), the higher the accuracy of the signal, and the higher the probability of a signal shift from (+) to (–) dynamics (a signal for attack shifts into a signal for nonattack).

Equations (1), (2), (3) and (4) completely describe diffusion of opinions in the forex market. If $P(f, t)$ is the probability at a point in time t and the initial conditions are known $P(f, 0)$, its deformation in time should be estimated. It is possible to compute stationary distributions of $P_s(f)$ to which diffusion dynamics strives. Equations (3) and (4) display that signal significance σ in relation to market observations is measured by R/h and is designated as s.

According to the fundamental data on the forex market, it is assumed that $p_+ = p_-$, i.e. $f = 1/2$. Thus, the average market opinion s coincides with EV.

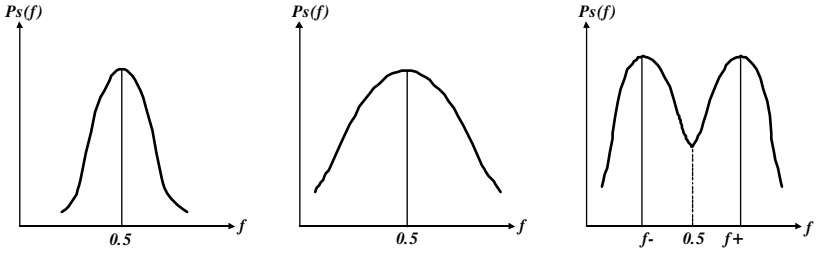
If s is too high, this suggests independence of personal choice. Each agent remains true to his own opinion. In this case the distribution is close to normal with an average value of 0.5 and variation $N/V(\sigma)$. The lower value of s describes a situation in which agents' credibility in the fundamental factor σ is lower, and hence the market opinion assumes greater significance. Consequently, the imitation component is given added weight. Also, the average value is about 0.5 while the variation is greater.

When s has reached a particular critical value s_c, the information from the market prompts self-accelerating dynamics resulting in a deviation from fundamental factors (Shiller, R.,1981). Stationary distribution becomes *bimodal* and has two levels f_- and f_+. The bigger the deviation of f_- and f_+ from 0.5, the stronger the variation. When s tends to 0 and +1, all market participants are unanimous.

If the market is close to f_- (f_+) (Chart 12), the probability of phase transition is insignificant, given a great number of participants N. The probability becomes 0 for $N \to \infty$. There are two possible stationary distributions of these probabilities, Dirac figures δ_- and δ_+ for f_- and f_+ (Orléan, A.,1992). The average opinion has two equilibrium positions. It may converge to one or the other position with probabilities depending on the initial conditions. However, if the stationary state is reached, the average opinion does not change.

Since the actual number of forex market participants N is big, the market opinion f oscillates for a long time around f_+ (respectively f_-)

Chart 12



no imitation, only fundamental factors

weak imitation plus fundamental factors

only imitation, no fundamental factors

as it moves in the form ***exp(N)*** (see details in Kahneman and Tversky, 1982). In a particular moment a dramatic change occurs resulting in f_+ (f_-). This is the *phase transition.* The probability of this shift for large values of N is negligible but not 0. It is reasonable to say that extremes are always adjusted but most often from extremes in the opposite direction and never to some standard level. In this case the average value of the market is ***EV*** (fundamental), reached by alternation of extremes in both directions (complete imitation or lack of imitation).

In practice, one of the limitations of the model $p_- = p_+$ is not always fulfilled, i.e. $p_- \neq p_+$. Changes in the fundamental factor impact imitation, i.e. the phase transition is not entirely random: it is activated by *additional information about fundamental factors* (in this case the state of forex reserves and current account).

In general, this model indicates panic dynamics, namely how insufficiently informed agents imitate informed ones. It also suggests that imitation is ambivalent and may entirely deviate from true fundamental information.

Appendix 2

An Overview of Indicator Approaches to Attacks on Fixed Exchange Rates

Summary of the Literature on Indicator Approaches

Regarding the methodology used, Kaminsky and Reinhart (1998) distinguish four groups of economic analyses dealing with the study of speculative attacks.

The first group of papers provide mainly a qualitative discussion of the causes and developments leading to currency crises, introducing one or several indicators. No formal tests are conducted to evaluate the usefulness of the various indicators in predicting crises. As various authors attach greater importance to these indicators, they prove to be more significant in the empirical sample of their studies.

The second group of papers examine the facts of the period leading up to and immediately following the currency crisis. Sometimes the pre-crisis behavior of a variable is compared to the control group variables of countries where no currency crises occurred, or with behavior of the same variables during 'tranquil' periods for the same group of countries. Parametric and nonparametric tests are used to assess whether there are systematic differences between the pre-crisis episodes and the control group. These tests can be useful in narrowing the list of potential indicators, as not all the variables included in the analysis ended up showing abnormal behavior in advance of crises.

The third group of papers estimate the probability of devaluation one or several periods ahead, along the lines pioneered by Blanco and Garber (1986) in their discussion of the Mexican crisis of the early 1980s, based on an explicit logit or probit theoretical model. These papers help to narrow the list of useful indicators up to statistically significant ones for the method applied.

The fourth group of papers are based on the methodology used in Kaminsky and Reinhart (1998). This paper presents a nonparametric approach to evaluate the usefulness of several variables in signaling an impending crisis. This methodology can be interpreted as an extension of the methodology used in the second group of papers.

Approaches to Assessment of the Probability of a Speculative Attack

Regarding the methodology, there are two major approaches. *The first* is based on probit and logit econometric model of predicting the probability of a speculative attack. In this approach, a system of inde-

pendent variables which most thoroughly describes the behavior of the dependent variable in past periods is used. *The second approach* compares the difference in values of the selected indicators for the periods prior to the speculative attack and their values in 'tranquil' periods, thereby estimating the probability of a speculative attack.

The major disadvantages of the first approach are: it focuses on the variables that have an explanatory power regarding the probability of a speculative attack in the past; this approach disregards the influence of other variables which did not have a statistical significance in the past (which does not mean that in the future they will not have such significance).

Kaminsky and Reinhart (1998) highlight additional disadvantages of this model: inability to rank the variables predicting speculative attacks in the best way in order to reduce the probability of false signals; uncertainty of the depth of macroeconomic imbalances which impedes initiation of preventive measures.

Indicators

Macroeconomic and Monetary Indicators

Share of budget deficit in GDP

This reflects the probability of a shock on the fixed exchange rate caused by increased money demand by the government. Under a currency board, excessive demand cannot be met by the central bank. In similar situations governments often resort to state banks as they exercise direct or indirect control over them. This leads to a disequilibrium in the forex market, an increase in interest rates, pressure on borrowers for advance repayment of loans, deterioration of bank profitability and prerequisites for insolvency.

Share of government expenditure in GDP

A high share of government expenditure in GDP may prompt irrationality and imbalances in the balance of payments current account since supply would be unable to meet dramatically increased government spending.

Share of public sector credit in domestic credit

Government as an indirect borrower (through public enterprises) is a potential source of moral hazard which may threaten the banking system solvency and prompt unreasonable use of resources. Although public sector ownership is beyond government commitments, public sector obligations are directly or indirectly guaranteed by the govern-

ment and the guarantee often transforms into government budget expenditure.

Gap between money demand and supply

Imbalances between money demand and supply lead to general economic instability with sources of different nature. Under a fixed exchange rate, this would impact interest rates. If any attempt to manipulate the interest rate is made, its balancing role worsens to be replaced by the shadow exchange rate.

Money supply growth

Fast growth rate of money supply coupled with the lack of increase in forex reserves (net foreign assets of the monetary authorities) indicate a lending boom which, under a fixed exchange rate, may lead to an increased consumption and deteriorating balance of payments current account.

M2 monetary aggreagate/gross international forex reserves ratio

This ratio reflects the extent of central bank forex reserves cover for broad money and indicates the degree of conversion of bank deposits into foreign currency under a fixed exchange rate as a result of a possible run on the banking system. This indicator shows the ability of the economy to respond to liquidity shocks as a result of withdrawal of deposits from the banking system and/or portfolio investment.

Indicators reflecting the balance of payments state

These are general indicators characterizing the state of individual items in the balance of payments. As a rule, they should not be reviewed separately due to their interdependence. For instance, a huge current account deficit does not necessarily threaten the exchange rate. If this deficit is funded by inflow of foreign investment or credits, the extent of their reversibility should be analyzed in order to estimate the vulnerability of the exchange rate maintained.

Current account as a share of GDP

The share of the balance of payments current account in GDP characterizes the extent of foreign financing in a particular economy. Levels exceeding 3.5% deficit in GDP are considered critical. If this deficit is funded by a capital account surplus (mainly by direct foreign investment), the fixed exchange rate may be considered less vulnerable to speculative attacks irrespective of the higher level than the critical deficit.

Real exchange rate

Deviation of the current exchange rate level from the long-term

trend is a reliable indicator of a particular country's competitiveness. Dornbusch, Goldfain, Valdes (1996) argue that in a period prior to a currency crisis, the real exchange rate is overvalued relative to its average value in 'tranquil' periods. In case of devaluation this deviation immediately reverses its direction which clearly shows that the initial overvaluation is not due to changes in consumers' preferences or any productivity shocks.

There are two possible reasons behind the real appreciation of the exchange rate: *first*, inflation (money supply growth reflecting increased investment requirements of the economy); and *second*, a positive differential in the profitability of the factors of production in macroeconomic terms. The first reason worsens the ability to protect the fixed exchange rate, while the second one has a positive effect. Under high capital flows mobility and comparable rates of return at the same degree of risk, labor productivity is of key importance.

Imports and exports dynamics

The volume of foreign trade as a share of GDP indicates the degree of an economy's openness. Other conditions being equal, the more open the economy, the stronger the impact of international commodity and capital markets, and hence the more vulnerable the economy to external shocks related to changes in these markets. The analysis of this indicator should be closely tied both with prices of major export items which reflect the state of commodity markets, and physical indicators measuring terms of trade.

Prices of major export items

Along with the above indicator, prices of major commodity items are of key significance for the compilation of the trade balance. Price fall in major export groups is one of the channels for transmission of external shocks in the economy and crisis contagion from countries with similar commodity structure of exports.

Capital Account

Gross international reserves/monthly imports ratio

This ratio reflects the degree of gross foreign exchange reserves cover for imports and shows the degree to which import needs of the economy can be met. It indicates the liquidity of the economy in general.

Portfolio investment/balance of payments current account balance

This indicator measures the degree of short-term deficit financing

of the current account. An eventual withdrawal of portfolio investment may lead to a depletion of central bank forex reserves and correspondingly to enhance the probability of an attack on the fixed exchange rate due to inconsistency caused by the short-term nature of portfolio investment and the long-term nature of current account deficit.

Direct investment/balance of payments current account balance

Similar to the preceding indicator, this one measures to what extent the current account deficit is financed by direct investment which, unlike portfolio investment, has lower degree of collectibility and its conversion into cash is more difficult.

Indicators driven by the foreign debt state

The share of foreign debt and payments on foreign debt service in GDP directly correspond to the country's ability to react against a possible attack on the fixed exchange rate using its forex reserves. Other conditions being equal, the bigger the foreign debt, the higher the risk of an attack on the fixed exchange rate, since governments prefer to preserve a portion of their gross forex reserves for repayment of future obligations.

Dynamics of public and publicly guaranteed foreign debt

The share of foreign government debt in GDP reflects the amount of a country's payments on foreign debt service. The bigger the indebtedness, the higher the expenditures on principal and interest repayments. This suggests that a country should allocate a significant portion of its gross foreign reserves on foreign debt repayment.

Maturity structure of foreign debt

Maturity structure of foreign debt is directly connected with the preceding indicator. The bulk of short-term loans in the structure of foreign debt reflects a greater concentration of payments within a shorter term, hence an increased need for foreign exchange reserves.

Short-term foreign debt/gross forex reserves ratio

This indicator displays vulnerability and liquidity of the economy to a possible speculative attack.

Expenditure on foreign debt service (as a portion of export revenue or share in foreign exchange reserves)

If export revenues are high, the bulk of fixed foreign debt payments can be covered by them, thereby releasing the burden on foreign exchange reserves and reducing the probability of an attack on the fixed exchange rate.

Monetary and Credit Indicators

Indicators Associated with Financial Liberalization

Financial liberalization is realized through various channels. A number of economists, among them McKinnon and Pill (1994), assume that full (open or hidden) guarantee on deposits may cause a boom in bank lending resulting in a banking crisis. *Increased interest rate volatility*, and hence capital flows, may be another consequence of financial liberalization. Liberalization results directly in a dramatic credit growth boosting fast economic growth. Usually the outcome of such a growth (based on consumption growth) is financial or foreign exchange collapse induced by rapid price rises in assets and a dramatic consecutive fall, which deteriorates commercial bank balance sheets.

Indicators of *financial liberalization* include: credit growth, multiplier variation, real lending rate, interest rate differential between assets and liabilities operations, consumer credit growth.

Credit as a share of GDP

Credit growth is a result of financial liberalization. While this fact itself is not a cause for concern, the structure of credit flows by use plays an important role. Very often lending boom is directed to customers. In countries where production capacities prove insufficient to immediately increase supply, or the national economy is uncompetitive, credit expansion often results in increased imports which directly worsens the balance of payments current account.

Share of private sector credit in GDP

According to Pill and Pradhan (1995), financial liberalization developments are best described by the private sector credit/GDP ratio. The higher the share of private sector credit, the higher the extent of liberalization in the financial system.

Increase in real interest rates

The abolition of interest rate ceilings on deposits and credits enhances commercial bank competitiveness in attracting resources, resulting in increased interest rates on liabilities operations. To compensate for the higher cost of attracted resources, banks have to raise real lending rates. This worsens borrowing firms' cash flows, generating bad loans which reflect on the state of the banking system and may erode its credibility. This may grow into a systemic crisis affecting sound banks.

Interest rate differential between assets and liabilities operations

The relationship between financial sector liberalization and the interest rate differential is straightforward. Commercial banks' pursuit of a maximum profit leads to an increase in the differential between assets and liabilities operations. This is typical of countries with underdeveloped capital markets (like Bulgaria), being an alternative funding source.

Money Multiplier variation

Money multiplier variations are indicative of the extent of economic liberalization due to enhanced volatility of commercial bank reserves and the currency outside banks/deposits ratio.

Indicators Relating to the State of the Banking System

Total amount of attracted deposits to deposits of nonresidents

This ratio measures liquidity and indicates vulnerability of a banking system in case of a run on deposits by nonresidents. Under worsened solvency of the banking system or a part of it in the context of a general liquidity shortage, this ratio may be become a signal for massive withdrawal of other depositors' funds.

Share of bad loans in banking system assets

This is a classical indicator for the state of commercial bank portfolio. The amount of commercial bank portfolio should be interpreted in compliance with capital adequacy indicators, since losses incurred from bad loans may be compensated by the capital reserves of the banking system.

Commercial bank net interest income to total financial assets

Net interest income is the major income source for a typical commercial bank. The amount of net interest income in absolute terms is indicative of banks' ability to efficiently reach a profitability level which will ensure bank stability in the future. Low values of this ratio signal problems in principal banking activity or shift to other activities.

Provisions on risk exposures classified as loss to pre-tax profit

If the share of the financial result allocated to provisions is large, this is indicative of an excessively high credit risk taken by the bank. This may worsen a bank's solvency in case of a persistent profitability crisis.

It should be noted that an excessively high capital adequacy represses bank profitability, and sometimes the high capital adequacy ratio reported does not necessarily mean a high capital base. It is likely

the degree of assets risk indicator to be deliberately undervalued in assets classification.

Share of deposits attracted in the interbank money market in total deposits

This indicator measures the degree of bank independence from the money market, being a short-term and extremely unreliable source of funds due to the high degree of collectibility of other banks' deposits.

According to Kaminsky, Lizondo, Reinhart (1998), indicators characterizing the state of the balance of payments are: the share of the current account balance in GDP; the real exchange rate; the trade balance; terms of trade; prices of major export items. Also, indicators reflecting the degree of financial liberalization may be used as very reliable warning signals of a currency crisis. In support of this, we add the conclusions of this study: exports growth, the size of real interest rates and the M2/foreign exchange reserves ratio send the most accurate signals of a currency crisis.

Appendix 3

Data Used and Results Obtained from the Empirical Test

Table 2

Model 1. PROBABILITY OF AN ATTACK ON THE USD/BGL EXCHANGE RATE

Dependent Variable: CR_0
Method: ML – Binary Probit
Date: 12/23/98 Time: 14:28
Sample(adjusted): 1996:04 1998:07
Included observations: 28 after adjusting endpoints
Convergence achieved after 6 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.225697	0.937008	-2.375324	0.0175
DREER(-1)	-5.149370	2.718864	-1.893941	0.0582
I_0(-1)	0.221892	0.143315	1.548276	0.1216
KA(-1)	-0.024713	0.012373	-1.997314	0.0458
Mean dependent var	0.285714	S.D. dependent var		0.460044
S.E. of regression	0.280050	Akaike info criterion		0.683542
Sum squared resid	1.882277	Schwarz criterion		0.873857
Log likelihood	-5.569587	Hannan-Quinn criter.		0.741723
Restr. log likelihood	-16.75155	Avg. log likelihood		-0.198914
LR statistic (3 df)	22.36392	McFadden R-squared		0.667518
Probability(LR stat)	5.48E-05			
Obs with Dep=0	20	Total obs		28
Obs with Dep=1	8			

Table 3

Model 2. PROBABILITY OF AN ATTACK ON THE DEM/BGL EXCHANGE RATE

Dependent Variable: CR_1
Method: ML – Binary Probit
Date: 12/23/98 Time: 14:28
Sample(adjusted): 1996:04 1998:07
Included observations: 28 after adjusting endpoints
Convergence achieved after 6 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.237707	0.944710	-2.368671	0.0179

I_1(-1)	0.237963	0.149708	1.589519	0.1119
DREER(-1)	-5.212602	2.740715	-1.901913	0.0572
KA(-1)	-0.024774	0.012652	-1.958224	0.0502

Mean dependent var	0.285714	S.D. dependent var	0.460044
S.E. of regression	0.278710	Akaike info criterion	0.678078
Sum squared resid	1.864299	Schwarz criterion	0.868393
Log likelihood	-5.493088	Hannan-Quinn criter.	0.736259
Restr. Log likelihood	-16.75155	Avg. log likelihood	-0.196182
LR statistic (3 df)	22.51692	McFadden R-squared	0.672085
Probability(LR stat)	5.09E-05		
Obs with Dep=0	20	Total obs	28
Obs with Dep=1	8		

Table 4

VALUES OF SPECULATIVE ATTACK INDICES AND THEIR COMPONENTS (CHANGE IN FOREX RESERVES, THE INTEREST DIFFERENTIAL AND THE EXCHANGE RATE)

obs	*DER*	DER_1	*DRES*	ID_0	ID_1	I_0	I_1
1991:12	NA	0.238666	NA	9.763209	4.344995	NA	NA
1992:01	0.092160	0.033609	-0.043210	11.22222	4.288462	2.553158	0.792204
1992:02	0.013434	-0.008550	-0.029032	11.22222	4.283381	2.447733	0.469685
1992:03	-0.035626	-0.039248	0.562686	11.22222	4.248092	-1.952267	-4.090587
1992:04	-0.011598	-0.013216	0.079893	11.22222	4.208333	1.637771	-0.369486
1992:05	0.008257	0.018980	0.064553	11.22222	4.188679	1.751837	-0.091263
1992:06	-0.007759	0.064877	0.060152	11.22222	4.188679	1.784563	0.177419
1992:07	-0.011295	0.010231	0.127433	11.43781	3.703669	1.327138	-0.637532
1992:08	-0.023726	0.032016	0.124023	10.50000	3.299065	1.165986	-0.528304
1992:09	0.018902	0.003735	-0.001884	9.500000	2.988604	1.903345	0.240961
1992:10	0.049028	-0.029078	0.016186	9.500000	3.272635	1.768977	-0.042356
1992:11	0.040000	0.001104	-0.112000	9.500000	3.307692	2.722168	1.068439
1992:12	-0.008502	-0.015574	-0.029118	9.500000	3.298874	2.105862	0.365775
1993:01	0.044508	0.069875	0.012096	11.00000	3.984424	2.097709	0.546257
1993:02	0.040266	0.003266	-0.034709	12.00000	4.467928	2.644625	0.585466
1993:03	-0.003382	0.000553	-0.025695	12.00000	4.585392	2.577603	0.512663
1993:04	-0.004525	0.026332	0.076769	12.00000	4.745856	1.815680	-0.105574
1993:05	0.000379	-0.010406	0.046561	12.00000	5.025492	2.040310	-0.050377
1993:06	0.010223	-0.049798	-0.015061	11.25000	4.697674	2.349371	0.182542
1993:07	0.019865	0.006933	-0.115433	11.25000	4.939394	3.095730	1.237355
1993:08	0.007718	0.038340	0.024291	10.25000	4.769231	1.857871	0.348012
1993:09	0.022247	0.059979	-0.003808	10.25000	4.806452	2.066815	0.670791
1993:10	0.052801	0.003214	-0.083319	10.25000	4.897772	2.658054	0.976545
1993:11	0.056252	0.039071	-0.019809	12.25000	6.230559	2.583548	0.781274
1993:12	0.049406	0.045199	-0.071456	12.25000	6.517730	2.967599	1.216793
1994:01	0.110364	0.109139	-0.047069	13.25000	7.142857	2.985131	1.407618
1994:02	0.028910	0.039559	-0.027757	13.25000	7.142857	2.841527	0.906304
1994:03	0.737758	0.768433	0.057210	14.75000	8.170306	2.508032	4.093077
1994:04	-0.124115	-0.120999	0.305231	14.75000	8.516616	0.663759	-2.299721
1994:05	-0.022679	-0.007112	0.066710	13.85849	9.000000	2.260091	0.093012
1994:06	-0.034718	0.005713	0.094838	13.00000	9.413223	1.880197	-0.021491

1994:07	-0.006523	-0.000765	-0.385270	13.00000	9.696095	5.450268	3.534941
1994:08	0.072782	0.069834	-0.047878	12.23529	9.769231	2.789350	1.394142
1994:09	0.070117	0.088456	0.253098	13.60000	11.47863	0.822706	-0.629345
1994:10	0.060784	0.099125	0.141499	13.60000	11.47863	1.652557	0.255353
1994:11	0.001848	-0.042228	0.042986	12.51852	11.47863	2.170014	0.261196
1994:12	0.015068	0.020014	0.047284	11.69565	11.47863	1.974400	0.549220
1995:01	0.009543	0.037783	-0.078478	11.69565	11.47863	2.909563	1.575732
1995:02	-0.015154	0.023288	0.064885	10.68000	11.47863	1.641535	0.435175
1995:03	0.007922	0.045693	0.116655	10.68000	11.47863	1.256571	0.165398
1995:04	-0.013906	0.006045	0.123121	8.760000	10.07078	0.826646	-0.184379
1995:05	0.010883	0.002298	0.072690	7.800000	8.981851	1.010725	0.095661
1995:06	0.001668	-0.002272	0.045003	6.840000	7.909091	1.025683	0.203475
1995:07	0.002422	0.007843	-0.018741	5.400000	6.272727	1.213295	0.615723
1995:08	0.026578	-0.047907	-0.008451	4.600000	5.363636	0.977677	0.189398
1995:09	0.000588	0.051768	-0.009602	4.600000	5.457565	0.986240	0.716921
1995:10	0.009115	0.026532	0.018186	4.600000	5.809339	0.779607	0.405003
1995:11	0.017045	0.003175	-0.057922	4.600000	5.944444	1.345544	0.860253
1995:12	0.012749	0.001237	-0.075478	4.600000	6.014028	1.476094	0.985679
1996:01	0.044979	0.007740	-0.181459	4.600000	6.186858	2.264165	1.819195
1996:02	0.029643	0.043630	-0.075792	5.880000	8.207709	1.732991	1.358448
1996:03	0.036282	0.027184	-0.185138	7.333333	10.57407	2.835116	2.251482
1996:04	0.134340	0.085320	-0.016581	10.33333	14.81395	2.178366	1.591710
1996:05	0.644375	0.662462	-0.029453	17.16667	24.34884	3.633076	5.317337
1996:06	0.057263	0.061850	-0.029467	17.16667	24.34884	3.633182	2.229683
1996:07	0.203782	0.244640	-0.106152	17.16667	24.34884	4.203408	3.739637
1996:08	0.079352	0.075743	0.086692	17.16667	24.70755	2.769428	1.462289
1996:09	0.138571	0.107407	-0.089806	49.16667	74.25000	10.44595	6.381422
1996:10	0.041960	0.029249	0.024731	39.16667	59.25000	7.605480	4.085197
1996:11	0.460001	0.463532	-0.000375	29.16667	44.25000	5.803390	5.461833
1996:12	0.392986	0.375367	-0.008256	29.16667	44.25000	5.861994	5.067178
1997:01	1.096850	0.985149	-0.129729	31.89256	48.75000	7.307381	9.418168
1997:02	1.001664	0.945354	0.039133	32.16667	48.75000	6.106241	7.957926
1997:03	-0.223319	-0.221150	0.152586	34.34202	53.25000	5.695235	1.430072
1997:04	-0.076100	-0.094977	0.712366	11.22042	17.85000	-3.065641	-4.544580
1997:05	0.068334	0.078872	0.095410	6.190865	10.02000	0.521759	0.392551
1997:06	0.095976	0.074961	0.066875	0.878378	1.685990	-0.322589	0.005301
1997:07	0.072850	0.009469	0.136445	0.059406	0.550725	-1.002789	-0.927641
1997:08	-0.018874	0.000000	0.103490	0.119086	0.610329	-0.745863	-0.727120
1997:09	-0.025539	0.000000	0.076744	0.177554	0.631090	-0.535353	-0.526794
1997:10	-0.024847	0.000000	0.062625	-0.013445	0.281659	-0.468350	-0.446097
1997:11	0.027923	0.000000	0.005829	0.121951	0.455696	-0.019088	-0.011664
1997:12	0.005376	0.000000	0.040588	0.241883	0.613924	-0.253706	-0.259135
1998:01	0.018407	0.000000	-0.067698	0.160920	0.547046	0.535401	0.541425
1998:02	0.006080	0.000000	0.085735	0.068740	0.447894	-0.623851	-0.606387
1998:03	0.007966	0.000000	0.026112	0.048093	0.398230	-0.184600	-0.166482
1998:04	-0.020003	0.000000	0.017228	0.061667	0.375810	-0.115844	-0.101983
1998:05	-0.008676	0.000000	0.100548	0.014925	0.321814	-0.744705	-0.725303
1998:06	0.015597	0.000000	0.006480	0.035058	0.359649	-0.041213	-0.023185
1998:07	-0.022760	0.000000	0.004827	0.040268	0.365639	-0.027888	-0.010480
1998:08	0.012889	0.000000	-0.060388	0.030303	0.360000	0.455074	0.474072
1998:09	-0.066190	0.000000	0.014956	0.059233	0.354120	-0.099433	-0.086597
1998:10	-0.015360	0.000000	0.016742	0.236220	0.374179	-0.077515	-0.098483
1998:11	0.033445	0.000000	8.80E-05	0.117647	0.313175	0.022743	0.021116
1998:12	-0.016152	0.000000	0.077320	0.121771	0.388128	-0.550732	-0.547969

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DP/5/1999

Monetary Sector Modeling in Bulgaria, 1913–1945

Nikolay Nenovsky, Boris Petrov

Abstract. This study traces some facts of BNB history, restores monetary aggregates, money supply and demand dynamics, money velocity and inflation sources. Econometric processing of restored time series make it possible to check some major theses: that inflation is a monetary phenomenon prompted by deficits and quasi-deficits in the economy caused by government budget and balance of payments imbalances; that demand for money is insensitive to interest rate changes; that nominal income dynamics follows closely money stock growth, i.e. the transaction motive in money demand is decisive. Within the framework of empirical testing impulse direction and effects are studied: from real economy to monetary aggregates (real business cycle theory) and vice versa (monetary business cycle theory). VAR models and Granger Sims causality tests are used.

Резюме. Изследването припомня някои факти от историята на БНБ, възстановяването на паричните агрегати, динамиката на паричното предлагане и търсене, скоростта на парите и източниците на инфлация. Иконометричната обработка на възстановените динамични редове позволи промерка на няколко основни тези: инфлацията е паричен феномен, тя е предизвикана от покриване на дефицитите и квазидефицитите в икономиката, породени от неравновесие в държавния бюджет и платежния баланс на страната; търсенето на пари е нечувствително към измененията в лихвените проценти; движението на номиналния доход плътно следва нарастването на паричната маса, т.е. трансакционният мотив в търсенето на пари е определящ. В рамките на емпиричната проверка е проведено специално изследване на влиянието и посоката на импулсите: от реалната икономика към паричните агрегати (теория на реалния бизнес цикъл) или, обратно – от движението на парите към реалната икономика (теория на паричния бизнес цикъл). Използвани са VAR-модели и тестове за причинност на *Granger Sims*.

Contents

Objects and Structure of the Study

In his preface to Stoyan Bochev's book *Capitalism in Bulgaria* (1998), which is in essence a separate piece of research, Roumen Avramov restores the tradition of modern analysis of Bulgarian monetary policy in the country's first half-century of contemporary sovereignty. The parallels with Bulgaria's new monetary history fifty years later are unequivocal.

The *objects* of our study are rather limited and may be viewed as footnotes to the study of monetary history between 1913 and 1945. This involves modeling of monetary relationships in Bulgaria and drawing some theoretical conclusions. The monetary history of the selected period is examined in the light of modern economic concepts and quantitative techniques. Within the framework of the present analysis, an attempt is made at restoring monetary statistics and constructing time series of monetary aggregates and other major macroeconomic indicators, to be used in future studies.

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This study is dedicated to the 120th anniversary of the BNB. We are indebted to Roumen Avramov who reviewed an earlier draft of the study, corrected most of our errors and inaccuracies and gave us some valuable ideas. Kalin Hristov provided additional help.

The postulate of the constitutional subordination of Bulgarian National Bank monetary policy to the state, and in particular to the budget (and hence the excuse for all monetary disasters in Bulgaria during the reviewed period) has been extensively expounded: *D. Yordanov (1910), H. Chakalov (1920), S. Bochev (1924), A. Hristoforov (1946), R. Avramov (1995, 1998)*. We accept this as a working hypothesis and reduce it to the following underlying proposition: *inflation and lev devaluation over the period under review are of purely monetary nature. Currency issue is caused in its turn by deficits and quasi-deficits in the government budget and the balance of payments which in their turn are impacted by real sector developments.*

The other hypothesis we test empirically is that money dynamics is contingent on real sector development and that any manipulation of money, whatever the motivation for it, has a destabilizing effect.

The study is *organized in the following manner*: in the *first part* we investigate the historical, legislative and operational framework for BNB operations from its foundation to the end of 1945. We focus on money supply dynamics. Due to a lack of statistical data, 1946: the last year of *de jure* BNB independence is not captured. *(De facto* BNB policy was completely subordinated to governmental policy much earlier.)

In the context of these specific historical developments, in the first part we place a particular focus on the BNB as a lender to government. The relationship between the two institutions is marked by inequality throughout the period under review, taking the form of unscrupulous direct budget deficit financing, triggering money supply instability and hence inflation.

The *second part* reveals the sources and statistical methodology used in the construction of time series for reserve money and broad money, accompanied by brief explanations of a methodological and functional nature. An analysis of the factors that have caused the observed changes is included.

The *third part* is devoted to modeling money supply and demand, inflation and its sources. Money multiplier (and its components) and money velocity are calculated and their trends outlined.

The *fourth part* presents an empirical testing of the 'monetary – real' causality for the 1913 – 1945. An analysis based on VAR models (vector autoregressions) and the Granger – Sims causality tests examines the two extreme hypotheses: that shocks spread from money to the real economy *(Friedman, M., A. Schwartz, 1963; Sims, Ch., 1972),* or that

money follows real economy development (the real business cycle theory, *King, R., Ch. Plosser, 1984; Romer, Ch., D. Romer, 1989*). Such tests using Bulgarian historical data are carried out for the first time and they shed new light on the long-standing discussion on the role of money in the economy.

I. An Overview of Developments in the National Economy and Money Supply

Major *criteria* adopted in the periodization of monetary sector development in Bulgaria are changes in the institutional and macroeconomic frameworks. The first reflects modifications of contemporary laws on the BNB or the passage of new ones under the impact of political changes in Bulgaria, and the implementation of different stabilization programs. The second reflects the effects of a number of external and internal economic factors.

1879 – 1885

The Bulgarian National Bank was established on 25 January 1879 with the approval of its Articles of Association by the Knyaz Dondukov-Korsakov. According to the motives listed in the accompanying note *(BNB Jubilee Collection, 1879 – 1929, 1929)*, the Bank was designed as an establishment to meet credit needs for the promotion of trade development. In short, during this period the BNB performed the *functions of a pure commercial bank*. It raised resources through deposits and placed its funds by lending to agricultural savings associations and municipalities or by discounting bills of exchange. The Bulgarian government allocated funds for its capital formation and the opening deposit base. Until 1885 the Bank was not capable of performing large-scale operations.

One of the peculiarities of this period is the fact that the BNB was not an issuing bank. Under a law adopted in 1880 *(the Law on the Minting Rights in the Principality)*, issue was entrusted to the government. The monopolization of seigniorage is understandable given the monetary needs of the newly emerged state. However, despite the Law, evidence shows that the desired results were difficult to achieve. For instance in 1882 a mere 2.1 million nickel coins were minted, and 20 million silver levs in total for 1884 and 1885 *(Statistical Yearbook of the Bulgarian Kingdom, 1909)*. At the same time, Turkish, Romanian and Russian silver coins were in circulation. The reason for the lack of ho-

mogenous circulation in the country until 1885 was inconsistent government policy (including legislation). This policy allowed the exchange of Russian silver roubles for levs at a higher rate than that in neighboring countries which boosted their import and demand for them in the country *(120 Years BNB, 1879 – 1999)*.

As statistical data on money supply for this period is not representative enough, it cannot serve the purposes of our research.

1886 – 1912

From early 1884 to late 1887, after legislative intervention *(120 Years BNB, 1879 – 1999)*, all foreign coins were withdrawn from circulation. This created a lev monopoly as legal tender and laid a basis for its strengthening.

In parallel with this act in 1885 a new establishment instrument on the BNB was adopted *(The Law on BNB Establishment)*. Pursuant to this the Bank was granted the privilege of issuing banknotes against the obligation to maintain a 33.3 percent gold cover for banknote issue. In addition, the law provided for extended BNB commercial operations – another step seeking to enhance Bank role in national economic life.

Other implications of the amended law involved the clear statement on relationship with the government whereby BNB exposure was delimited (through a clause in an additionally created constituent Articles of Association) to 20% of paid-up capital.

During the review period primary source of funds for BNB operations were deposits and current accounts. The high cost of these funds, combined with the necessity of increasing BNB contribution to the budget and relatively higher silver reserves required particular steps to strengthen the credibility of gold-backed banknotes as legal tender. To this end, the law was amended in 1891 to authorize the BNB to issue silver banknotes backed at 33.3% of face value. The Bank was obliged to convert the two types of banknotes against reserve metals upon demand. Despite its legally mandated power, the BNB made use of the right to issue silver-backed banknotes only as late as 1899. The main reason for the enforced issue of silver-backed banknotes were the dire straits of public finance[1] due to poor agricultural crops, current account deficits in the balance of payments and depletion of Bank gold reserves

[1] *Unfortunately, because of the practice (applied till late 1902) of reporting the obligations of the government together with claims on current accounts and on private persons in the BNB accounting balance sheet (D. Yordanov, 1910), it is not possible to measure the latter claims and hence assess the role of government debt as a source of currency issue growth.*

(120 Years BNB, 1879 – 1999). At the same time convertibility into gold was discontinued and gold-backed banknotes were to be converted into silver plus the relevant *agio* at the prevailing daily exchange rate *(120 Years BNB, 1879 – 1999)*.

In 1902, due to good agricultural crops and receipt of external loans, some stabilization was achieved and *agio* (premium above official rate) dropped to its normal level.

The period between 1903 and 1912 is characterized by rapid economic growth. Trade balance was positive until 1909, the lev exchange rate was stable and agricultural crops were good. This helped enhance the country's credibility and in 1909 Bulgaria received its first external loan without any special guarantee. Part of this was used to repay government outstanding obligations to the BNB. During this period banknotes came to be viewed as a reliable means of payment. Deposits with the BNB, the Bulgarian Agricultural Bank and the Postal Savings Bank (major institutions in which the public's savings were concentrated) gradually increased. BNB efforts to make banknotes the primary source of funds succeeded. This marked the beginning of a long process of transforming the BNB into a typical issuing bank. The beginning was set in 1906 with the adoption of the new Law on the BNB.

Over the period until 1912 money in a broad sense, in the form of deposits, did not typically enjoy public credibility. Economic agents preferred coins and storage of savings. This conclusion is backed by a number of special studies *(D. Yordanov. Bank Review, 1910)*. The lack of credibility in paper money is also associated with the bitter experience of constantly devaluating *kaymeta* (paper banknotes issued by the Ottoman government and in circulation from 1839/1840 to 1862 *(Eldem, 1999)*.

It is notable that the role of money as a means of payment and a store of value was limited. There are several reasons for this. Firstly, public living standards and savings were low. Secondly, the public still mistrusted the newly established banks and resisted entrusting its savings to them. In these conditions, it was common practice with Bulgarians to keep their temporary cash surpluses at home, only more educated individuals preferring to delegate this to someone else.

1913 – 1922

With Bulgaria's involvement in the wars economic conditions began gradually deteriorating. Agricultural output declined continuously, trade balance was negative from 1909 to 1921 (except for the 1915 –

1917 period due to military supplies to Germany which were not paid for, however), government obligations to the BNB grew rapidly, inflation accelerated and the lev devalued. The growing government budget deficit was entirely financed through banknote issue and consequently currency in circulation grew immensely. The ratio of banknote gold cover decreased dramatically *(Bochev, S., 1998)*. Nevertheless, purely formally the provisions of the Law on the BNB were observed inasmuch as at the insistence of BNB management Bank's foreign receivables under military advances to Germany were reported as gold reserves.

1923 – 1928

During this short period economic conditions in Bulgaria gradually improved. Growth of government debt to the BNB and banknote issue were legally constrained (a Law on Limiting the Issue of Banknotes was adopted under pressure from the Inter-Allied Commission in 1922), inflation dropped gradually, agricultural crops improved, but trade balance stayed negative. The exchange rate stabilized thanks to the introduction of a full BNB monopoly on trade in foreign instruments of payment in late 1923. National income increased, as did the country's credibility whereby Bulgaria was granted two external loans: the Refugee Loan (1926) and the Stabilization Loan (1928). Disbursed funds were used by the government to repay its debt to the BNB and to recapitalize the Bulgarian Agricultural Bank and the Bulgarian Central Cooperative Bank, aiming to stimulate lending by them. With the adoption of the 1928 Law on the Lev Stabilization and Coin Circulation the gold-exchange monetary standard was introduced, lev convertibility was almost completely restored and BNB monopoly on trade in foreign instruments of payment was abolished. High interest rates and the stable exchange rate helped rapidly attract short-term investment which shifted into the banking system.

1929 – 1939

Following national income growth in 1927 and stagnation in 1928, in late 1929 poor agricultural crops and dramatically increased imports caused the balance of payments deficit to hit critically high levels and BNB gold exchange reserves more than halved. As a result of credit expansion and the need for refinancing, discount lending by the BNB more than doubled. The credit portfolio of the Bulgarian Agricultural Bank (BAB) increased by 40% in a year. At the end of that year the

number of overdue credits increased dramatically, signaling a credit crunch *(BNB Annual Report, 1929)*.

Crisis trends evolving in 1929 intensified in 1930 and 1931 in line with falling global prices, despite improved agricultural crops and higher exports. Imports contracted to less than half, contributing to a surplus on the balance of payments current account. However, this proved insufficient to offset the withdrawal of foreign capital investment by several private shareholder banks. Consequently BNB reserves dropped drastically. Despite dramatically reduced lending, overdue loans increased steadily. In response to these negative developments a new Law on the Trade in Foreign Instruments of Payment was passed, providing for rigorous import regulation.

Business cycle negative development continued until late 1935 when the lowest point was hit and the output index measured by its physical volume fell to 87 against a base of 100 in 1927. At the same time foreign trade came under severe constraints due to enforced principles of clearing exchange of goods. The next year, 1936, marked a turning point and the beginning of a period of recovery for the Bulgarian economy. This continued until 1939 when the upper limit of the business cycle was reached. During the entire period under review a sustained trend evolved toward concentration of Bulgarian exports to Germany at the expense of other traditional foreign trade partners. The current account continued to be regulated through internal compensatory premia and clearing.

In 1936 the ratio of the lev gold cover was reduced from 33.3% to 25% and the requirement to raise the interest rate when the cover fell below the legally prescribed limit was abolished. This *de facto* devaluation was aimed at severing the relationship between money supply and depleted reserves to meet enhanced demand resulting from economic recovery. Growth gradually slowed over the next few years and a decline occurred in 1940.

1940 – 1945

In a state of war, a sustained downward trend in national income began in 1941, its value index reaching the unprecedented 72.11 against a base of 100 in 1927. In parallel with this banknote issue grew rapidly from 1941. It was covered in the BNB balance sheet under the Foreign Claims item, recorded as Other Foreign Assets. This reflected surpluses on clearing accounts with Germany, financed by the government budget. The reported deficit was directly covered by currency is-

sue. After the war ended Bulgaria's claims remained outstanding and were ultimately forfeited under the 1947 Paris Peace Treaty.

Additionally, the government began issuing treasury bills from 1942. They were granted the status of legal tender. Thus accelerated currency issue proved to be the main reason for the steep inflation rise during the 1943 – 1945 period.

II. Statistical Data: Methodology and Sources

The data used in the study was collected after a comprehensive investigation and systematization of monetary statistical principles applied during the period under review. For the purpose, a number of official sources of information were used, including:

Statistical Yearbooks of the Kingdom of Bulgaria for 1909, 1930, 1940, from which the following data were derived: population, average exchange rate, trade balance, retail price index, agricultural produce, and deposits in the banking system (with the exception of those for 1927 – 1930 for which other sources were used).

Statistical Yearbook of the People's Republic of Bulgaria, 1943 – 1946, from which the following data were derived: deposits in the banking system, consumer price index, trade balance, population, and wheat crops.

BNB Annual Reports for 1927 – 1940. These reports were used to calculate deposits with the BNB, reserve money, government liabilities to the BNB, and deposits with commercial banks.

Asen Chakalov's monograph *National Income and Expenditure in Bulgaria, 1924 – 1945*, on real and nominal national incomes.

BNB Statements including data on the size of deposits and current creditor accounts of shareholder banks for the 1924 – 1929 period.

BNB Statistical Bulletin, 1939 – 1945, presenting data on banks' deposits for the period.

Jubilee Book of the Bulgarian Agricultural Bank, 1864 – 1928. The balance sheets published in it provided data on deposits for the 1912 – 1928 period.

In the process of data collection and analysis we discovered that it was impossible to construct one of the time series on the basis of a single source (for example the *Statistical Yearbook*) and we had to calculate the amount of deposits in the banking system for the 1927 – 1930 period by adding the balance sheet indicators of major deposit institutions – BNB, BAB, the Bulgarian Central Cooperative Bank (BCCB), the Postal Savings Bank and private shareholder banks. Internal settle-

ments (where data is available) were cleared to avoid double reporting. This allowed for the time series to be extended in scope and enabled us to carry out reliable econometric tests.

Due to changes in the country's land area and hence population, the figures for income and monetary aggregates were expressed *per capita*. This approach was introduced by Milton Friedman *(Friedman, M., 1959)*.[2]

Real values of variables were obtained by deflating the nominal values by the retail price index against the 1913 base.

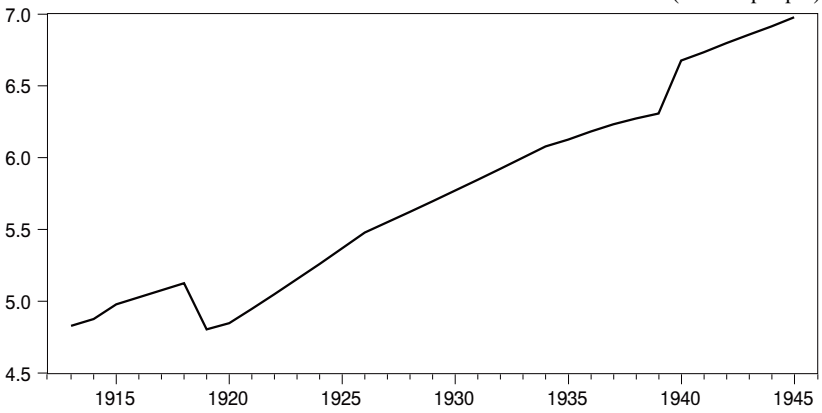
During the period under review *major macroeconomic indicators* exhibited the dynamics displayed in the charts below.

Population numbers reflect changes in the country's land area under the Treaty of Neuilly-sur-Seine and the Craiova Agreement of 1940.

Chart 1

POPULATION

(million people)

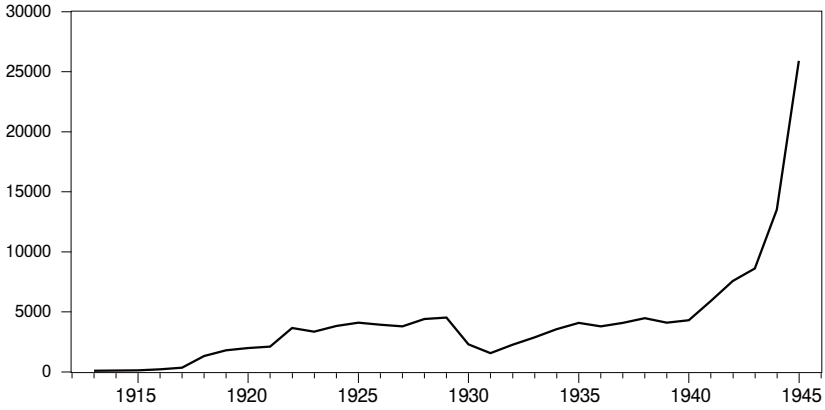


Data on the price index for the 1913 – 1922 period was taken from the *Statistical Yearbook, 1913 – 1924*, and relevant changes in the base were made to achieve compatibility. A similar procedure was applied in respect of data for 1923 – 1926 (*Statistical Yearbook, 1926)* and 1927 – 1945 (*Statistical Yearbook of the People's Republic of Bulgaria*, 1946).

[2] *For more detail see Nenovsky, N., 1998, Chapter 2.*

Chart 2

RETAIL PRICE INDEX
(1913 = 100)

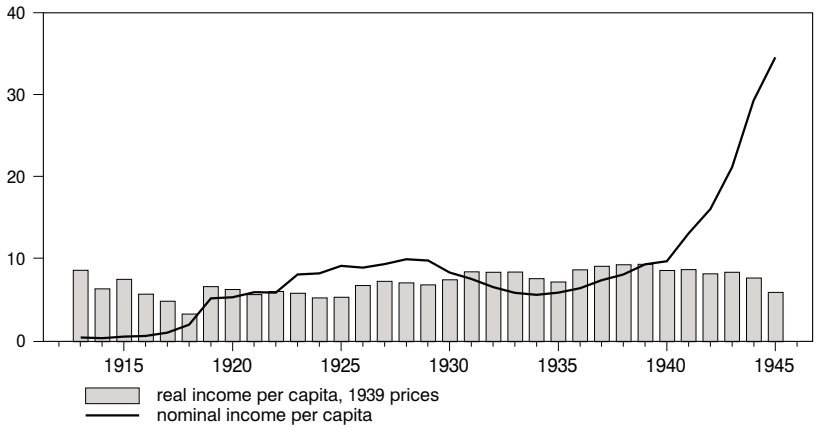


The nominal and real income figures for the 1913 – 1924 period are a rough estimate by the authors. They are approximated with physical agricultural produce and the general index of stock prices of agricultural products for the period. For the 1924 – 1945 period *A. Chakalov's (1946)* data was used.

Chart 3

REAL AND NOMINAL INCOME PER CAPITA

(thousand levs)

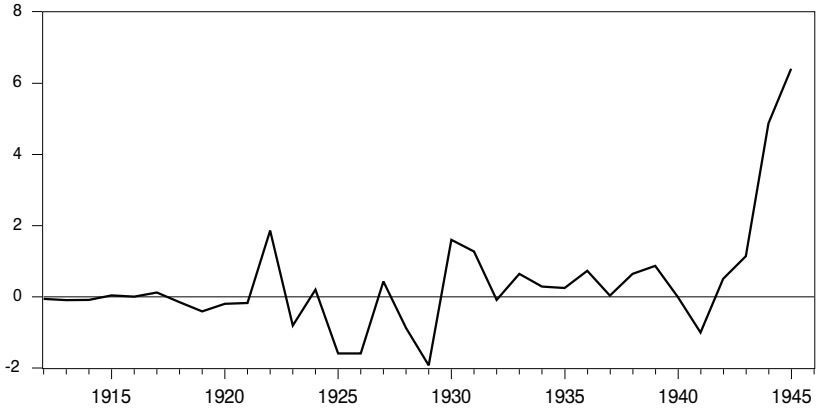


Trade balance data more or less follow agricultural produce dynamics as agricultural goods were the major items on Bulgaria's export list. It should be noted that in a number of cases the government intervened actively in foreign trade through administrative regulation of imports and exports. The continued orientation of exports to Germany and the lack of imports from that country led to the formation of a sustained positive clearing balance, particularly after 1942.

Chart 4

TRADE BALANCE DYNAMICS

(billion levs)



III. Modeling the 1913 – 1945 Monetary Dynamics

This part deals with modeling major monetary relationships: money supply and demand, multiplier and velocity of money, the relationship between money supply and nominal and real national income, the relationship between currency issue and inflation, the impact of government liabilities on inflation.

The study of the money market may be reduced to analysis of money supply and money demand, and gaps between them manifesting themselves as inflation.

Money Supply Dynamics

Money supply is both institutionally set (part of reserve money) and the result of economic agents' behavior: multiplier and part of reserve money sources (mainly BNB internal claims).

Reserve money per capita is calculated as a sum of the amount of issued banknotes and commercial banks' balances on current accounts with the BNB.

Chart 5

BANKNOTES PER CAPITA

(levs)

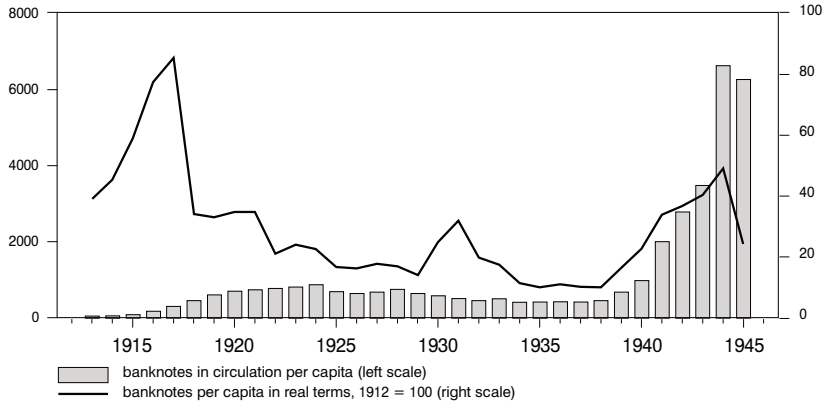
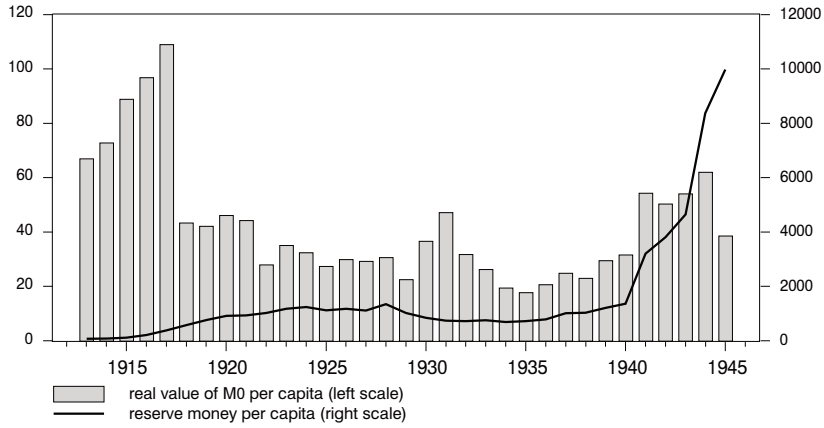


Chart 6

RESERVE MONEY PER CAPITA

(1912 = 100)

(levs)



Deposits (quasi-money) per capita reflected the propensity to savings in monetary instruments (e. g. deposits).

Chart 7

DEPOSITS PER CAPITA

(levs)

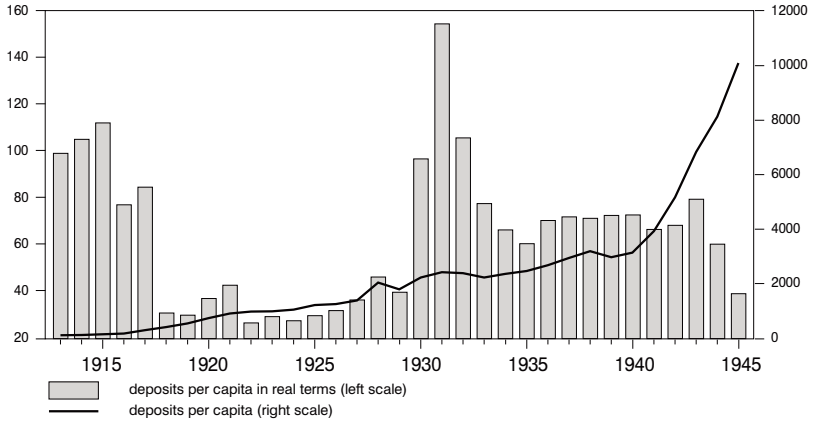
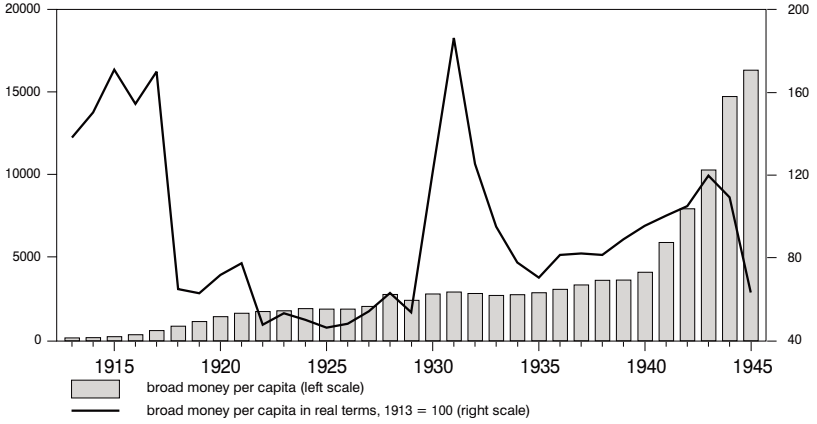


Chart 8

BROAD MONEY (M3) PER CAPITA

(levs)



Broad money included banknotes in circulation, current accounts with the BNB and commercial banks (except for current accounts with the BNB), time and savings accounts and deposits of orphans with the Bulgarian Agricultural Bank, the Bulgarian Central Cooperative Bank, the Postal Savings Bank, private shareholders and popular banks (after 1927).

Deposits with the BNB consisted of the following balance sheet items: current and deposit accounts of the government, time deposits of the government, other current accounts, and other time deposits.

Data displayed on Chart 8 clearly indicates that in high inflation and deflation periods (at relatively stable nominal interest rates) the real value of currency dramatically changed. For instance, the real value of currency in circulation *per capita* declined drastically in the inflationary 1918 – 1920 period and increased between 1930 and 1932, a period of deflation.

Money Multiplier and Its Components

Money multiplier indicates economic agents' behavior and the stability of money multiplier plays a key role in macroeconomic developments.

In the period under analysis multiplier average value was 4.28, ranging between 2.4 and 5.7. Multiplier variance was 21%, measured through the standard deviation as a percentage of the average for the period (see the table on p. 24). Money multiplier behavior was unstable and cyclical. Impulses prompting changes in the money multiplier depended on shocks in the amount of banknotes in circulation which caused changes in the *currency in circulation/deposits* (C/D) ratio.[3] Money supply shocks occurred as a result of deficit financing by currency issue. The review of money multiplier fluctuations indicates that they coincided with strong fluctuations in the banknote issue in the 1915 – 1920 and 1940 – 1945 periods.[4]

It would be reasonable to expect that between 1934 and 1936, when the entire financial system was caught in a debt crisis, economic agents would prefer to hold cash. However, this did not happen. Most probably this crisis was not characterized by runs on banks, turning into panic. This is confirmed by the behavior of the *banknotes in circulation/ quasi-money* ratio displayed on Chart 10.

[3] *This ratio is a money multiplier component.*

[4] *It is supposed that the values of money multiplier for 1913 – 1926 were undervalued due to lack of complete data on deposits for the entire national financial system. For instance, the sample did not cover deposits with popular banks between 1913 – 1926 which had a very small market share at the time. There was no data on private bank deposits in the 1915 – 1918 period. The share of private bank deposits is based on the assumption that the deposit indicator for private banks was 64.33% of state-owned banks, which was the average value in 1914 and 1919.*

Chart 9

MONEY MULTIPLIER
(Broad Money/Reserve Money)

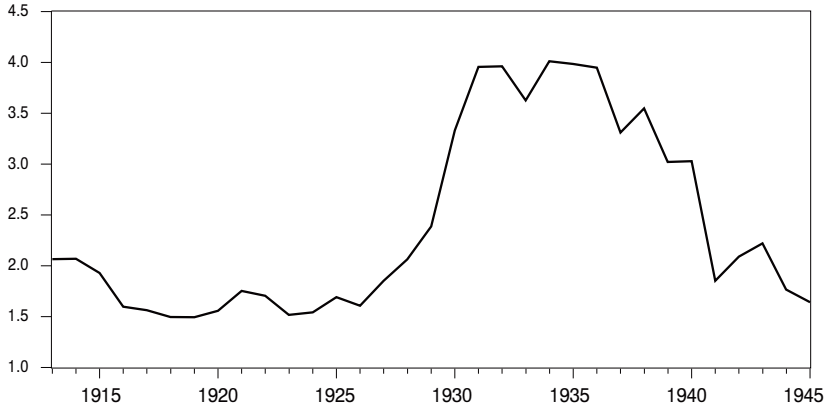
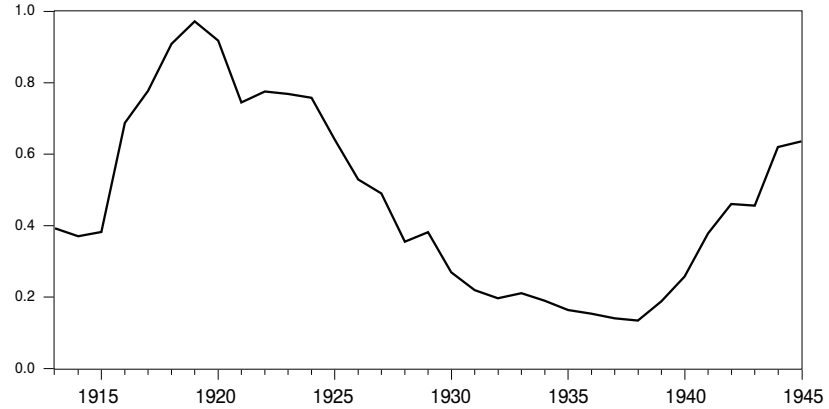


Chart 10

BANKNOTES IN CIRCULATION/QUASI-MONEY



The banknotes/quasi-money ratio reflects economic agents' preferences to use transaction and savings instruments. Theoretically, the lack of shocks in money supply help maintain this ratio stable. In the long run, it was influenced primarily by the evolution of financial mediation and development of new instruments. But data on the review period indicates quite the opposite: an absence of such stability due to excess banknote supply.

Money Supply and National Income

Per capita nominal national income growth displayed 'strikingly' similar dynamics to the growth of currency in circulation and broad money *per capita*. Harmonized movements of nominal income and monetary aggregates occurred in other countries as well. In support of this fact, it is reasonable to mention the study of Milton Friedman and Anna Schwartz on the US economy.

Chart 11

DYNAMICS OF CHANGES IN NOMINAL NATIONAL INCOME AND CHANGES IN CURRENCY IN CIRCULATION

(billion levs)

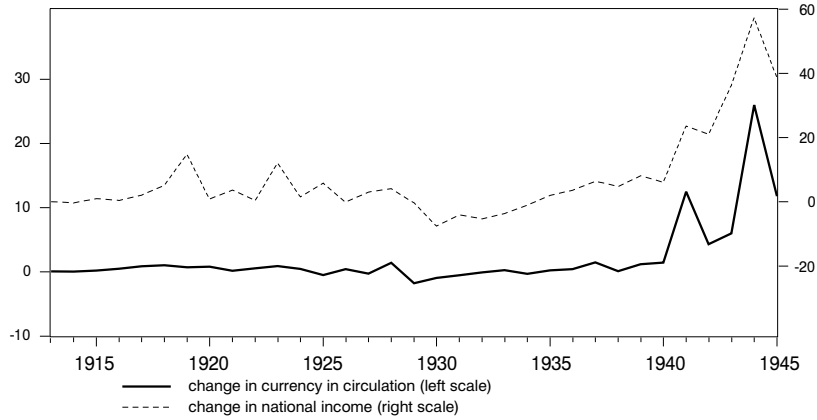
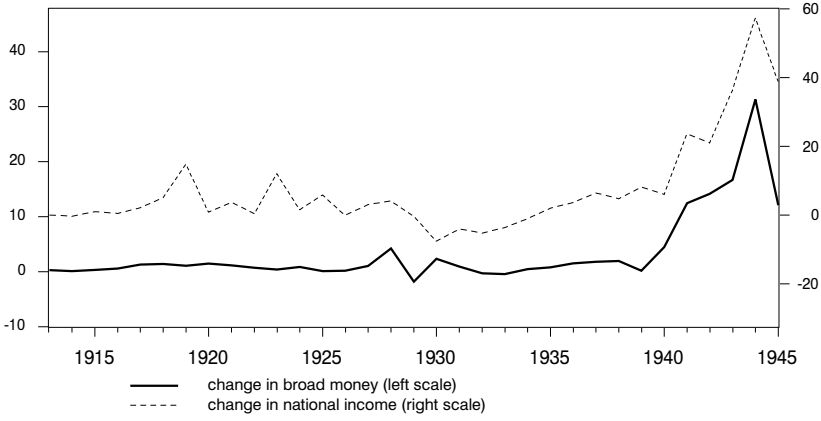


Chart 12

DYNAMICS OF CHANGES IN NOMINAL NATIONAL INCOME AND CHANGES IN BROAD MONEY

(billion levs)



Direct dependence between nominal income growth *per capita*, currency in circulation and broad money *per capita* are displayed in the chart below (scale *per capita*).

Chart 13

RELATIONSHIP BETWEEN CHANGES IN CURRENCY IN CIRCULATION AND CHANGES IN NOMINAL INCOME

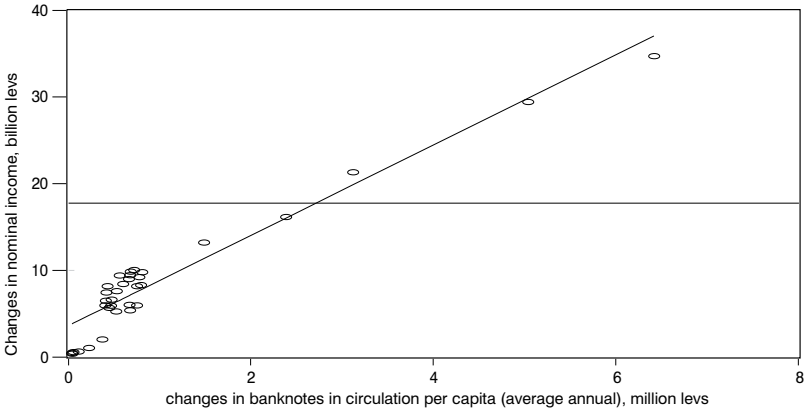
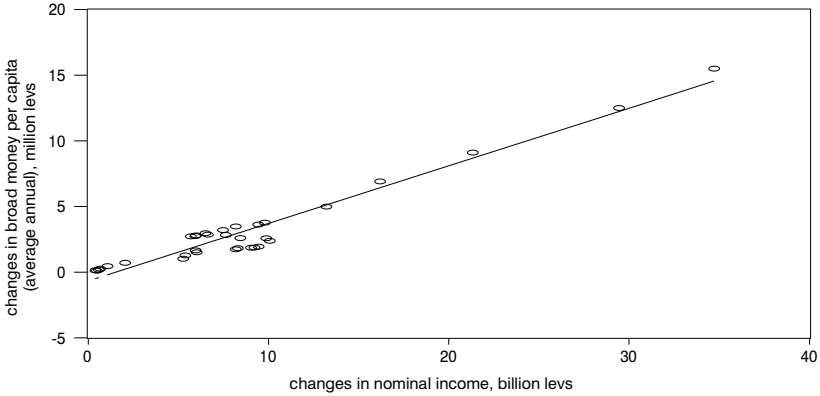


Chart 14

RELATIONSHIP BETWEEN CHANGES IN BROAD MONEY AND CHANGES IN NOMINAL INCOME



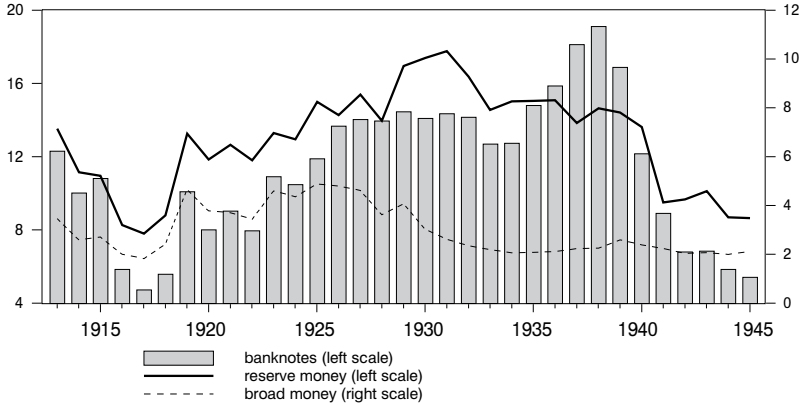
There are two fundamental ratios which are always included in the historic studies of monetary links: the *national income/monetary aggregate* ratio (establishing the velocity of money) and the reciprocal *mon-*

etary aggregate/national income ratio (defining money balances per unit of income *(Friedman, M., 1958, 1968)*. Based on the latter ratio Milton Friedman calculated the *number of weeks* needed to cover *per capita* income with money balances in various countries *(Friedman, M., 1968)*.

The *velocity of money* measured by banknotes, reserve and broad money displayed the following dynamics:

Chart 15

VELOCITY OF MONETARY AGGREGATES



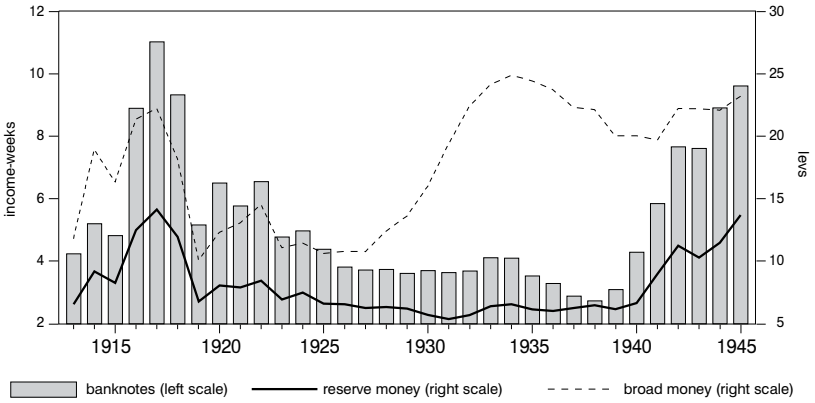
An increase in the velocity of money in the high inflation 1917 – 1920 period was reasonable. This was clearly pronounced in banknotes. The chart also displays the *downward trend* in money velocity (particularly after 1930 – 1931), which coincided with trends in other countries over this period *(Friedman, M., 1959)*.[5]

According to Milton Friedman, real (and not nominal) currency amount is of decisive significance for economic analysis. A real quantity is "money expressed in goods and services which can buy", or money equivalent to the number of income-weeks *(Friedman, M., 1969, p. 67)*. Thus, *money balances* (banknotes, reserve money and broad money) are indicator of an economy's monetization. For Bulgaria this indicator in the period under review displayed the following dynamics:

[5] *According to Friedman, in the long-run money velocity tends to decrease, since velocity depends on permanent income developments. Besides, money is "a luxury good" (that is its elasticity is >1). For details, see Nenovsky, N., 1998, p. 72.*

Chart 16

MONEY BALANCES EXPRESSED IN INCOME-WEEKS



The *banknotes/income* ratio ranged from 0.06 to 0.07 until 1940. Then the ratio started to increase gradually, reaching a high of 0.22 in 1944. Expressed in income-weeks, this was three to four weeks until 1940 and 11 weeks in 1944. These indicators proved similar to those in other countries in the period under review *(Friedman, M. 1968, 1969)*. According to Milton Friedman's calculations, in the period under review[6] banknotes in circulation expressed in income-weeks for various countries were as follows: India, seven weeks; Yugoslavia and Greece, six; Turkey, five; the USA, four; Israel, four. Lower values of this indicator for the USA and Israel were attributable to the structure of money supply. In the latter two countries deposits accounted for a bigger share and monetization of the economy was stronger as a whole. The dramatic increase in 1940 (the amount of banknotes held by the public was equivalent to 11 income-weeks) coincided with the beginning of intensive banknote issue by the BNB and a period of high inflation, which marked the economy's demonetization.

The table on page 24 shows *major characteristics of time series of analyzed variables (average, median, maximum, minimum, standard deviation and volatility measured as a percentage of standard deviation of the average for the period)*. From 1940 this trend was reversed, resulting in stronger fluctuations of monetary indicators for the 1940 – 1945 period compared with relative stability of the 1927 – 1939 period. The same conclusion is valid for the 1913 – 1922 period.

[6] *Friedman, M. (1969),* op. cit., *pp. 67 – 71.*

The variables used are as follows:

M3/N – broad money *per capita*;
M0/N – reserve money *per capita*;
BN – amount of banknotes *per capita*;
DD/N – deposits (quasi-money) *per capita*;
GD – government debt;
GD/N – government debt *per capita*;
M – money multiplier;
V0 – velocity of banknote circulation;
V1 – velocity of reserve money circulation;
V2 – velocity of broad money circulation;
Y/N – nominal income *per capita*;
YR/N – real income *per capita*;
P – price index;
S – BNB discount rate;
BNC – banknote cyclical component;
M3C – M3 cyclical component;
M0C – reserve money cyclical component;
DDC – quasi-money cyclical component;
YC – real income cyclical component.

MONETARY INDICATORS

	BN	M0/N	M3/N	DD/N	M	V0	V1	V2
1913 – 1926								
Average	488.3330	694.8099	1118.607	630.2740	1.684270	9.372226	5.868399	3.512008
Median	615.1650	837.1099	1279.278	635.7571	1.602419	10.04803	6.185378	3.581197
Max.	861.3549	1237.583	1907.841	1247.321	2.068191	13.66263	8.246224	4.875609
Min.	39.09078	66.93018	138.1750	99.08424	1.492996	4.715528	2.849244	1.823651
Standard deviation	303.7677	448.6956	715.6698	428.8356	0.200171	2.665617	1.668502	1.061443
Volatility	0.62	0.65	0.64	0.68	0.12	0.28	0.28	0.30
1927 – 1945								
Average	1479.453	2223.472	4958.174	3478.721	2.859336	12.73670	7.310857	2.670143
Median	634.4062	1065.327	3004.001	2566.779	3.023414	13.98461	7.864446	2.240551
Max.	6629.446	9977.211	16361.55	10094.48	4.010457	19.10504	10.32467	4.791280
Min.	402.9252	688.2196	1882.615	1247.321	1.607221	5.410049	3.480176	1.993616
Standard deviation	1897.519	2633.053	4178.813	2331.648	0.914036	3.976224	2.150436	0.884319
Volatility	1.27	1.18	0.83	0.65	0.30	0.32	0.30	0.29
1913 – 1945								
Median	633.5176	1012.111	2719.844	2031.431	2.062134	11.88240	7.145090	2.586722
Max.	6629.446	9977.211	16361.55	10094.48	4.010457	19.10504	10.32467	4.875609
Min.	39.09078	66.93018	138.1750	99.08424	1.492996	4.715528	2.849244	1.823651
Standard deviation	1556.281	2189.491	3781.332	2314.017	0.921237	3.874940	2.093083	1.001521
Volatility	1.43	1.36	1.10	0.98	0.38	0.34	0.31	0.34

Money Demand Dynamics

Data[7] reveals that national income and transaction motives played a key role in money demand dynamics. In the period under review, interest rates did not affect money demand and they were not the true price of money.[8] Consequently, there was no statistically significant portfolio motive in the money demand function.

This conclusion reflects the inefficiency of interest rate (discount rate) as an anti-inflationary and monetary policy instrument. Intentionally or not, the BNB did not actively employ discount interest. Adjustments in discount reflect real sector state, and particularly the economy's need for credit.

The assessment of money demand function through the two major and most precisely defined aggregates (real balances of money in circulation and real balances of broad money) is summarized in the following equations. (Coefficients should be read as elasticity.)

The variables used in regressions are as follows:
M0 – reserve money;
M3 – broad money;
B – money in circulation;
P – retail price index based on 1913[9]
N – number of individuals;
Y – national income;
S – BNB discount rate;

Demand for broad money

$$\log(M3/PN)_t^d = 12.84 + 0.70 \log(Y/PN)_t^d + AR(1)$$
$$(7.63) \quad (7.91) \quad (16.69)$$
$$R^2 = 0.86 \quad R^2_{adj} = 0.85 \quad DW = 2.31 \quad F = 0.00$$

Demand for cash

$$\log(B/PN)_t^d = 11.13 + 0.68 \log(Y/PN)_t^d + AR(1)$$
$$(4.41) \quad (5.08) \quad (9.51)$$
$$R^2 = 0.86 \quad R^2_{adj} = 0.85 \quad DW = 1.46 \quad F = 0.00$$

[7] *Tests on stationarity of time series are included in the Appendix.*

[8] *For a similar analysis of money demand in India over the same period, see: Darrat, A., M. Webb, 1986. It confirmed the opinion that interest rates were formed in the real sector as a link between savings and investment.*

[9] *Thus $\pi = \log[P/P(-1)]$ is the inflation rate measured through the retail price index.*

If the BNB discount rate is included in the money demand function, equations are as follows:

Demand for broad money

$$\log(M3/PN)_t^d = 12.59 + 0.68 \log(Y/PN)_t^d - 0.09\ S + AR(1)$$
$$(7.23)\quad (7.48)\qquad (-0.31)\quad (13.98)$$
$$R^2 = 0.86\quad R^2_{adj} = 0.84\quad DW = 2.22\quad F = 0.00$$

Demand for cash

$$\log(B/PN)_t^d = 10.30 + 0.63 \log(Y/PN)_t^d - 0.06\ S + AR(1)$$
$$(3.87)\quad (4.58)\qquad (-0.13)\quad (7.75)$$
$$R^2 = 0.86\quad R^2_{adj} = 0.85\quad DW = 1.27\quad F = 0.00.$$

Although a minus sign appears before the discount interest in both equations, it is not a statistically significant member of regression (see t-statistics).

These assessments confirm the monetarist view that the interest rate is not an opportunity cost of money in the long run, and that it is an ineffective instrument for influencing the public's monetary behavior.

IV. Monetary Aggregates and Inflation

The study of inflation regression dependence on money supply (broad money M3) reflects the close direct link between them. Elasticity is measured at 1.03. The regression equation is as follows:

$$\log(P)_t^d = -7.1 + 1.03 \log(M3/N)_t^d + 0.72\ AR(1)$$
$$(-25.5)\quad (5.8)\qquad (5.7)$$
$$R^2 = 0.95\quad R^2_{adj} = 0.94\quad DW = 1.66\quad F = 0.00.$$

The dependence of inflation on banknotes in circulation was stronger since banknotes were the major legal tender. This reflects low popularity of treasury bills with a 3% interest rate coupon, issued after 1942 and used as legal tender. The regression of banknotes with the inflation rate displays the following equation:

$$\log(P)_t^d = -5.02 + 0.55 \log(B/N)_t^d + AR(1)$$
$$(-3.15)\quad (2.72)\qquad (12.9)$$
$$R^2 = 0.94\quad R^2_{adj} = 0.938\quad DW = 1.58\quad F = 0.00.$$

The analysis of regression dependence between *government debt and inflation* changes proves that the increase in currency in circulation is prompted by government debt. The results displays a strong positive link and high elasticity of 0.85. The increase in the government debt by

1% between 1927 and 1945 prompted similar inflation growth, which confirms the above hypothesis.

The regression equation (government debt and inflation) is as follows:

$$\log(P)_t^d = 7.82 + 0.69 \log(GN)_t^d + AR(1)$$
$$(29.3) \quad (4.86) \qquad (5.85)$$
$$R^2 = 0.95 \quad R^2_{adj} = 0.94 \quad DW = 1.71 \quad F = 0.00.$$

The increase in government debt stock combined with reserve money growth (mostly banknotes) results in enhanced monetization, a subject of study in the following regression.

The manner of government debt financing and the positive clearing balance with Germany were the two key factors behind price instability in the economy between 1940 and 1945. This is proved by the strong interdependence between the change in the nominal amount of monetary aggregates and amount of government debt, indicating a high degree of monetization of the budget deficit and balance of payments deficit in the economy.

The regression equation (government debt and banknotes) is as follows:

$$\log(BN/N)_t^d = 9.65 + 0.53 \log(GD/N)_t^d + MA(2) + AR(1)$$
$$(1.09) \quad (2.47) \qquad (2.65) \quad (13.11)$$
$$R^2 = 0.97 \quad R^2_{adj} = 0.96 \quad DW = 1.88 \quad F = 0.00.$$

The regression equation (government debt and broad money) is as follows:

$$\log(M3/N)_t^d = 1.86 + 0.67 \log(GD/N)_t^d + AR(1)$$
$$(1.6) \quad (4.91) \qquad (19.91)$$
$$R^2 = 0.99 \quad R^2_{adj} = 0.98 \quad DW = 1.92 \quad F = 0.00.$$

V. Studying the Direction of the Money Variables – Real Variables Impulses

The impulse direction from money to the real economy is an indispensable but insufficient condition for employment of various monetary policy instruments. If this is so, the next step will be to find if the effect is positive, *i.e.* whether it offsets and stimulates the real economy; or if the effect is negative, resulting in disequilibrium and repression of the real sector development.[10]

[10] *The theory of the real business cycle holds that monetary aggregates behavior follows*

Chart 17

DYNAMICS OF CYCLICAL COMPONENTS OF REAL INCOME AND BANKNOTES

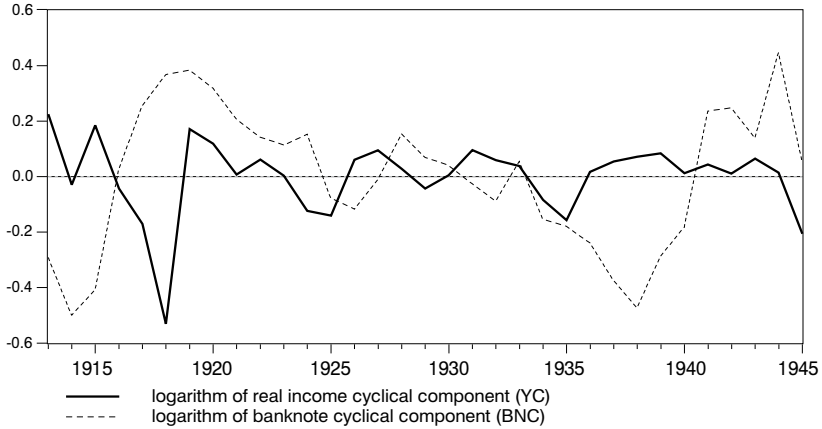
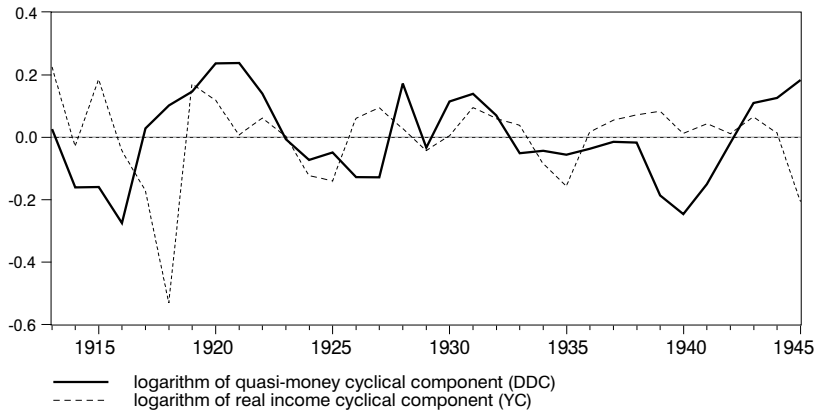


Chart 18

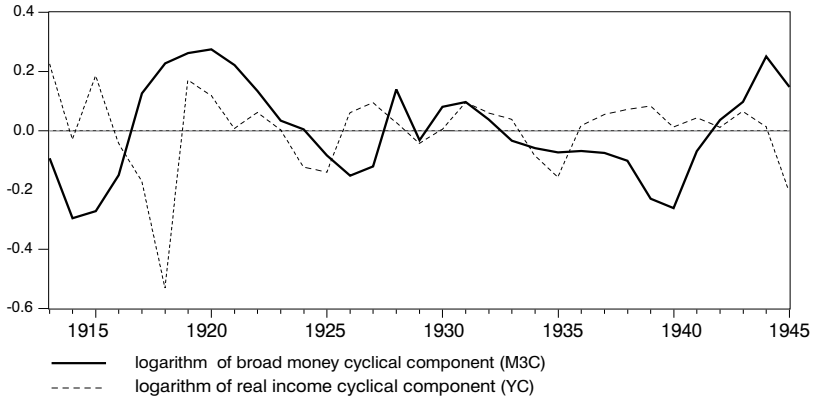
DYNAMICS OF CYCLICAL COMPONENTS OF REAL INCOME AND QUASI-MONEY



real sector development (reverse causation) and adapts to various types of shocks, associated mostly with supply. In these models money supply is endogenous, and various monetary instruments employed by the central bank are ineffective and have variable effect on economic agents.

Chart 19

DYNAMICS OF CYCLICAL COMPONENTS OF BROAD MONEY AND REAL INCOME



This chapter aims to answer the first question: the *monetary – real sector* impulse direction. In this study the methodology (borrowed from the theory of the real business cycle) of Hodrick – Prescott (1997) [11] and Kydland – Prescott (1990) is used. It consists of several consecutive procedures.

First, based on the Hodrick – Prescott filter[12] logarithmic series of income, prices and monetary aggregates should be decomposed into trend and cyclical components.

Charts 17 and 18 display *movements in cyclical components* of real income and banknotes, and real income and quasi-money.

Second, dynamics of *cyclical components* obtained for these variables are compared and their dependence is studied using the Granger – Sims causality test[13] and the VAR model built by them.[14]

---

[11] *The filter constituted in 1981 by Hodrick, F., E. Prescott has been widely used in recent years, but it was officially published in 1997.*

[12] *The formula of this filter is: :*

$min \{ \Sigma c_t^2 + \lambda \Sigma [(g_t - g_{t-1}) - (g_{t-1} - g_{t-2})]^2 \}$,

where $c_t = y_t - g_t$ *and* y_t *is the variable in question,* c_t *– its cyclical component,* g_t *– its trend, and* λ *– a positive figure. The higher the value of* λ*, the better the adjustment of the series. When* λ *tends to infinity, then* g_t *tends to linear trend. For details, see Hodrick, R., E. Prescott (1997).*

[13] *Within this test the variable Y causes X at a particular volume of information if the present value of X may be better predicted using previous values of Y than without them. This may be presented as a minimized variance of the predicted value and to be summarized:* $\sigma^2(X_{t+1} | X_t Y_t) < \sigma^2(X_{t+1} | X_t)$.

[14] *For more details about VAR models, see Hamilton, J. (1994).*

Major conclusions are as follows (results of the tests are included in the Appendix):

1. The hypothesis of a lack of causation of variances of banknote cyclical component on real income cyclical component is rejected.
2. The hypothesis of a lack of causation of variances of reserve money cyclical component on real income cyclical component is rejected.
3. The hypothesis of a lack of causation of variances of broad money cyclical component on real income cyclical component is rejected.
4. The hypothesis of a lack of causation of variances of quasi-money cyclical component on real income cyclical component is not rejected.

In general the above links indicate causation *directed from monetary variables to the real sector*. This proves the hypothesis that impulses of instability in the economy are caused by monetary aggregates.

The third step in the analysis is building a *VAR model*, consisting of cyclical components of monetary and real variables. Within the VAR model variance decomposition and response to shocks for various variables are used.

Reserve money and banknotes are considered *outside money* (controlled by the BNB), and quasi-money as *inside money* (endogenously determined by the public).[15] Consequently, the results of tests on bilateral causation are checked again as to: (1) whether developments in supply of banknotes and reserve money (controlled and determined by the central bank) influence the real income cyclical component; (2) whether developments in the quasi-money cyclical component influence the real income cyclical component; (3) whether developments in the quasi-money cyclical component depend on real income developments.

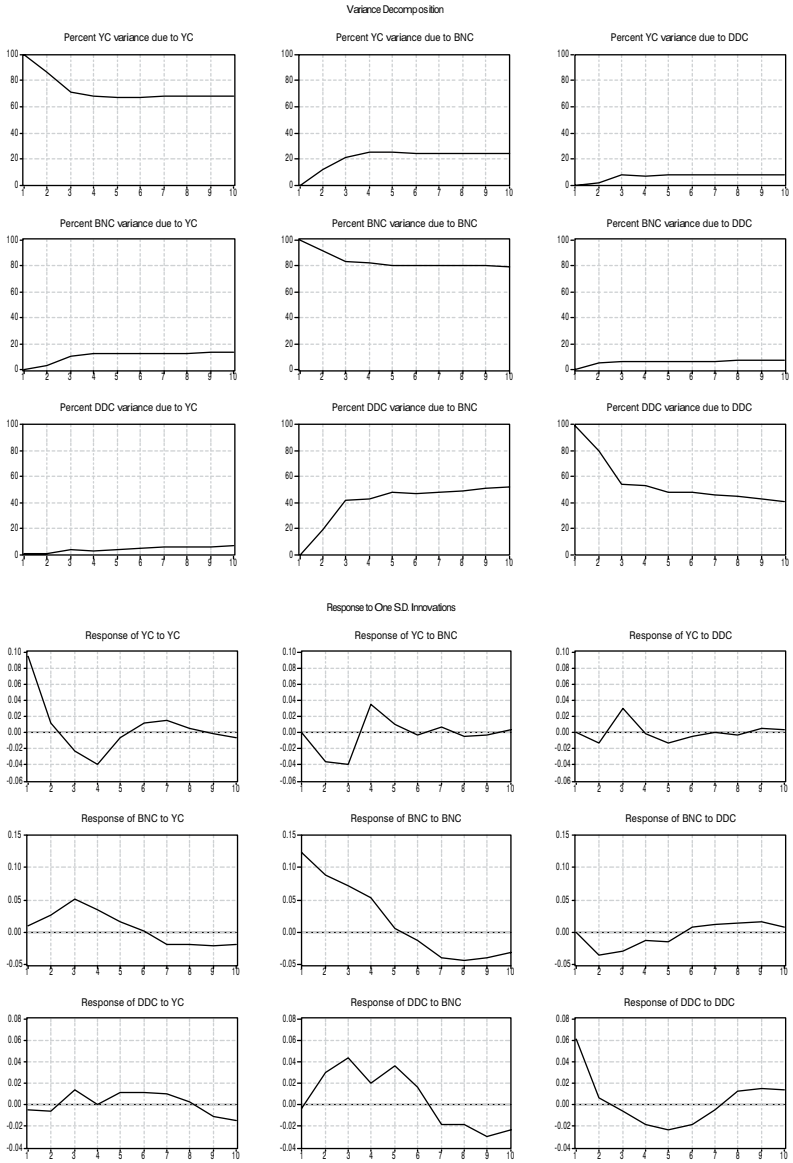
The analysis of variance decomposition in Model 1 shows the following results:

- The degree of real income variance (approximately 68%) is attributable to endogenous fluctuations, 24% to banknote fluctuations, and 8% to quasi-money fluctuations.
- The degree of banknote variance (approximately 80%) is endogenous, attributable to previous periods' variances.
- 50% of quasi-money variance is caused by banknote variance, 40% by the quasi-money's own fluctuations in previous periods, and 10% by real income shocks.

[15] *In the theory of real business cycle, differentiation of outside (controlled) and inside (uncontrolled) money is of particular significance. This theory assumes that inside money follows real economy movements, while outside money is the major source of shocks in the economy. For more details, see Plosser, C. (1989) and Ahmed, S. (1993).*

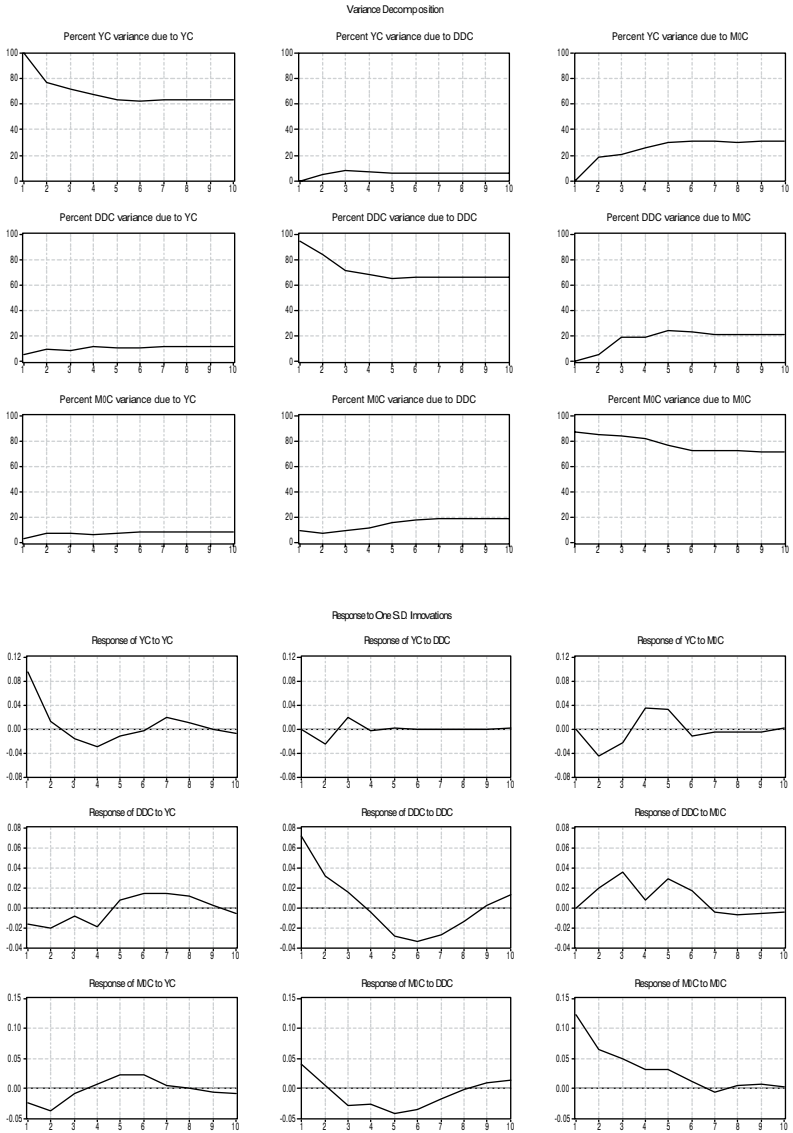
Model 1

RELATIONSHIP BETWEEN CYCLICAL COMPONENTS OF BANKNOTES (BNC), QUASI-MONEY (DDC) AND REAL INCOME (YC)



Model 2

RELATIONSHIP BETWEEN CYCLICAL COMPONENTS OF RESERVE MONEY (M0C), QUASI-MONEY (DDC) AND REAL INCOME (YC)



The analysis of impulse response function reveals the following results:

- The impulse caused by the banknote cyclical component has a negative impact on real income until the third period, and then the direction of influence changes. This impulse occurs until the sixth period and its influence subsides.
- The impulse prompted by real income has a positive impact on quasi-money until the sixth period and subsides very slowly.

The analysis of variance decomposition in Model 2 reveals the following results:

- The variance of the real income cyclical component is caused by its variance in transition periods (64%), by reserve money (31%) and by quasi-money (6%).
- 68% of reserve money variance is attributable to its variance in preceding periods, 23% to quasi-money variance and just 9% to real income variance.
- 62% of quasi-money variance is attributable to quasi-money variance in preceding periods, 25% to reserve money variance and 13% to real income variance.

The impulse response function in Model 2 is as follows:

- Impulses caused by quasi-money and directed to real income have a positive effect, expressed in a three-period lag, which then subsides.
- Impulses directed from real income to quasi-money have a positive effect and subside very slowly.
- Impulses directed from reserve money to real income have ambiguous effect: initially it is negative, after the second period it is positive, and after the fifth period it subsides.

The result of both models

In the period under review, developments in monetary aggregates variance *is endogenous* for the greater part, caused by past shocks of the central bank. This proves the thesis of the destabilizing behavior of the issuing institution during this period. The hypothesis of the real business cycle theory on monetary policy nonsystematicity is not confirmed. Impulses are generated from the monetary to the real sector rather than *vice versa*. These results come closer to the classical approach of Friedman and Schwartz according to which money causes fluctuations in income.

Conclusion

The review of major monetary dependencies between 1913 and 1945 confirms the disastrous role of government intervention in the economy, and particularly in central banking. Inflation is a monetary

phenomenon: a result of money supply manipulation and money supply inconsistency with money demand developments, attributable to real economy development. Monetization of deficits by the government is the major source of instability. In the historical period under review, these deficits were primarily the result of extraordinary circumstances like the two World Wars, and to a lesser extent of failures in the real sector and the 30s crisis. The monetization of deficits resulted in a significant redistribution of the national wealth (assets and liabilities) in favor of particular social groups.

What was the role of the BNB? Was it able to counteract the economic processes, thus neutralizing the negative effects of shocks? Was it possible for the central bank to implement a neutral monetary policy, consistent with Milton Friedman's rule prescribing a pursuit of moderate real money supply growth? The answers to these questions are clear in advance to those who know Bulgaria's history well, and particularly its new history: they are negative. The reasons behind this are various: culture *(Avramov, R., 1998)*, historical heritage, politics and institutional development.

Consequently, the results of stabilization programs in Bulgaria had temporary effects since they were not a product of consistent social and political resolve to fight inflation like that in Germany after the World War II which helped create an institution capable legally and *de facto* of providing national currency stability and economic growth.

Recently, influenced by *institutionalism,* economists dealing with monetary problems started to consider carefully the institutional structure of money supply, including the role of the central bank in the structure.

The introduction of a *currency board in Bulgaria* in the summer of 1997 partially answered the questions put by institutionalism as regards monetary system organization. However, no answer has yet been found to the reasonable question of Roumen Avramov: "Are there no alternatives enabling the economy to achieve the same, or even better results?"

This is an insidious question, and even more insidious questions are: is it possible to have decentralized *money demand,* a result of spontaneous activity of economic agents on the one hand, and *money supply* which is a quasi-monopoly of the government based on various instruments used to achieve goals? Is it possible to estimate the liquidity needs of the economy? Is it possible to supply any good knowing nothing about demand for this good? What will happen with the price of this good? What will happen with the interest rate? Should the central bank participate in the money market?

To find answers to these questions, we recommend that readers should open their *microeconomics* books.

Appendices

Table 1

RESULTS FROM STATIONARITY TESTS

Variable	Phillips – Perron Test (PP Test)		Integration and lags	
	levels	I difference	I	lag
M0/N	5.65		0	3
BN	2.98		0	3
DD/N*	4.57		0	3
M3/N	5.47		0	3
M	-0.59	-5.05	1	3
GD*	6.6		0	3
GD/N*	5.21		0	3
GDNR	0.17	-5.59	0	3
BNR	-1.16	-4.73	1	3
M0*	4.55		0	3
M0RN*	-1.19	-5.93	1	3
M3R	-1.26	-4.99	1	3
YN*	-6.81		0	3
YRN*	-0.87	-6.7	1	3
YC*	-4.97		0	3
P	3.17		0	3
S*	-0.56	-5.31	1	3
DDC**	-2.78		0	3
IC**	-2.76		0	3
M0C**	-2.51		0	3
M3C**	-2.35		0	3
BNC**	-2.46		0	3

* *With trend and level.*
** *At 95% significance level.*
*** *McKinnon critical values for rejection of stationarity hypothesis at 95% significance level: with trend and constant: -4.27; without trend and constant: -2.63; with constant without trend: -3.65.*

Table 2

GRANGER TEST FOR CAUSALITY BETWEEN CYCLICAL COMPONENTS OF REAL INCOME (YC) AND OF QUASI-MONEY (DDC)

Sample: 1913 – 1945
Lags: 2

Zero hypothesis:	Observations	F-statistics	Probability
YC does not cause Granger DDC	31	0.32982	0.72202
DDC does not cause Granger YC		1.61416	0.21837

Table 3

GRANGER TEST FOR CAUSALITY BETWEEN CYCLICAL COMPONENTS OF REAL INCOME (YC) AND OF RESERVE MONEY (M0C)

Sample: 1913 – 1945
Lags: 2

Zero hypothesis:	Observations	F-statistics	Probability
M0C does not cause Granger YC	31	3.48018	0.04579
YC does not cause Granger M0C		0.30751	0.73792

Table 4

GRANGER TEST FOR CAUSALITY BETWEEN CYCLICAL COMPONENTS OF REAL INCOME (YC) AND OF BROAD MONEY (M3C)

Sample: 1913 – 1945
Lags: 2

Zero hypothesis:	Observations	F-statistics	Probability
M3C does not cause Granger YC	31	3.36151	0.05030
YC does not cause Granger M3C		0.13116	0.87765

Table 5

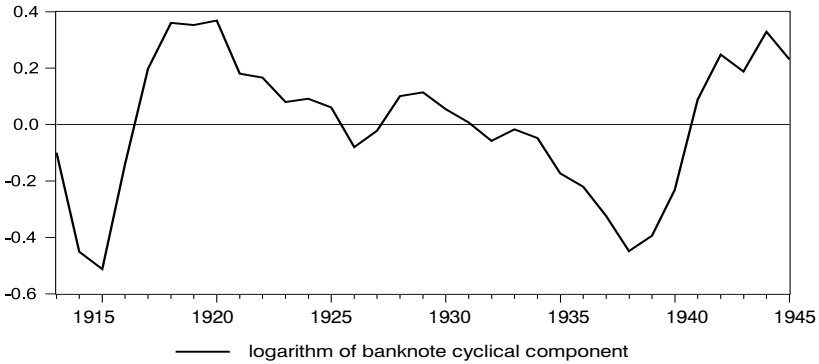
GRANGER TEST FOR CAUSALITY BETWEEN CYCLICAL COMPONENTS OF REAL INCOME (YC) AND OF BANKNOTES (BNC)

Sample: 1913 – 1945
Lags: 2

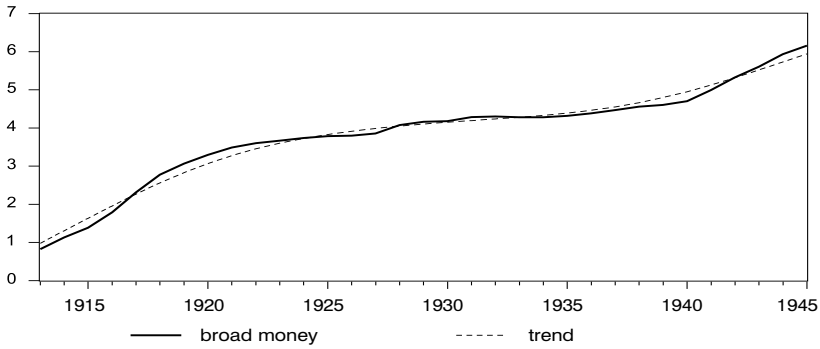
Zero hypothesis:	Observations	F-statistics	Probability
BNC does not cause Granger YC	31	3.58641	0.04212
YC does not cause Granger BNC		0.04017	0.96069

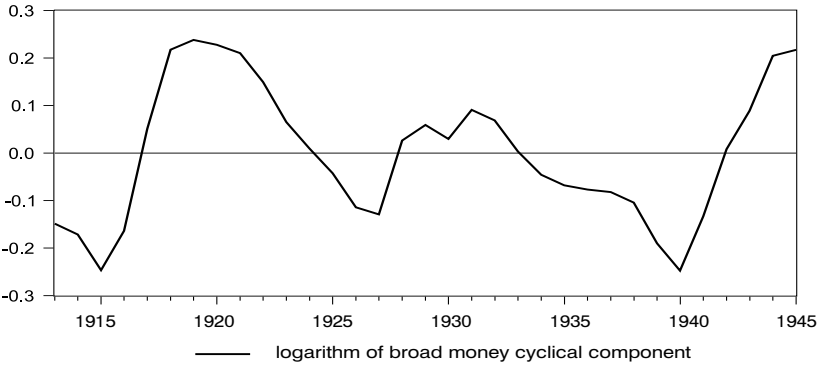
DECOMPOSITION OF SERIES INTO TREND AND CYCLICAL COMPONENT

Banknotes

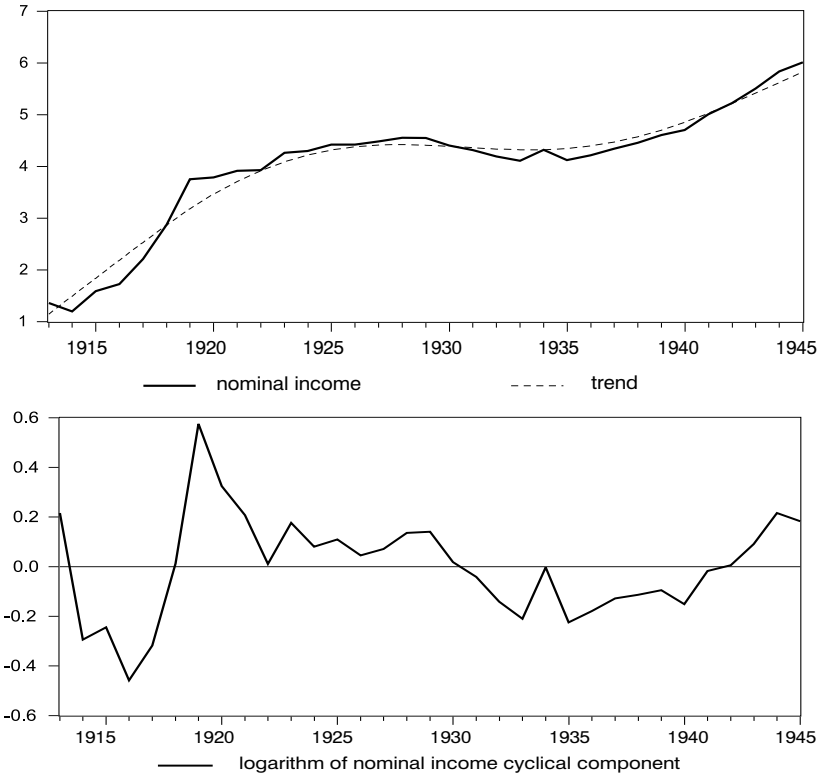


Broad Money

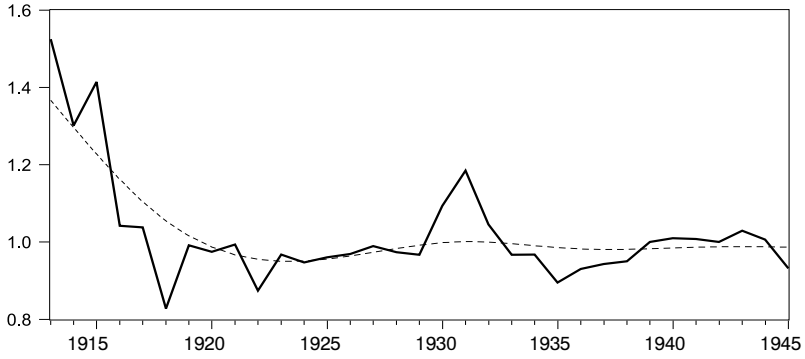


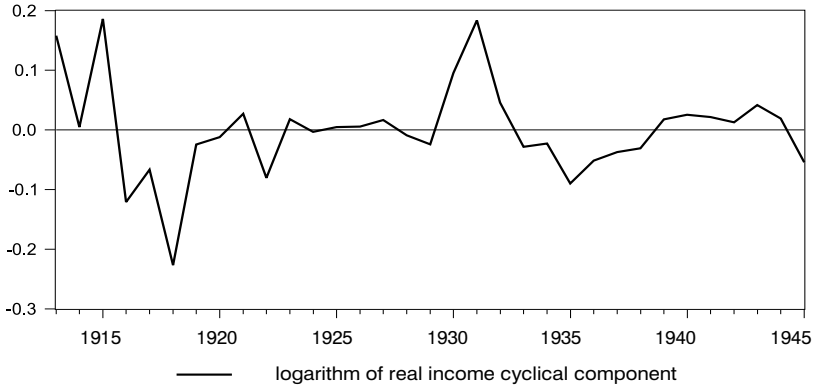


Nominal Income



Real Income





Currency in Circulation/Deposits

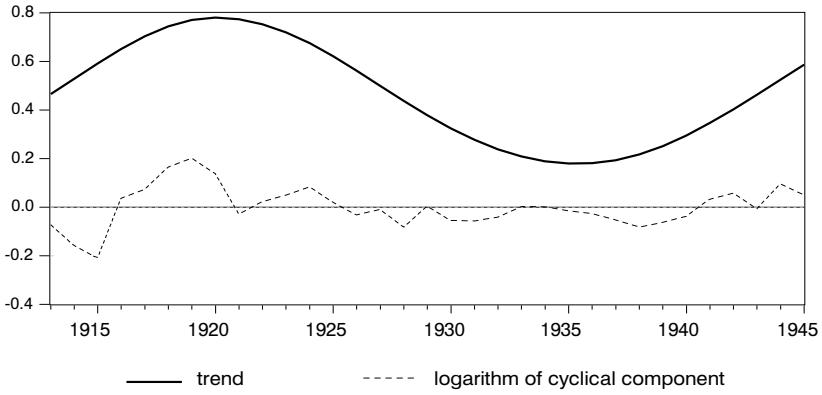


Table 6

STATISTICAL DATA

Year	Money multiplier (broad money/ reserve money) (levs)	National income per capita (levs)	Real national income per capita (levs)	Amount of currency in circulation at year-end (thousand levs)	Reserve money at year-end (thousand levs)	Amount of bank deposits at year-end (thousand levs, BNB incl. until 1928)	Population at year-end	Price index (1913 = 100)	Government debt at year-end (thousand levs)	Average annual BNB discount interest rate
1913	2.06	478.22	8692.50	188742	323159	478408	4828300	100.00	148604	6.50
1914	2.07	399.57	6411.91	226615	363493	525158	4875300	102.50	173065	6.50
1915	1.93	583.50	7578.44	369829	556924	703618	4978600	126.00	166159	6.50
1916	1.60	662.24	5779.90	833910	1040549	828490	5026900	214.00	280236	6.50
1917	1.56	1067.22	4912.72	1492768	1901206	1477646	5075800	344.00	643077	6.50
1918	1.50	2049.87	3346.99	2298619	2921793	2072755	5125200	1317.00	1318498	6.50
1919	1.49	5267.39	6680.41	2858489	3644151	2582213	4803900	1803.00	2017885	7.00
1920	1.56	5390.17	6332.61	3354139	4438071	3557628	4846971	1990.00	3031014	6.50
1921	1.75	6021.95	5702.76	3615440	4594412	4432853	4946900	2104.00	3591359	6.50
1922	1.70	5963.56	6099.43	3885990	5146647	4886429	5049000	3656.00	3939241	6.50
1923	1.52	8176.67	5870.92	4138985	6044567	5029337	5153200	3351.00	4739606	7.00
1924	1.54	8304.59	5305.83	4530296	6509069	5503994	5259500	3824.41	5242041	9.00
1925	1.69	9220.38	5384.69	3655302	6002141	6496251	5368000	4098.91	5080668	9.00
1926	1.61	9020.14	6827.85	3480616	6417513	6833746	5478741	3925.19	4987275	10.00
1927	1.85	9452.10	7346.63	3726972	6138798	7635229	5550300	3792.47	11727965	10.00
1928	2.06	10053.53	7140.93	4173017	7562721	11422329	5622800	4406.85	15760576	10.00
1929	2.39	9867.46	6913.38	3608643	5784104	10188719	5696200	4520.62	13364193	9.50
1930	3.33	8429.11	7517.94	3295514	4842557	12828482	5770600	2298.23	11964585	10.00
1931	3.96	7622.61	8509.38	2918593	4315973	14153906	5845900	1566.29	13926928	9.48
1932	3.96	6631.38	8453.98	2634530	4232114	14126927	5922300	2256.52	13478839	8.60
1933	3.63	5939.23	8485.90	2983903	4500251	13334075	5999600	2863.31	13120303	8.00
1934	4.01	5686.80	7665.76	2448955	4182957	14326614	6077939	3553.54	13768759	7.00
1935	3.98	5969.47	7256.45	2496585	4412297	15081013	6126000	4076.90	14582020	6.61
1936	3.95	6500.49	8754.83	2570749	4835768	16517588	6182300	3796.26	15905622	6.00
1937	3.31	7471.56	9175.42	2569336	6307779	18300746	6232300	4084.49	17720697	6.00
1938	3.55	8177.24	9353.57	2800450	6427359	19998170	6272900	4471.32	19487228	6.00
1939	3.02	9421.97	9421.97	4245223	7608609	18729800	6307600	4095.86	21014052	6.00
1940	3.03	9796.90	8661.89	6518354	9065829	20925900	6676600	4308.24	22568073	5.80
1941	1.85	13209.39	8759.43	13467000	21553000	26432000	6734454	5904.87	32709100	5.00
1942	2.09	16172.89	8260.19	18922000	25875000	35143900	6797300	7573.55	46339500	5.00
1943	2.22	21319.42	8446.80	23860000	31869000	46887100	6856800	8612.69	63360700	5.00
1944	1.76	29430.12	7746.79	45834000	57839000	56227300	6913700	13512.56	68195500	5.00
1945	1.64	34722.45	5985.58	43726000	69612000	70430200	6977100	25902.54	96744600	5.00

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DP/6/1999

The Role of a Currency Board in Financial Crises: the Case of Bulgaria

Roumen Avramov

Abstract. The Currency Board Arrangement (CBA) is not a universal monetary system. It is introduced when confidence in the classical central bank and its ability to use independently and reasonably available tools is undermined. A currency board is assumed to be expedient when the national currency unit is practically destroyed, most often in the wake of hyperinflation. In this context, the CBA is a powerful instrument to remonetize economic life and return confidence in the financial system. Finally, the success of a currency board depends on broad political consensus at its adoption as it represents a specific public contract and a basically new monetary constitution.

Резюме. Паричният съвет не е универсално приложима парична система. Тя се въвежда там, където доверието към класическата централна банка и към възможностите є да използва независимо и разумно поверените є инструменти е изгубено. Най-целесъобразно е въвеждането на паричен съвет, когато националната парична единица е практически унищожена, което най-често става след хиперинфлация. В такива случаи той е мощно средство за възвръщане на доверието във финансовата система. Накрая, важно условие за успеха на паричния съвет е наличието на широко обществено съгласие при приемането му, доколкото той представлява особен вид обществен договор и принципно нова парична конституция на страната.

Contents

I. A Currency Board Arrangement – Basic Features and the Bulgarian Case

The currency board arrangement (CBA) is a monetary system providing for the national currency issue (central bank monetary liabilities) to be fully covered by a convertible foreign (reserve) currency. The national and reserve currencies are freely convertible into one another at a fixed exchange rate. The foreign currency covers only base money (the narrowest monetary aggregate) of the currency board economy.

The CBA bears a certain resemblance (though in a completely modified context) with gold standard principles. It could be considered as a 'surrogate' for the automatism and the rules of the gold standard. In some sense it is a return to the goals' hierarchy of the gold standard and to the corresponding adjustment mechanisms. Both systems aim to subordinate money supply to simple, effective and transparent rules. They affect macroeconomic policy by imposing the strongest discipline – that of capital movements and the markets.

Under a CBA, money supply is strictly limited. This result is achieved along two lines.

First of them is the fixed exchange rate. CBA are often seen as an extreme form of fixed exchange rate systems whereby irreversibility of commitment is guaranteed by a legally fixed parity between the national currency and the reserve currency. Thus the currency board is capable of enhancing confidence, reducing the risk of attack against the national currency and imposing the stricter discipline rules of fixed exchange rate regimes. Devaluation is eliminated as a possible source of increasing the nominal money stock.

Furthermore, money supply is strictly constrained by eliminating one of its sources. Under the classical two-tier banking system, the central bank issues money against both foreign and domestic assets. In this case it performs issuing functions by increasing its monetary liabilities against lending to government (budget financing) or commercial banks (refinancing or lender of last resort). Manipulation of domestic sources of reserve money underlies monetary policy and, in a sense, is the

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raison d'etre for central bank existence. However, if manipulation is exercised beyond certain sound limits and under governmental pressure it starts to generate inflation.

Under a CBA, the currency issue is backed only by foreign assets, whose dynamics is independent of monetary authorities' actions and tied to the balance of payments, especially capital flows. As currency issue against domestic assets is impossible, major sources of inflation (direct or indirect budget deficit monetization and support of insolvent banks by the central bank) are eliminated. The major channel of inflation (between central bank and government) is nonexistent and the newly created monetary authority plays a passive role with regard to money supply. The latter is determined outside the central bank, which responds automatically to economic agents' autonomous demand for money.

With a CBA major monetary policy functions typical of a classical central bank become void. Simple rules replace to a great extent discretionary decisions (and temptations) consistent with monetary policy. The fundamental issue of central bank independence is radically resolved by **amputating** those functions that materialize its relationship with the government and by exporting monetary sovereignty outside the country.

The introduction of a CBA prompts significant changes in economic behavior.

- *It largely extends the scope of hard budgetary constraints.* Government and banks are directly affected by this as they should translate hard budget constraints to state-owned enterprises and (through banks) to the private sector. However, such transmission is not completely guaranteed and transfers intended to cover losses and costs in a given sector (or economic agent) at the expense of others do not disappear altogether. The central bank itself faces new constraints because it is deprived of the inflation tax, which is a major source of income in a classical central bank model.
- *The currency board fixes a key price – the exchange rate – while all other variables move freely.* The economy cannot adjust to external shocks through the exchange rate. Their impact on economic agents is direct. The burden of adjustment falls on the real sector and financial variables – interest rates, incomes, output volumes, productivity growth, employment – are among the main shock absorbers. A currency board is basically a pro-cyclical device.

This makes market and institutional flexibility an even more pressing issue as flexibility is crucial for ensuring efficient adjustment.

- *The opening of the economy is essential.* The CBA is extremely sensitive to capital outflows and inflows and to the balance of payments surplus/deficits, which ultimately cause money supply expansion or contraction. Under a currency board, the impact of capital flows on money supply cannot be sterilized.

The CBA is not a universal monetary system. It is introduced when confidence in the classical central bank and its ability to use independently and reasonably available tools is undermined. A currency board is assumed to be expedient when the national currency unit is practically destroyed, most often in the wake of hyperinflation. In this context, the CBA is a powerful instrument to remonetize economic life and return confidence in the financial system. Finally, the success of a currency board depends on broad political consensus at its adoption as it represents a specific public contract and a basically new monetary constitution.

Few countries have introduced the currency board system, best known being Hong-Kong, Argentina and Estonia. In none of them does the CBA operate in its 'pure' form. It has gradually acquired national peculiarities.

The currency board in Bulgaria was introduced with the new Law on the Bulgarian National Bank of 10 June 1997. The legal framework for its implementation was extended and elaborated with the Law on Banks adopted shortly afterwards, which introduced strict supervisory rules and higher requirements for commercial bank safety.

The CBA was adopted after several inconclusive attempts to stabilize the economy in 1991 – 1996 and a major financial crisis, which culminated in a short-lived hyperinflationary episode in December 1996 – February 1997. During those attempts all, but one, nominal anchors were exhausted without success, stabilization policy itself was compromised and key institutions lost their credibility. The boldest solution was to introduce the only remaining nominal anchor (the exchange rate), design a 'new' institution (a currency board), gain credibility by transferring monetary sovereignty abroad, and – for the IMF, which has seen its own prestige eroded – to support a different paradigm.

Thus, from the outset, the CBA was situated in a broader context. It was conceived (and self-imposed by broad national consensus) as a

cultural shock, a tool for imposing financial discipline rather than as a simple stabilization scheme. The currency board was perceived as a clear departure from the past, an arrangement designed to overcome the deeply rooted reluctance to modernize the Bulgarian economy after seven years of piecemeal, inconsistent and incomprehensive reforms, and as an ambitious plan to deal with the institutional failures during the first transition years.

The general principles of the Bulgarian currency board comply with institutional arrangements of similar monetary systems. Nevertheless, some specific features need be highlighted.

- Bulgaria did not create a new monetary institution (as did Hong-Kong) but used the institutional design of the existing central bank. Taking the traditional model of the Bank of England, two separate departments were established within its structure: an Issue Department and a Banking Department. The residual deposit of the Banking Department with the Issue Department provides the accounting link between them. This deposit represents the positive net value of the currency board, i.e. the excess of foreign exchange reserves over reserve money and other Issue Department liabilities.
- Reserve money cover must exceed 100% but there is no fixed norm. The excess is intended to be used by the BNB to intervene as lender of last resort in case of a systemic liquidity crisis in the banking system. This provision is to be enforced in extremely limited circumstances and exclusively for solvent banks.
- The BNB is left with only one discretionary tool to regulate banking system liquidity: setting the minimum reserve requirement ratio.
- A government deposit is included in the currency board liabilities. On the one hand, the deposit accumulates IMF (and other international financial institutions inflowing funds and is covered by Issue Department liquid assets. This represents the strongest guarantee that debt payments to international financial institutions will be met. On the other hand, the presence of the government deposit in currency board liabilities indirectly affects reserve money, its growth causing (under specific conditions) reserve money to diminish and *vice versa*. Budget deficit or surplus assumes a key importance for overall stability and monetary system liquidity.
- The government deposit includes foreign currencies (mostly

US dollars) other than the reserve currency. This entails that a portion of Issue Department assets not to be denominated in Deutschemarks. To reduce the currency risk for the Issue Department, the law provides for the gap between assets and liabilities denominated in currencies other than the Deutschemark not to exceed 2% in either direction.

- A peculiarity of the Bulgarian currency board is the BNB's legally provided right to extend direct credit to the government against purchase of special drawing rights from the IMF. The maturity of the government debt to the BNB, denominated in SDR, completely matches BNB debt to the IMF. This right is consistent with BNB function as a government agent and it formalizes government financing against IMF credits.
- Deutschemark (DEM) is the reserve currency of the Bulgarian currency board, while it does not dominate foreign trade transactions and the country's foreign debt denomination. Given the asymmetric denomination of a considerable portion of domestic debt (in levs/Deutschemarks) and foreign debt (in US dollars), the effects of USD/DEM exchange rate fluctuation are partially neutralized.

II. The 'Vulnerability Topography' of a Currency Board

An economy operating under CBA principles needs greater flexibility of the markets in order to cope with missing adjustment instruments of monetary policy and of the floating exchange rate. But the bulk of measures in this area extend outside the functions and competencies of the central bank.

The sensitivity of a CBA to output and BOP fluctuations has not been empirically tested. By any means, the arrangement is functioning smoothly – as any other monetary system – in the context of a balanced BOP and a sustained growth in the economy. But a CBA is fully compatible with a GDP slowdown or a BOP deficit as well. While pro-cyclical, the CBA has also a stronger elasticity to exogenous shocks. As the experience of Argentina and Hong-Kong shows, in case of major shocks the economy reacts by sharper fluctuations of interest rates, real variables and a tighter fiscal policy stance. An indirect threat for the system could come from political pressures for a withdrawal from the CBA through a change in the fixed exchange rate. The depression of the real sector and the restrictive financial conditions will make public

consensus, needed for the successful operation of the CBA, less sustainable.

Internal Vulnerability

The implementation of the CBA in Bulgaria has produced important shifts in financial flows and hence – in the balance of economic power.

By restructuring financial flows and debt burden, the implementation of the CBA has had an important impact on the role of **government** in the economy

The government was put under harder budget constraints concerning domestic revenues and expenditures. A considerable adjustment effort occurred in 1998, resulting in the building up of a large fiscal reserve account. The external debt service, however, still needs a continuous infusion of foreign financing.

At the same time, the currency board *de facto* strengthens (by narrowing the focus) the position of the government. The CBA provides it with a credible excuse for spending moderation. During 1991 – 1996 the government had a formal autonomy in decision-making, not a real one – the burden of the internal debt ruled out any possibility for effective policy choices.

The hyperinflationary episode of 1996 – 1997 'diluted' the debt stock denominated in national currency, in particular the government's domestic debt. The servicing of total government debt was reduced from unsustainable levels in 1996 (interest payments equaled 18% of GDP) to a comfortable 2.5% in 1998. The dramatic fall in interest rates (from 300% in September 1996 to 5% during 1998) allowed non-interest payments in budget expenditures to increase from 7% in January 1997 to 50% in February 1998 and 1999. Debt maturity was gradually extended. There was a clear crowding-out of domestic debt by foreign debt **(Charts 5, 6, 7, 8).**

The Ministry of Finance became the centerpiece of overall liquidity management in the economy. It performs a 'quasi-monetary policy' through the government deposit at the central bank and treasury-bills issuing. The responsibility (and the risks) for the overall monetary stability (in particular for interest rates) shifted to a great extent from the central bank to the fiscal authorities.

The hyperinflationary outburst preceding the introduction of the

CBA cleaned up the **commercial banks'** balance sheets as well. The banking system was recapitalized through revaluation gains from their forex-denominated assets and the closing of ailing banks. At the same time, the real value of lev-denominated liabilities eroded substantially.

A sound banking system is an essential condition for the stability of the CBA. As expected after a deep financial crisis, with the introduction of the CBA commercial banks changed substantially their behavior. They adopted a cautious stance and a pronounced risk-aversion policy. The outcome has been a general credit restraint and a dramatic improvement in the liquidity position of commercial banks. A longer period of stability is needed, however, in order to overcome the shock of the previous financial collapse.

At present, the banking system is not a source of major risks for the economy **(Charts 9, 10, 11)**. Maintaining this position is not easy. Banks are facing a profitability problem related to the lack of creditworthy opportunities in the real sector, still subject to a deep restructuring. They adjust their portfolio by shifting to deposits abroad and investing in government securities. Some cost cuts have been effected, but mergers and rationalization of the highly fragmented banking structure is still ahead.

The direct effects of the CBA for the **real sector** are ambiguous. The CBA provides the economic agents with a framework of financial stability, longer horizon and broader choice. The benefits of the new environment can be fully capitalized, however, only through a sizable investment effort.

After years of declining output (with the only exception of the anemic recovery in 1994 – 1995), economic growth is starting from a very low point and has not yet entered a stage of full-fledged expansion. A moderate 3.5% GDP increase was recorded in 1998, but this (and higher) rate need to be sustained for several years in order to produce tangible effects. In spite, growth projections have been revised downward against the negative global and regional outlook **(Charts 1, 2)**.

During 1991 – 1996 the real sector used to adjust to different types of shocks through arrears, bad debts and devaluation of the exchange rate. Many of those possibilities are no longer disposable with a CBA. Entrepreneurial surveys confirm indirectly the change by showing that the main challenges faced by producers are shifting from financial problems and solvability of their clients to general and specific market conditions.

The experience from the last two years demonstrates, however, that 'liquidity surrogates' does not disappear altogether. Although bank arrears have declined substantially, some interfirm arrears and debts to the budget have piled-up, concentrated mainly in large state-owned companies. Loopholes for hidden subsidies and soft budget constraints are still in place. Most of them are to be eliminated in the framework of the three-year EFF with the IMF, but the economy still faces deep sectoral inefficiencies and imbalances to be addressed by bold medium-term reforms.

A CBA is not a panacea for the deeper transformation of a transition economy. The outcome of this transformation – and the long-term viability of the CBA itself – depends on the success of the entire set of supporting structural reforms. The change in the mentality and behavior of the real sector is the most difficult aspect of the transition, even with the strong constraints of a CBA in place. But if the currency board is to be considered, as it is, as a *cultural shock*, its success (and vulnerability) depends critically on the penetration and adoption of a new culture of financial responsibility.

The restructuring of the financial flows in the economy and the elimination of the crowding-out effect with the CBA permitted **households** to obtain access to some credit resources. An appreciable increase of lending to households (mainly consumer credit through the State Savings Bank) has been observed. At the same time, after a rapid recovery of the wage losses from hyperinflation, personal income has grown at a moderate rate.

Remonetization of the economy is probably the essential goal of the CBA and the most synthetic test for its success. It should be remembered that the main macroeconomic precondition for the introduction of a CBA is 'disappearance of money' – a CBA is of doubtful usefulness in the absence of a previous demonetization of the economy.

This was the case in Bulgaria at the beginning of 1997, with an almost complete dollarization, a tangible perspective of default on foreign debt and a *de-facto* default on the internal debt through a continuous monetization of fiscal and quasi-fiscal deficits triggering hyperinflation. The CBA was the only appropriate arrangement to restore confidence in the national currency and the financial system as a whole.

Remonetization has been under way since July 1997. After a strong increase in the second half of 1997, growth of monetary aggregates

slowed in 1998. The deceleration is only partly due to a deterioration of the external sector position (current account deficit and a squeeze in the capital account surplus). Under a CBA money supply is directly influenced by balance of payments developments, but the causal link is only with narrow monetary aggregates. Commercial banks have still the possibility to expand or reduce credit without the strong constraints imposed on the issue of reserve money and the dynamics of M2/M3 is influenced also by other factors, such as changes in the multiplicator or the degree of credibility of the financial system.

The most pronounced increase was observed in the 'money outside banks' component of M1, reflecting the much lower opportunity cost to hold cash balances and widespread cash transactions. Broader aggregates rose slowly, due to the relatively moderate growth of bank deposits **(Charts 12, 13, 14, 15)**.

Total domestic credit remains at historically low levels. The main factors behind this trend are diminishing government borrowing requirements after the introduction of the CBA and the forced isolation of many state-owned enterprises from the credit market. Credit to the private nonfinancial sector has been limited in 1997 – 1998, although lev credit is showing signs of revival in the second half of 1998 and the first months of 1999. The fastest pace is observed for credits to households **(Charts 19, 20, 21, 22)**.

As expected, a return of confidence in the national currency has accompanied the CBA. Although the share of foreign currency deposits has diminished, it remains, however, very high by historical standards **(Charts 16, 17,18)**. A much more pronounced trend has been the sharp decrease in forex-denominated loans extended by banks. Overall, the confidence in the banking system after the deep financial crisis of 1996 – 1997 is returning only cautiously with still a weak bank intermediation.

External Vulnerability

The recent global financial turmoil has stressed the fragility of the international financial architecture and the need for reshaping some of its underlying principles. Economies operating under CBA were among the most seriously threatened by the crisis. In a broader perspective, a basic principle of their monetary system – the fixed exchange rate – was questioned.

The launching of the CBA in Bulgaria benefited from a timely and calibrated foreign financing. An IMF standby arrangement was ap-

proved in April 1997. It was the first (out of five during 1991 – 1996) to be completely disbursed. Later on, a three-year EFF was agreed in September 1998. Besides, a significant net inflow of foreign resources was recorded during 1997, due to the sizable surplus of the current and capital accounts. The assets of the Issue Department increased by 27.5% in the second half of 1997 and by 15.8% in 1998 **(Charts 23, 24)**.

By definition a CBA is more exposed to external shocks and with a more limited scope of instruments to absorb them. Thus it creates a more vulnerable (and hence more conditional) external environment for the national economy. The two-year experience in the context of growing global financial instability provides some valuable tests in this respect.

The direct, **trade channel**, was not of primary importance for the transmission of impulses from the most affected areas of the world economy. Trade with Russia amounted to 5.5% of exports and 20% of imports in 1998. We have to add another 7.2% of exports and 5% of imports for the other CIS countries. Even if exports to the CIS region fell dramatically in 1998 (by decreasing 38%), it turned out that sectoral depressions affecting world markets for the main Bulgarian export items (such as chemicals and steel products) are far more important. The overall trend of demand in the EU area also becomes a relevant factor, as its weight approaches 50% in Bulgarian trade **(Charts 25, 26, 26A)**.

Figures for the effective exchange rate (EER) show that no major appreciation of the lev has been observed since the implementation of the CBA. In fact, the movement of the only relevant exchange rate (USD/DEM) has been favorable for Bulgarian exporters, as the depreciation of the Deutschemark in the world forex markets has created a safety buffer. It compensated partially the negative terms of trade developments **(Chart 28)**.

The impact of a possible appreciation of the lev has been a permanent concern for the public and professional debate. The sensitivity of the issue is largely due not so much to actual trends, but to the fact that competitive devaluation is no more an option as it was during the previous inflationary episodes. The only available adjustment mechanisms are related to productivity improvements and cost-cutting which are not familiar to many exporters.

Capital flows are of crucial importance for the smooth functioning of the CBA **(Charts 27, 29)**.

Sizable *short-term portfolio investment* inflows were registered in the period preceding the installation of the CBA, attracted by the wide interest rate differential and by the imminent perspective of a successful stabilization, firmly supported by the IMF. With the gradual fall in interest rates after June 1997, the inflow vanished, before reversing its direction. This reversal could hardly be attributed to the effects of the Asian crisis. Instead, it reflected the changing conditions in the Bulgarian economy and the lower yield of Bulgarian domestic debt securities. The rudimentary development of the national capital market further isolated the economy from the impact of short-term capital movements **(Chart 30)**.

Bulgaria is still strongly dependent on *official foreign financing.* Since the outset of the transition IMF, WB and EU loans have traditionally ensured the needed BOP support. A growing part of the increase in foreign reserves is obtained at the cost of higher indebtedness to IFIs. While in 1997 growth in foreign debt represented only 9% of the increase of foreign reserves, in 1998 this ratio was 68% **(Charts 32, 33)**.

The present government's initial intention to raise funds through a bond issue has been postponed due to deteriorating conditions in emerging markets. Their virtual isolation from international capital markets is probably the major channel of influence of the world financial crisis on transition economies like Bulgaria.

To attract *FDI* has been a constant long-term policy goal. In the context of a currency board FDI are essential to ensure external and fiscal balances. Although a clear surge was observed in 1997, the pace of FDI slowed afterwards – they amounted to USD 504 million in 1997 and to USD 364 million in 1998. This trend is due to many factors, ranging from problems with structural reforms to limited attractive opportunities for privatization. With the outburst of the crisis in Kosovo the negative impact of the 'regional factor' has overshadowed many other considerations by undermining investors' confidence **(Chart 31)**.

The changing risk of the Bulgarian economy has been reflected in the quotation of Bulgarian Brady bonds. A neat upward trend was observed in 1997. This trend closely correlates with the successful preparation and implementation of the CBA.

As it can be seen from **Chart 34,** since the fall of 1997 the timing of the *fluctuations* of Bulgarian bonds follows this of indexes for countries with similar rating and for emerging markets. The amplitude of the fluctuations, however, is somewhat deeper in the Bulgarian case. The

Russian crisis and events of minor importance have been amplified for the Bulgarian Brady bonds index. This higher sensitiveness has important domestic repercussions as well. The domestic markets trend of government-issued, USD-denominated ZUNK bonds also follows the fluctuation of Bulgarian Brady bonds **(Chart 35)**. Thus world financial crisis directly influences the financial position of some Bulgarian banks, as they detain large volumes of ZUNK bonds.

Overall, developments in capital movements have had a mixed impact on the CBA. Although they have not directly threatened the stability of the Bulgarian currency board, the global financial crisis and political instability in the region have prevented the country from a broader access to foreign capital. Current account financing remains fragile and the BOP equilibrium is conditional upon the uncertain (heavily dependent on the global crisis) balance of the capital account.

Global trends have had some *positive effects* as well. The declining pace of interest rates in 1998 is by no means beneficial for a debtor country. Besides, lower interest rates in the reserve currency country are a basis for lower levels in the domestic markets as well. (Part of this effect is neutralized by lower yields of Issue Department assets invested abroad.) Finally, the Russian crisis and the dramatic fall of the prices of the Russian debt have permitted to settle pending debt issues with the two Moscow-based, ex-COMECON banks at extremely favorable terms for Bulgaria. Thus the official gross foreign debt of the country was reduced by more than USD 500 million.

III. What Is Left for a Central Bank in a Currency Board Framework?

At first glance the central bank seems the main 'looser' from the introduction of a CBA. Monetary sovereignty is transferred abroad. The room for manoeuvre of the central bank is strongly reduced. It looses its control over the monetary base – domestic components of money creation, normally managed by the central bank, disappear. The markets and the autonomous decisions of economic agents determine money supply, which is anchored by fixing the exchange rate. Short-run liquidity management is abandoned – there is no more control over interest rates fluctuations, no interventions in the exchange markets, no open-market operations. The central bank is strongly limited in its lender of last resort functions.

But what is the central bank really loosing under a CBA?

Theoretically the BNB had a complete 'autonomy' under the floating exchange rate regime in 1991 – 1996. It mismanaged, in practice, the instruments put at its disposal under pressures from governments and other sources. Strong conditionality was already in place through two channels: external – as the central bank was constrained by its limited reserves; internal – as government deficits were implicitly or explicitly monetized. The terminal financial crisis produced a nearly hyperinflationary environment in January – February 1997. In this context no economic agent – including the central bank – had a real margin for free decisions.

The CBA was a deliberate choice and an intentional limitation in the functions of the BNB. But, paradoxically, a greater autonomy was attained at the cost of the amputation of several of the 'classical' functions of the monetary authority:

- The central bank was redesigned as an institution obeying simple monetary rules. Its margin of maneuver was narrowed, but at the same time possible disequilibria stemming from misleading discretionary measures were also limited.
- The central bank was completely 'disconnected' from the government budget by ruling out any direct financing of fiscal deficits.
- The regulatory and supervisory responsibilities of the BNB have been strongly enhanced with its new legal status. Almost every prudential regulation has been amended in a sense of greater strictness and tighter supervisory rules.
- The central bank acquired larger responsibilities in the management of the foreign reserves. The assets of the currency board (the Issue Department of the BNB) are invested under very strict rules in order to achieve complete security, high liquidity and a comfortable return.

Probably, the only tangible 'loss' concerns the immediate institutional interests of the central bank. It has been put under hard budget constraints by abandoning the previous revenues related to the inflation tax and restraining itself to income earned from the management of external assets. But, at the same time, the BNB gained in transparency and liquidity. Its accounts were 'cleaned' with the launching of the CBA and a new, much more transparent, format for the presentation of the assets and liabilities of the institution was adopted. By its very design, a CBA has to maintain its assets in a highly liquid form and to follow a strict definition of foreign reserves. The asset management policy of a CBA is even more prudent and conservative than that of a

'classical' central bank.

A residual area of important direct and indirect influence of the central bank is the regulation of the allowed flexibility in the management of commercial banks' liquidity.

According to the new Law, the BNB is still empowered to change the ratio of minimum reserve requirements. A change can be made only after consultations with the IMF, and the use of this tool is restricted to cases of major shifts in the financial outlook. But the amended scheme for minimum reserve regulation has left substantial flexibility in the day-to-day management of commercial banks' reserves.

The rules for utilization of the LLR facility, foreseen in the Law, are very strict. This function can be exerted exclusively in the event of a systemic liquidity crisis in the banking sector.

With respect to the management of commercial banks' foreign assets, the BNB removed the reserve currency (Deutschemark) from the list of currencies making up their open positions. In line with the basic principle of the CBA, exchange of levs and Deutschemarks is treated as completely risk-free. This approach permitted the banks to invest in DEM-denominated assets abroad and to manage more effectively their liquidity in the context of a narrow range of possibilities in the Bulgarian economy.

A more comprehensive step is the expected adoption of a new Foreign Currency Law. The draft is still being discussed, but there is consensus to elaborate the Law as a liberalized framework for current account transactions. Meanwhile, the turbulent international financial conditions have shifted the emphasis on the proposed treatment of capital account transactions. The authorities have adopted a more cautious philosophy, by considering a more gradual liberalization in this matter.

Under a CBA the main responsibility for the overall liquidity stance of the economy has shifted from the central bank to the Ministry of Finance. Fiscal balance is crucial for the stability of the CBA. Although a balanced budget is not a *conditio sine qua non,* it is highly desirable to pursue a sound fiscal policy. A persistent departure from fiscal stability will inevitably undermine the financial foundations of the system.

During the last two years, fiscal adjustment in Bulgaria has been largely the outcome of spontaneous realignment of financial flows.

This positive adjustment was supported and enhanced by a deliberately prudent fiscal stance, while the sizeable primary surplus was utilized mainly for upgrading the long-depressed current expenditures and for some investment outlays.

In the midterm, however, fiscal policy faces two main challenges.

On the one side, equilibrium has to be maintained in the context of higher fiscal costs of structural reforms. Many of the expected steps (social security, health, retirement, energy) need an important government effort. The three-year EFF explicitly allows such an effort in carefully designed areas, by tolerating a 'conditional' budget deficit of 2.8% for 1999. Besides, fiscal bottlenecks could arise from unavoidable investment expenditures needed by the economy following an almost whole decade of decapitalization. Part of the resources is expected to come from the budget according to the ambitious government's investment program in infrastructures. The sustainability of the program is fragile and any change in its underlying assumptions could easily produce fiscal disequilibria.

The other midterm fiscal problem is related to the level of the tax burden in the economy. It is widely accepted that the current level is not sustainable in the long-run as it nurtures the underground economy and hampers the needed increase in savings. A tax cut, however, is conditional upon higher collectibility, broadening of the tax base and ultimately – upon widespread revival in economic activity.

IV. The Exit Strategy Debate

The Bulgarian CBA is clearly set up as a long-term arrangement. No change is considered in the foreseeable future and it is the firm position of the BNB and the government that this system successfully meets the need for a noninflationary monetary constitution. Experience with other CBA, like those in Hong-Kong, Argentina and Estonia, has proven that the arrangement is remarkably stable and able to face shocks of different magnitude and nature in the context of an unchanged institutional framework. There is convincing factual evidence that the Bulgarian CBA also confirms the stability of this monetary system – a set of indicators is presented in **Charts 36, 37, 38.**

Nevertheless, the issue of a possible exit strategy has been presented in academic and, to a less extent – in public debate almost since the implementation of the CBA. Besides, the Lithuanian 'exit program' provides a precedent, although the plan is apparently related to a con-

flicting situation between the peg to the US dollar and the goal to join the EU.

In fact, the 'exit issue' is that of CBA's internal development logic. Theoretically, only two options are available – a return to exchange rate flexibility and a full-fledged central bank; a monetary union. (I consider only the orderly options. An exit in crisis is not the outcome of a deliberate policy choice, but a passive decision in the face of uncontrollable events.)

The *first option* is not a viable one in the Bulgarian institutional and economic context. The pre-CBA experience has shown the futility of the budget constraints on economic agents and the low credibility of the main institutions in a 'classical' context. A stronger pressure for responsible behavior of the financial system is needed and it is satisfactorily ensured by the simplest and unsophisticated monetary constitution, which does not allow a manipulation of the exchange rate, and/or of the money supply.

The *second option* is more in line with the intrinsic logic of the CBA. For Bulgaria (which is an associated member of the EU) the natural way-out from a CBA is to join the EMU after accession to the EU.

This outlook was explicitly included in the design of the Bulgarian CBA. The Law on the BNB (the institutional framework of the CBA) stipulates an automatic shift from the Deutschemark to the Euro on 1 January 1999. This saves a complex and risky operation, which (if the lev were pegged to the US dollar) would have been necessary in the context of Bulgaria's accession to the EU.

A sufficiently long period under a CBA may become an asset for a country seeking to join the Euro-zone. The stable and smooth long-term functioning of the CBA is highly desirable for at least two reasons: to stabilize the macroeconomic parameters, thus paving the way for an eventual convergence towards the Maastricht criteria; to get accustomed economic agents to behave in an EMU-like economic environment by incorporating many of the main features (and of the financial constraints) proper to the Euro-zone. It might be observed, in particular, that a CBA incorporates many of the principles of the European System of Central Banks – independence, limited autonomy of decision and monetary policy tools, fixed exchange rates, ban of fiscal deficits financing. In this context, the currency board stabilization may prove to be the best way to prepare for Bulgaria's convergence with EU economic and monetary standards, and EMU at a later stage.

The mechanism designed for the 'out'-countries to join EMU provides a clear framework for an exit strategy. The optimal path for Bulgaria seems to be to maintain the CBA until the accession to the EU, to declare immediately the intention to enter EMU and to follow the established schedule. It is at this stage that the compatibility of the CBA with an EU membership becomes a relevant problem. (The legal opinion may come soon, during the accession negotiations between the European Commission and Estonia.) In the hypothesis of a complete institutional compatibility, a passage through ERM-II seems unnecessary, as the CBA provides an even stronger peg to the Euro. At the same time, a CBA is obviously not identical to a central bank – member of the ESCB. In the latter case a much more sophisticated set of monetary policy instruments is still available.

It is by any means clear, that this scenario entails a long way of structural and institutional reforms, as well as a prolonged effort towards a convergence of macroeconomic policy to that of EU member countries.

Recently another scheme of monetary union has been discussed in the context of the search for solutions to the global financial crisis. The plan of a complete *'dollarization'* of the Argentinian economy was presented as a new option for an exit strategy.

In its 'negotiated' form this idea matches almost completely the EMU scenario. If Argentina dollarizes with an ensured seignorage income and LLR commitment from the Federal Reserve System (a highly improbable hypothesis), that country will follow exactly the possible exit strategy for the Bulgarian CBA towards EMU. The non-negotiated dollarization corresponds, in turn, to an unilateral adoption of the Euro without any institutional link with the EU. Some economists in Bulgaria have recently advocated this idea. Like in Argentina, the rationale behind it is to provide an irreversible peg, to enhance credibility (which is not complete under a CBA regime) and to increase the attractiveness of the economy for foreign investors.

The deficiencies of such a strategy are manifold. It establishes the most constraining monetary system by eliminating even the residual instruments of monetary flexibility available to the CBA – a manipulation of minimum reserve requirements and some LLR facilities. Money supply becomes entirely subordinated to the considerations of the monetary conditions of the reserve currency country. The adopted currency (the Euro in the Bulgarian case) would be in fact a 'surrogate' one – a currency without a central bank. Monetary restrictions would

increase, but without the benefits of a full membership in the institutional infrastructure of the European Economic and Monetary Union. The residual central bank would have neither the voting power in the European central banks, nor even the rights and the policy instruments of the national central banks of EU countries.

The goal of an exit strategy is not to multiply the already strong monetary restrictions in place under a CBA. The scope to increase credibility of the economy lies outside the monetary area. If credibility can be enhanced only at the cost of a complete removal of the national currency, probably the country faces structural problems, which could hardly be resolved through a monetary union with a much more developed economy. This is not the case of Bulgaria. For it, as for any country operating a CBA, the real threat is the ever-faltering and lagging support from background structural reforms.

Charts

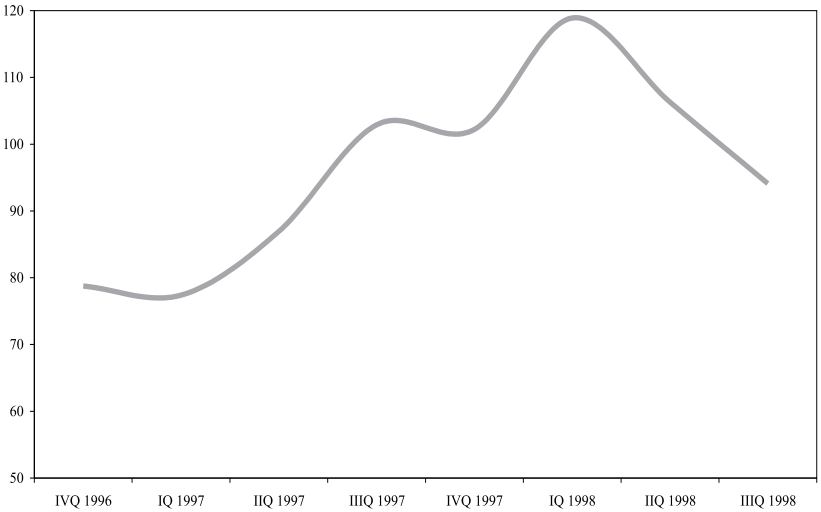
Chart 1

REAL GDP GROWTH, 1992 -1998

Source: National Statistical Institute.

Chart 2

REAL GDP GROWTH, IV Q 1996 – IIIQ 1998
(the same quarter of the previous year = 100)

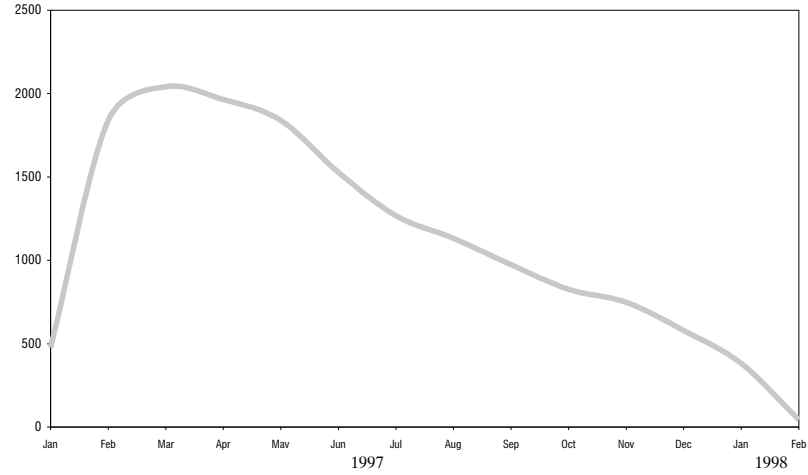


Source: National Statistical Institute.

Chart 3

**CONSUMER PRICES INFLATION,
DECEMBER 1996 – FEBRUARY 1998**

(on an annual basis) **(%)**

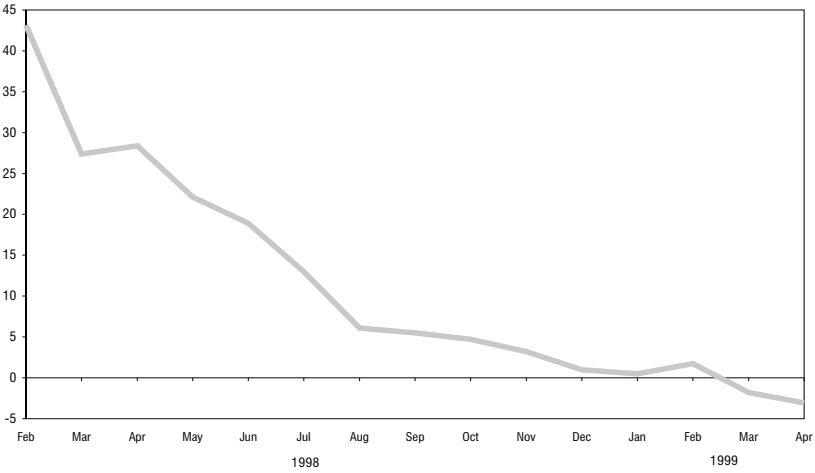


Source: National Statistical Institute.

Chart 4

**CONSUMER PRICES INFLATION,
FEBRUARY 1998 – JANUARY 1999**

(%)

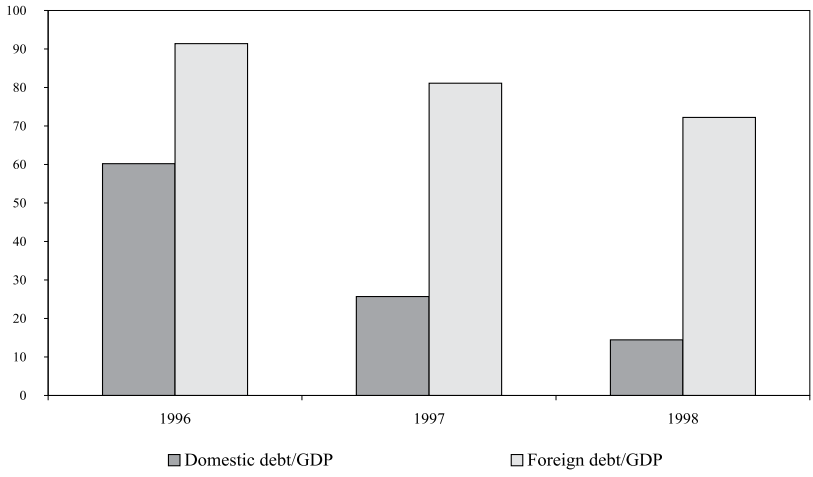


Source: National Statistical Institute.

Chart 5

GOVERNMENT DEBT/GDP, 1996 – 1998

(%)

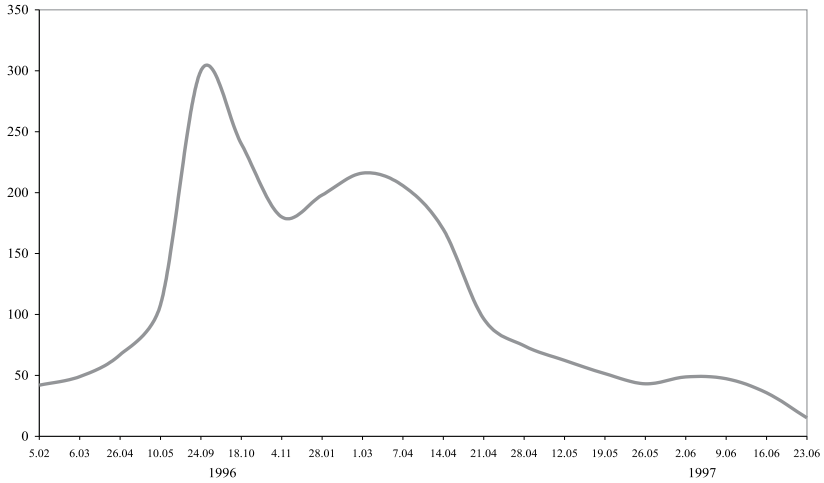


Source: BNB, Ministry of Finance.

Chart 6

ANNUAL BASE INTEREST RATE, FEBRUARY 1996 – JUNE 1997

(%)

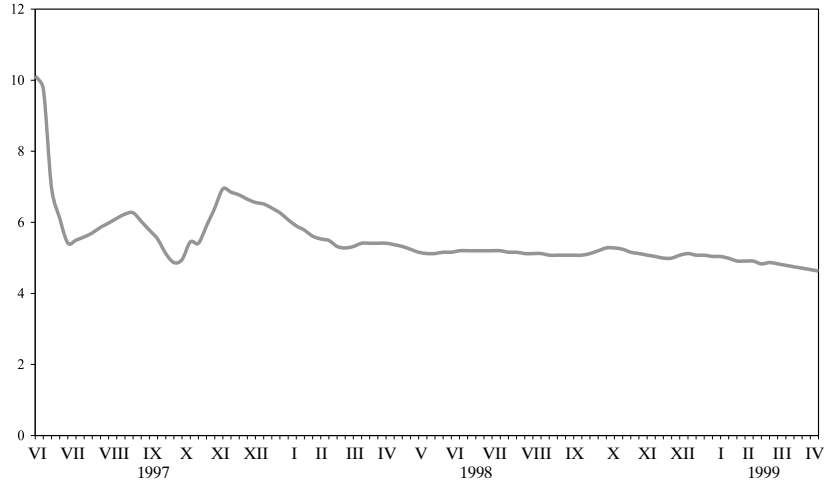


Source: BNB.

Chart 7

ANNUAL BASE INTEREST RATE, JUNE 1997 – JANUARY 1999

(%)

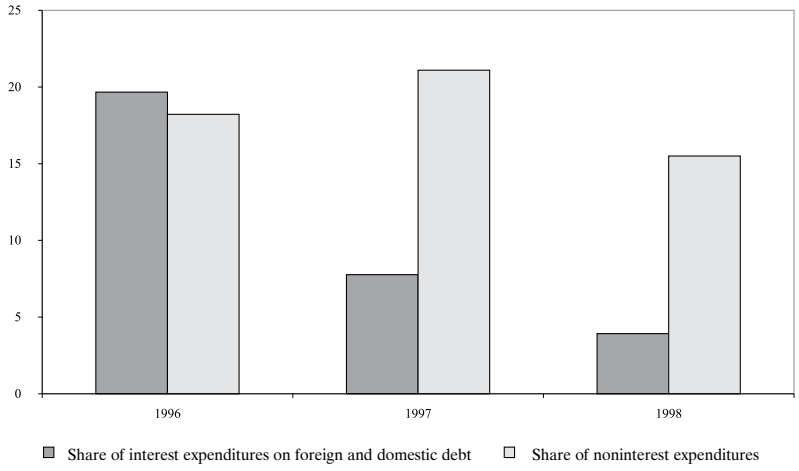


Source: BNB.

Chart 8

EXPENDITURES OF THE GENERAL GOVERNMENT BUDGET/GDP, 1996 – 1998

(%)

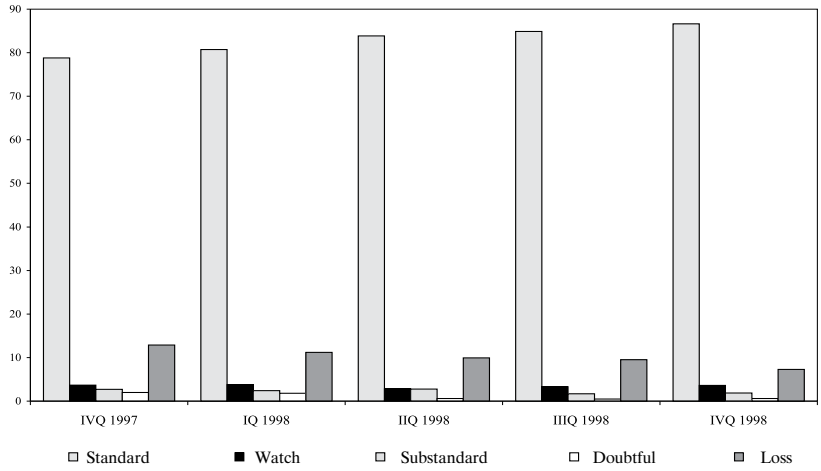


Source: BNB, Ministry of Finance.

Chart 9

CREDIT PORTFOLIO OF THE BANKING SYSTEM, IVQ 1997 – IVQ 1998

(%)

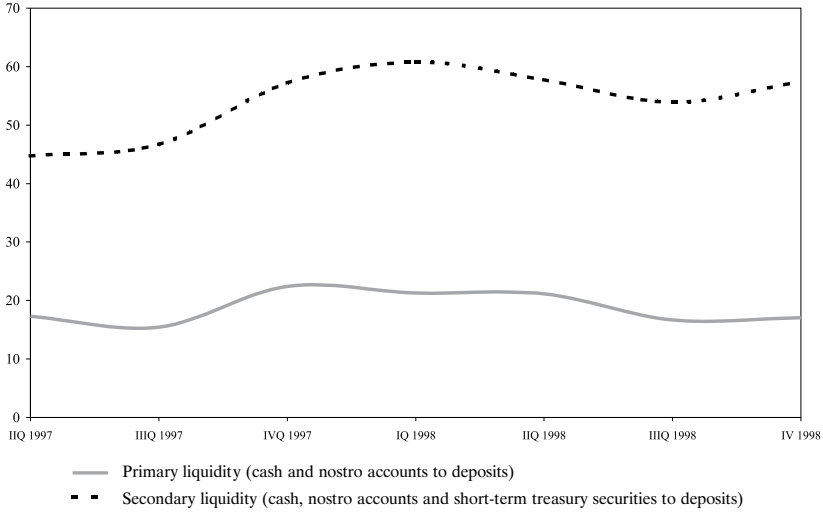


Source: BNB.

Chart 10

LIQUIDITY OF THE BANKING SYSTEM, IIIQ 1997 – IVQ 1998

(%)

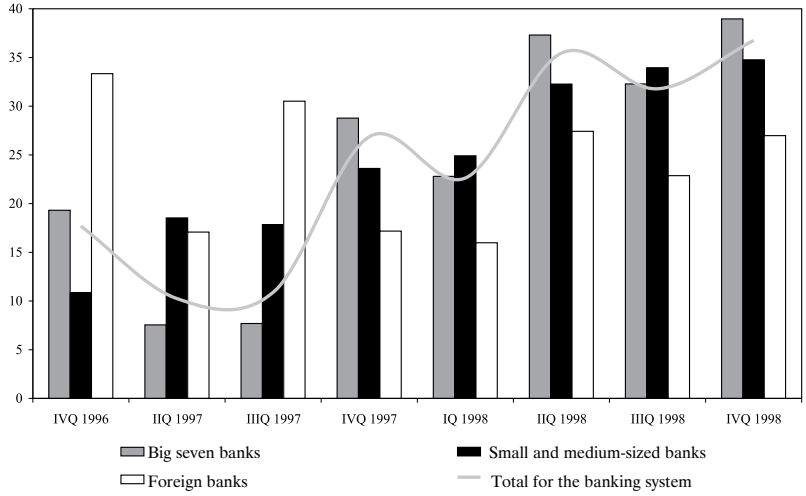


Source: BNB.

Chart 11

CAPITAL ADEQUACY RATIOS, IVQ 1996 – IVQ 1998

(%)

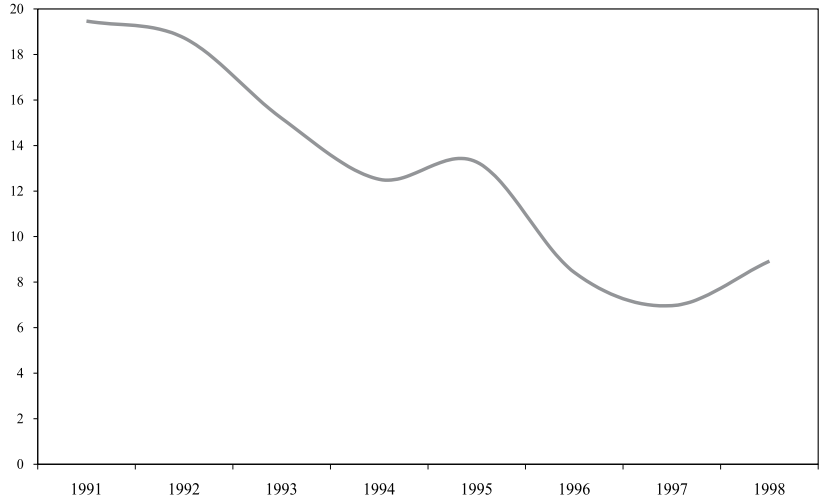


Source: BNB.

Chart 12

RESERVE MONEY/GDP, 1991 – 1998

(%)

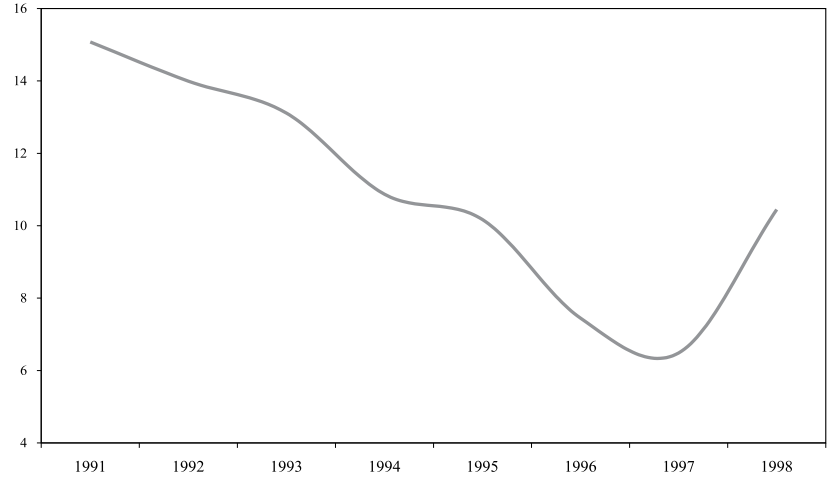


Source: BNB.

Chart 13

M1/GDP, 1991 – 1998

(%)

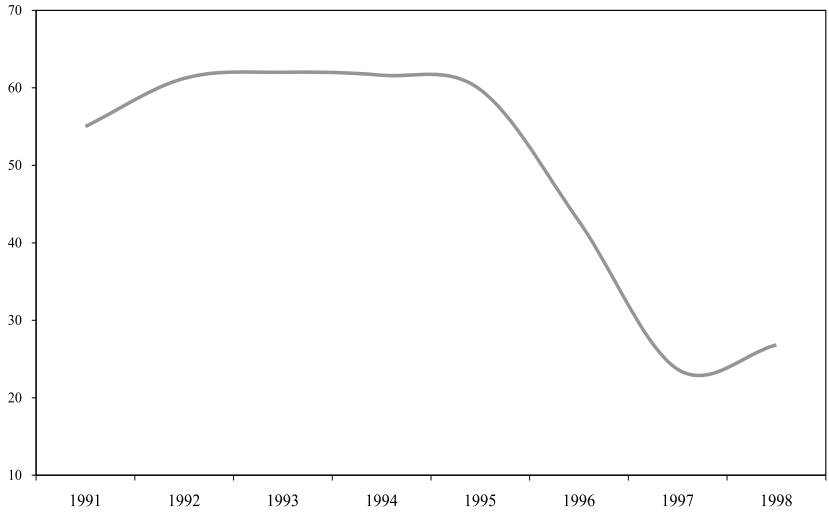


Source: BNB.

Chart 14

M2/GDP, 1991 – 1998

(%)

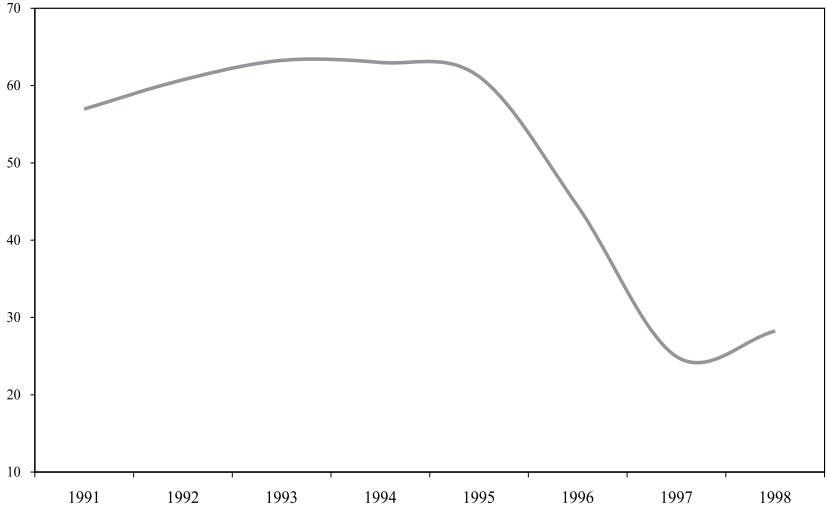


Source: BNB.

Chart 15

M3/GDP, 1991 – 1998

(%)

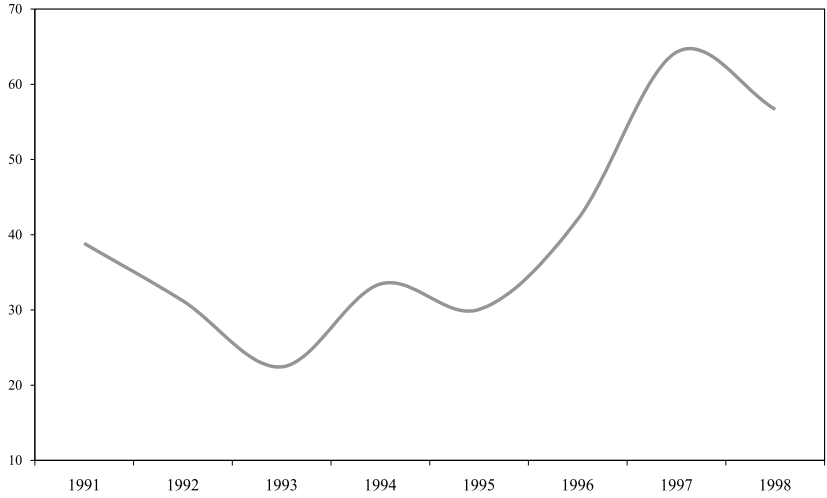


Source: BNB.

Chart 16

FOREIGN CURRENCY DEPOSITS/ TOTAL DEPOSITS
1991 – 1998

(%)

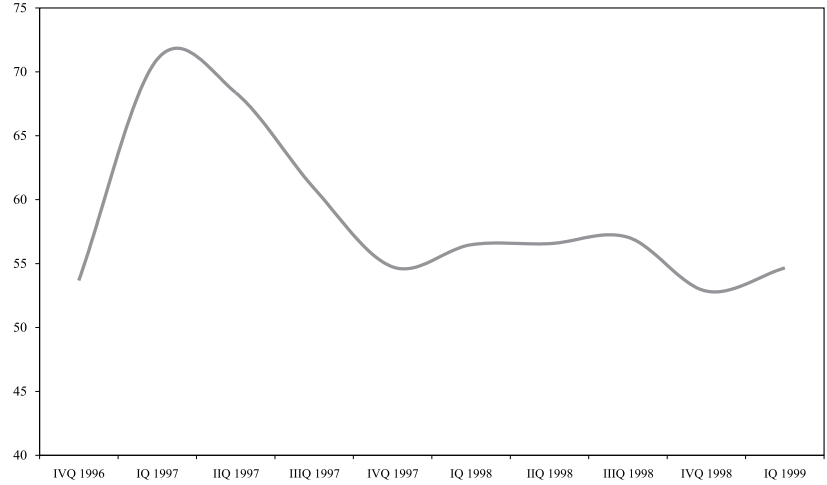


Source: BNB.

Chart 17

FOREIGN CURRENCY DEPOSITS/TOTAL DEPOSITS, IVQ 1996 – IVQ1998

(%)

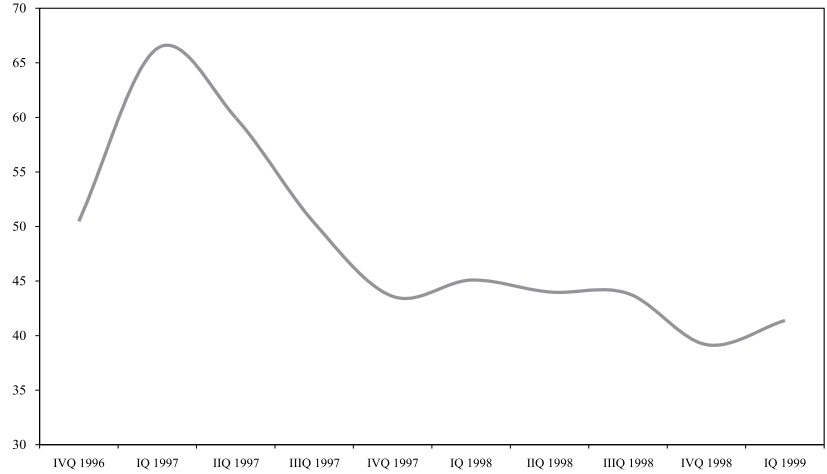


Source: BNB.

Chart 18

FOREIGN CURRENCY COMPONENT OF M3, IVQ 1996 – IVQ 1998

(%)

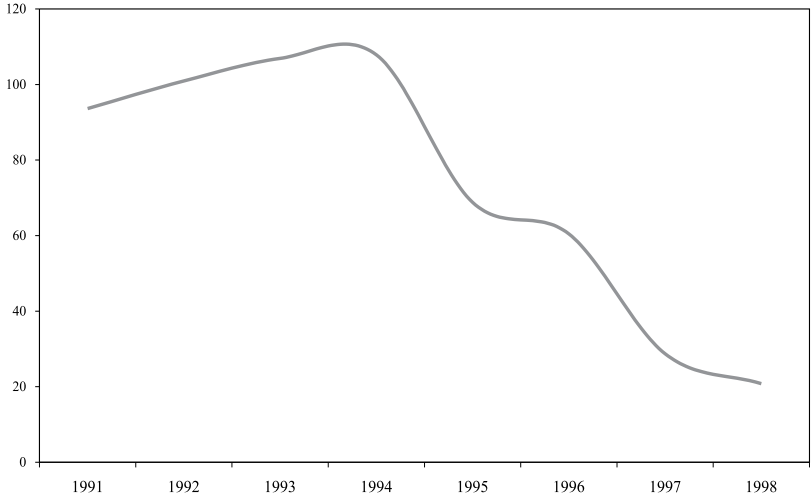


Source: BNB.

Chart 19

DOMESTIC CREDIT/GDP, 1991 – 1998

(%)

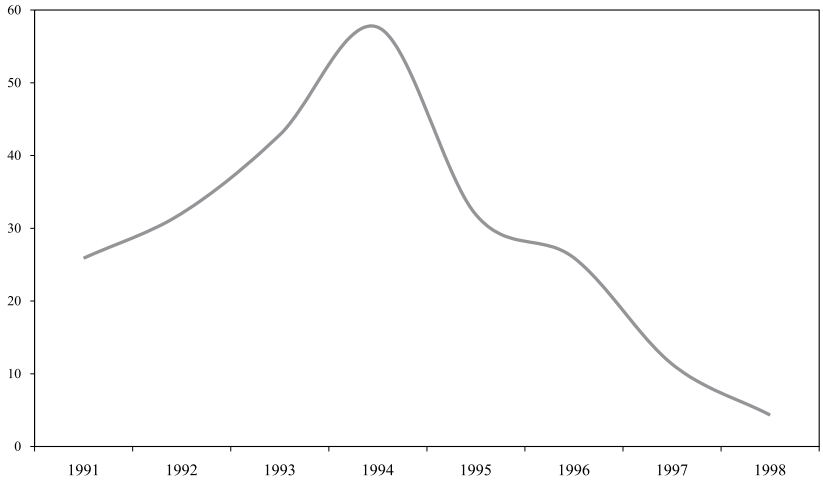


Source: BNB, National Statistical Institute.

Chart 20

CLAIMS ON GOVERNMENT/GDP, 1991 – 1998

(%)

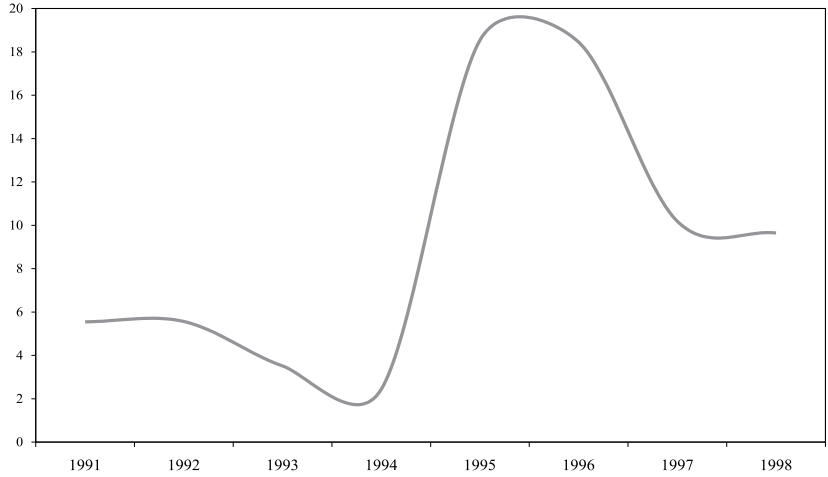


Source: BNB, National Statistical Institute.

Chart 21

CLAIMS ON PRIVATE NONFINANCIAL ENTERPRISES/GDP

(%)

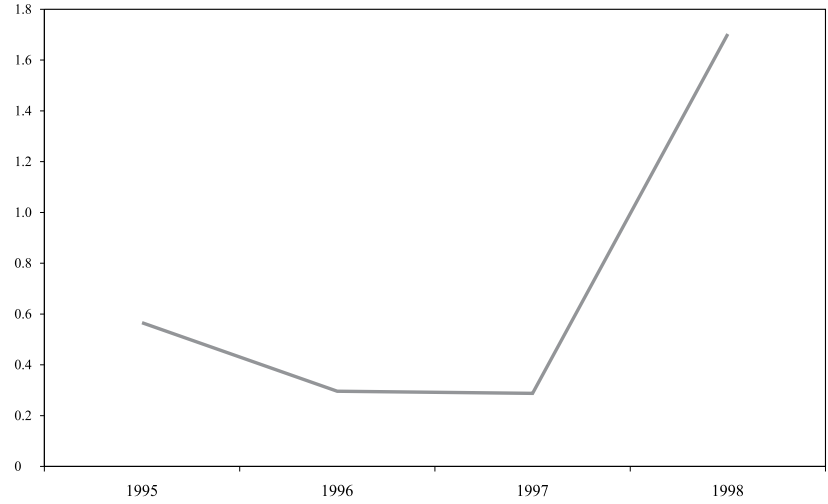


Source: BNB, National Statistical Institute.

Chart 22

CLAIMS ON HOUSEHOLDS/GDP, 1995 – 1998

(%)

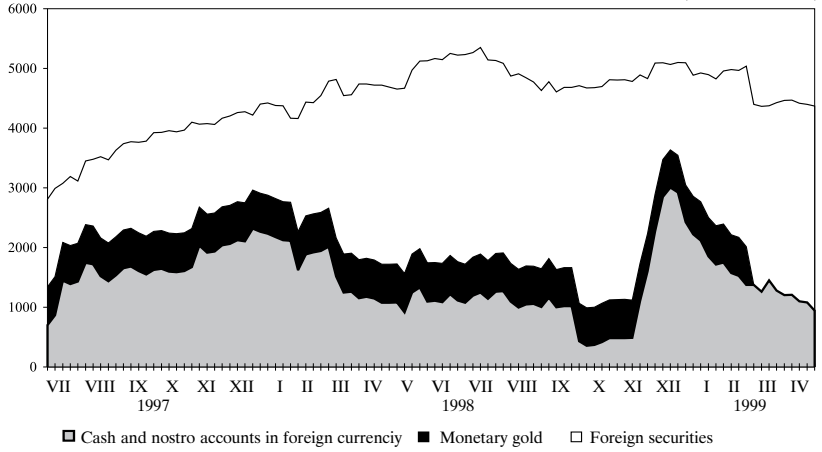


Source: BNB, National Statistical Institute.

Chart 23

ASSETS OF BNB ISSUE DEPARTMENT, JULY 1997 – MARCH 1999

(million DEM)

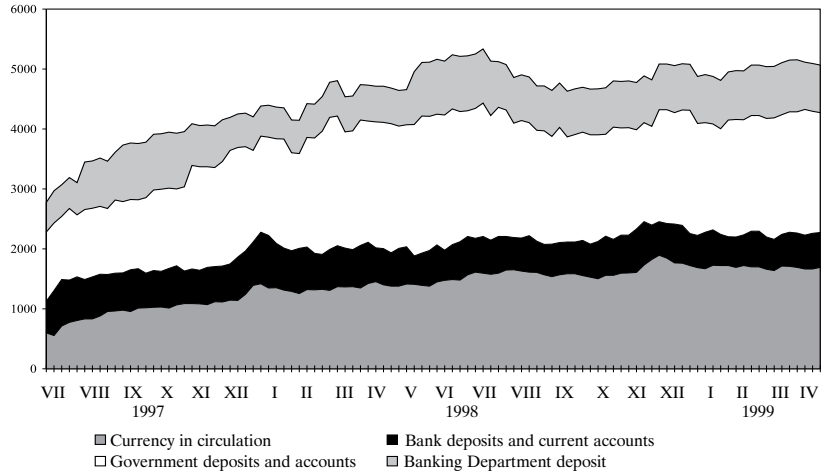


Source: BNB.

Chart 24

LIABILITIES OF BNB ISSUE DEPARTMENT, JULY 1997 – MARCH 1999

(million DEM)

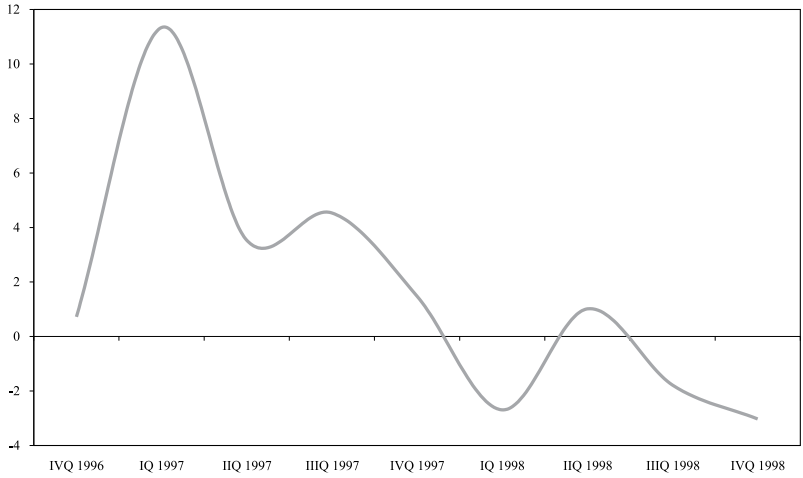


Source: BNB.

Chart 25

CURRENT ACCOUNT/GDP, IVQ 1996 – IVQ 1998

(%)

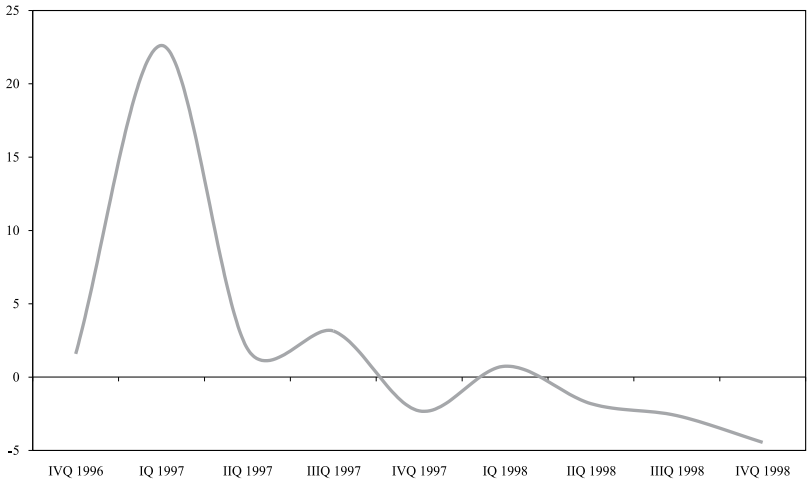


Source: BNB, National Statistical Institute.

Chart 26

TRADE BALANCE/GDP, IVQ 1996 – IVQ 1998

(%)

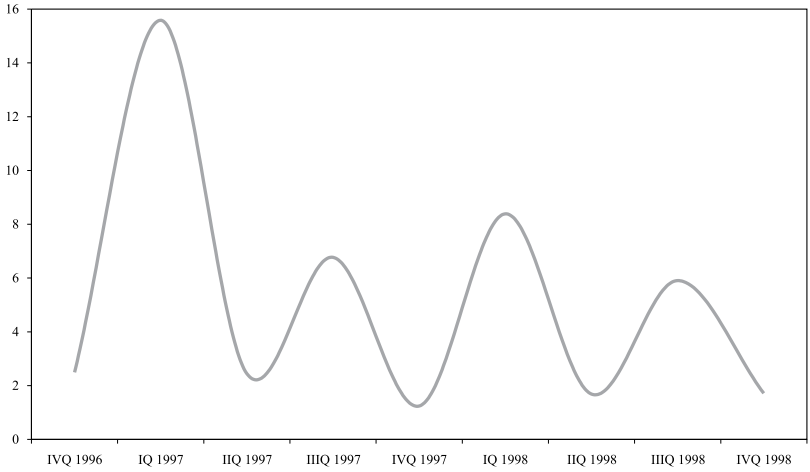


Source: BNB, National Statistical Institute.

Chart 26A

INTEREST PAYMENTS ON FOREIGN DEBT/GDP
IVQ 1996 – IVQ 1998

(%)

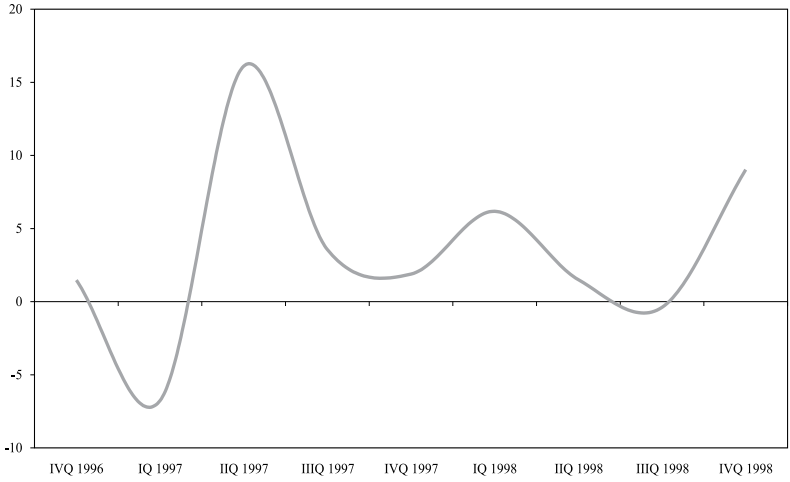


Source: BNB, National Statistical Institute.

Chart 27

CAPITAL ACCOUNT/GDP, IVQ 1996 – IVQ 1998

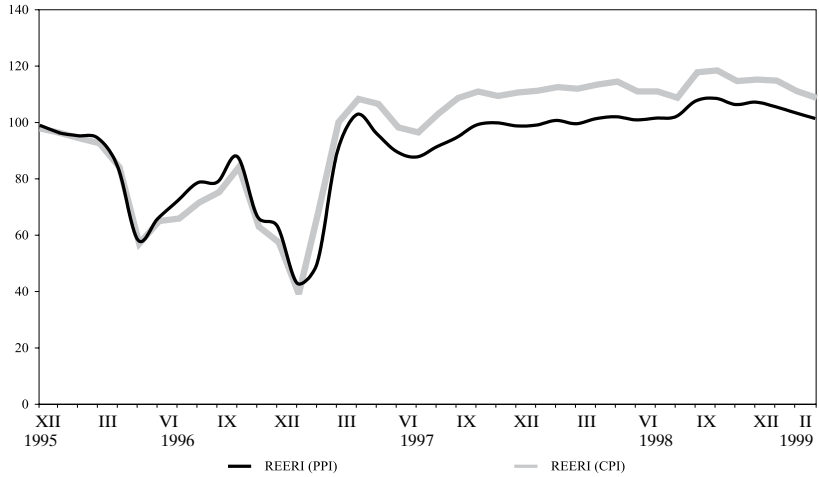
(%)



Source: BNB, National Statistical Institute.

Chart 28

REAL EFFECTIVE EXCHANGE RATE
(December 1995 = 100)

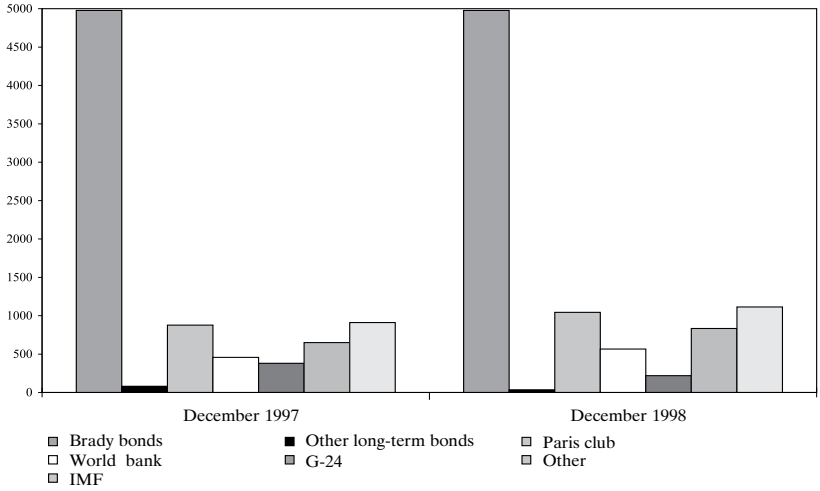


Source: BNB.

Chart 29

GOVERNMENT FOREIGN DEBT, 1997 – 1998

(million USD)

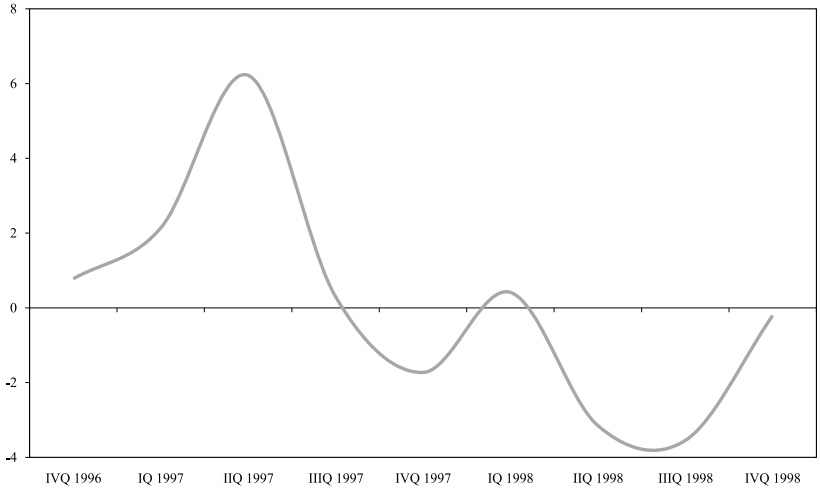


Source: BNB, Ministry of Finance.

Chart 30

NET PORTFOLIO INVESTMENT/GDP, IVQ 1996 – IVQ 1998

(%)

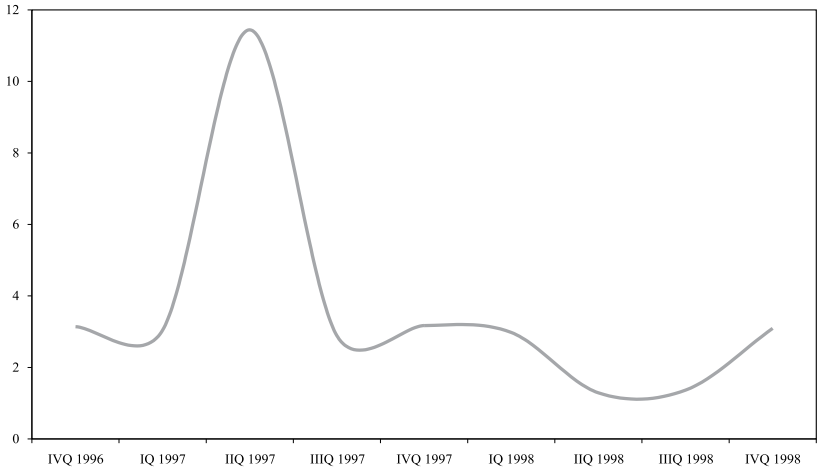


Source: BNB, National Statistical Institute.

Chart 31

FDI/GDP, IVQ 1996 – IVQ 1998

(%)

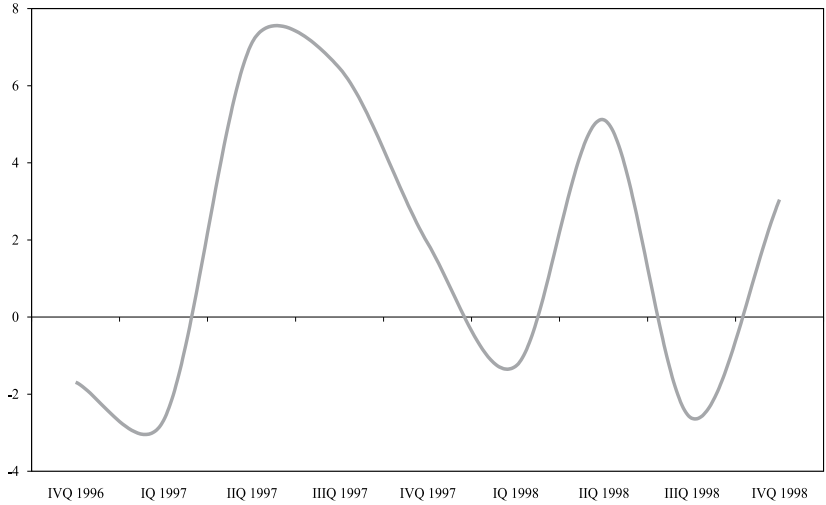


Source: BNB, National Statistical Institute.

Chart 32

NET CREDIT FROM IMF/GDP, IVQ 1996 – IVQ 1998

(%)

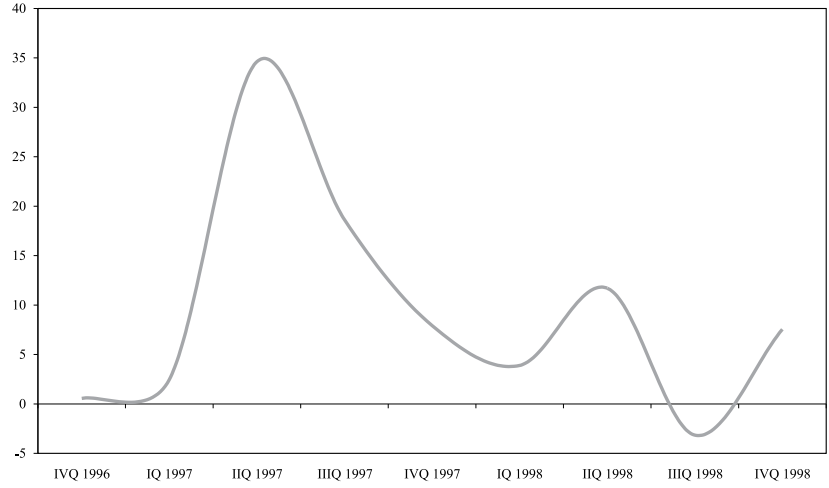


Source: BNB, National Statistical Institute.

Chart 33

CHANGES OF BNB FOREIGN RESERVES/GDP, IVQ 1996 – IVQ 1998

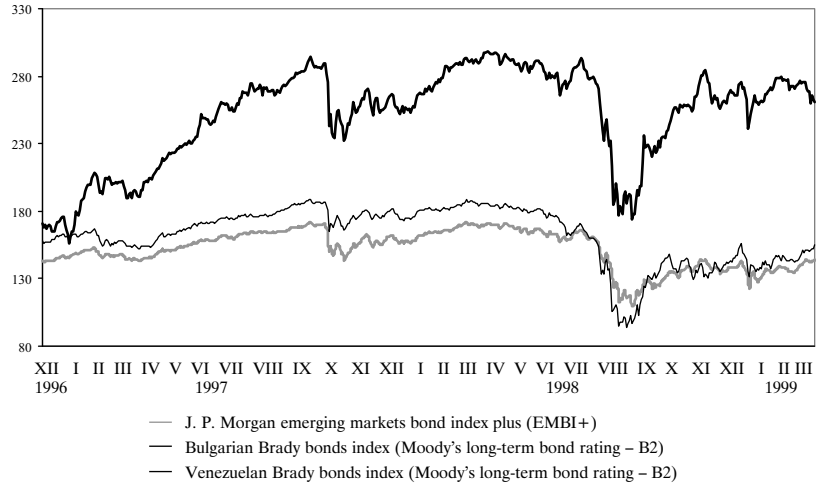
(%)



Source: BNB, National Statistical Institute.

Chart 34

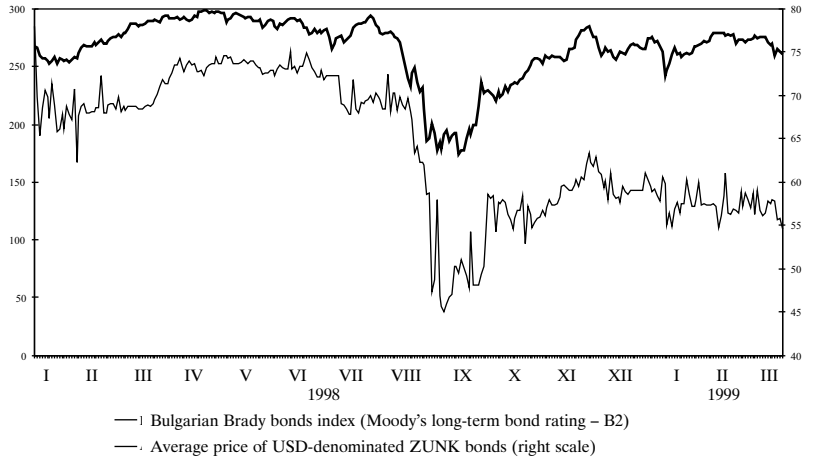
EMBI+, BULGARIAN AND VENEZUELAN BRADY BOND INDICES, 1996 – 1999



Source: J. P. Morgan.

Chart 35

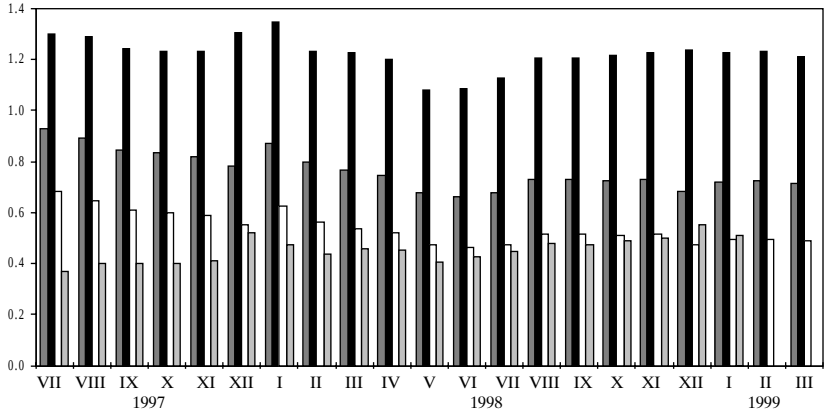
BRADY AND ZUNK* BONDS INDICES, DECEMBER 1997 – FEBRUARY 1999



** USD-denominated long-term government bonds issued to settle nonperforming loans of state-owned enterprises.*
Source: J. P. Morgan.

Chart 36

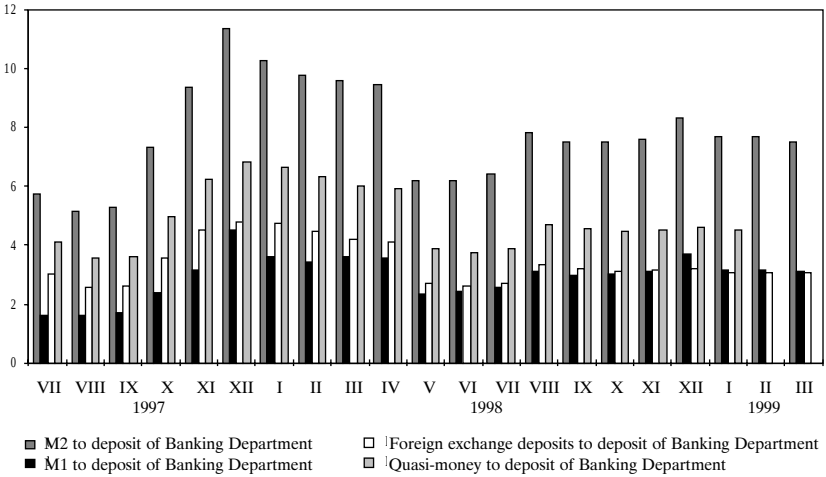
'STABILITY INDICATORS' OF THE CURRENCY BOARD – I
1997 – 1999



Source: BNB.

Chart 37

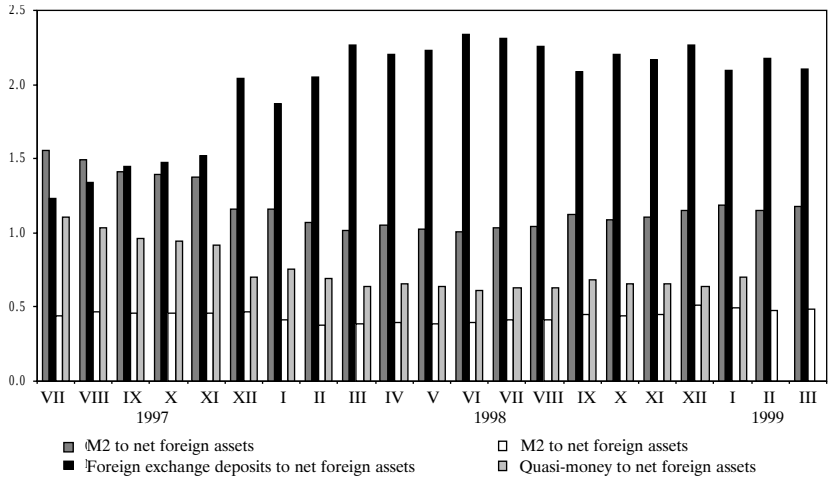
'STABILITY INDICATORS' OF THE CURRENCY BOARD – II
1997 –1999



Source: BNB.

Chart 38

'STABILITY INDICATORS' OF THE CURRENCY BOARD – III
1997 – 1999



Source: BNB.

DP/8/1999

Икономическата философия на Фридрих Хайек

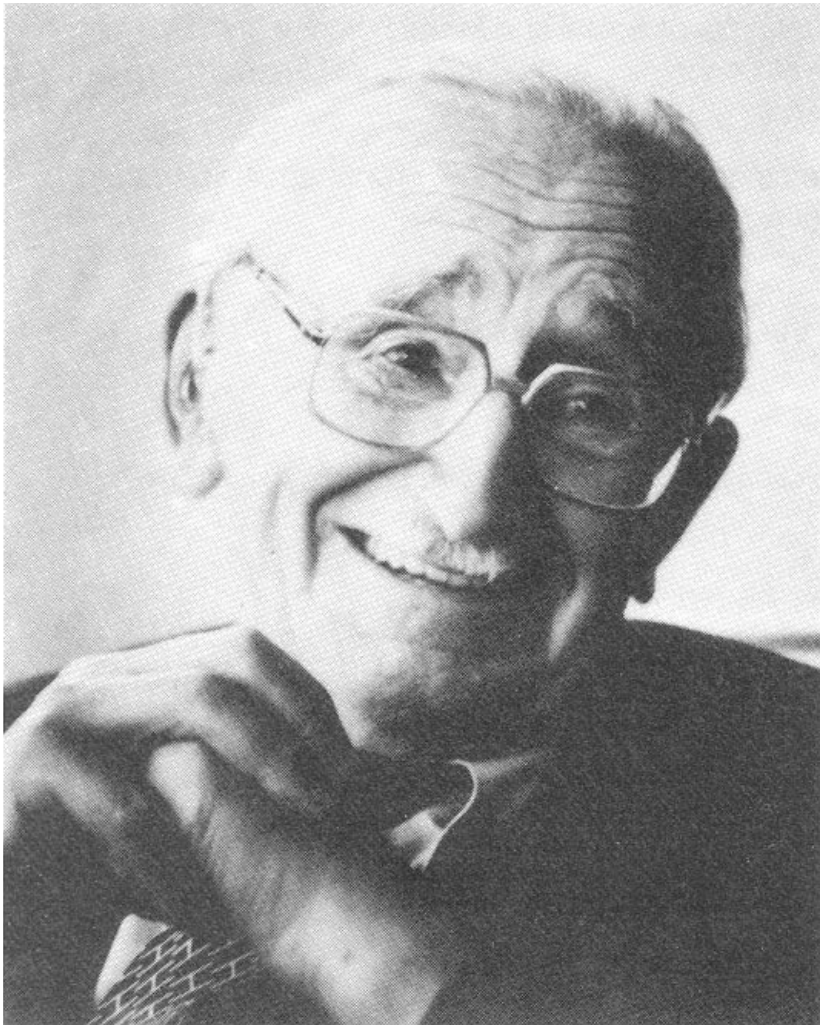
(100 години от рождението му)

Николай Неновски

Резюме. На 8 май се навършиха 100 години от рождението на Фридрих Хайек, може би най-мащабната фигура на либерализма на XX век. В есето е представен житейският път на Хайек, както и основните му приноси в социалните науки. Тези приноси са предвидени през призмата на четири дискусии: спонтанния ред срещу конструирания ред, методологическия индивидуализъм срещу макроикономиката и икономическата политика, разпръснатото знание и несъвършената информация срещу социализма и планирането, свободните пари срещу централната банка.

Abstract. The eighth of May marked the centenary of the birth of Friedrich Hayek, probably the most prominent figure of Twentieth Century liberalism. This essay traces Hayek's life and highlights his contributions to the social sciences. These contributions are considered in the light of four discussions: spontaneous order versus constructed order, methodological individualism versus macroeconomics and economic policy, dispersed knowledge and imperfect information versus socialism and planning, free money versus central banking.

Съдържание



„Редът не е насилие, извършено отвън върху обществото, а равновесие, търсено отвътре."

Ортега-и-Гасет
(мото от „Конституция на свободата" на Хайек)

На 8 май се навършиха 100 години от рождението на Фридрих Хайек (1899 – 1992 г.) – може би най-мащабната фигура на либерализма на XX в. Хайек живя достатъчно дълго и запази своята интелектуална дързост до пределна възраст[1], за да види целия „жизнен цикъл" на творчество си – неприемането на неговите идеи и загубата на дебата с Кейнс и Ланге през 30-те години, дългата изолация в следвоенния период и накрая триумфа с разпадането на социалистическата система в края на 80-те години.[2]

Научното наследство на Хайек обхваща не само икономическата теория, но и социалната философия и политологията, правото и антропологията, философията на науката и психоло-

[1] *Достатъчно е да се прочете една от последните му книги „**Фаталната самонадеяност**", писана на 88-годишна възраст, но звучаща като писана от младеж. Вж.* ***Хайек, Ф.*** *(1988).*

[2] *На 5 февруари 1981 година министър-председателката на Великобритания Маргарет Тачър казва в реч пред парламента, обръщайки се към опозицията: „Аз съм голяма почитателка на професор Хайек. Неговите книги – „Конституция на свободата" и трите тома „Право, законодателство, свобода" – би било добре да бъдат прочетени от някои от вас". По* ***McCormick, B.*** *(1992), p. 235.*

гията – общо 25 книги и 130 статии, преведени на различни езици.[3] Въпреки Нобеловата награда по икономика, присъдена му през 1974 г., за разработване на теорията за цикъла и парите, Хайек никога не е бил приеман като свой от икономистите.[4] Обяснението е просто – той е в друга парадигма (ако използваме методологията на Кун) и възможностите за комуникация с господстващата схема са незначителни. Отричането на неокласическия анализ и на класическата рационалност, на макроикономиката и икономическата политика, на моделирането и прилагането на математическите методи в управлението правят Хайек еднакво неприемлив за многобройните учени, преподаватели, държавни чиновници и политици, които виждат в него заплаха за своето съществуване. Нима не звучат предизвикателно думите му, че „куриозната задача на икономическата наука е да докаже на хората колко малко наистина знаят за онова, което си въобразяват, че могат да проектират“[5]. Затова Хайек така и не е приеман нито от кейнсианците и от монетаристите, нито от новите направления в икономическата наука – тази за рационалните очаквания и реалния бизнес цикъл.

I. Житейски път: Виена – Лондон – Чикаго – Фрайбург

Фридрих фон Хайек е роден във Виена на 8 май 1899 г. в семейство на интелектуалци. По бащина линия наследява интереса към биологията и естествените науки: дядо му е биолог, баща му – професор по медицина и ботаника. Тази традиция

[3] ***Boettke, P.*** *(1992). Интересен е фактът, че две от основните книги на Хайек – „Цени и производство“ и „Конституция на свободата“ – са преведени на китайски съответно през 1966 г. и 1975 г. Вж. пълната библиография на творчеството на Хайек до 1988 г. в:* ***Dostaler, G., D. Ethier, ed.*** *(1989).*

[4] *Известен е отказът на икономическия факултет на Чикагския университет през 1950 г. да предостави катедра на Хайек и той става професор по социални науки и етика. Показателни са и атаките на един от най-популярните съвременни икономисти Пол Кругман, който неотдавна изказа мнението, че Хайек с нищо не е допринесъл за развитието на икономическата наука и не заслужава уважение. Вж.* ***Krugman, P.*** *(1998).*

[5] ***Хайек, Ф.*** *(1988), с. 104. Преводът на български е неточен – икономическата наука е подменена с икономиката.*

продължават и братята на Хайек – единият е професор по анатомия, а другият – по химия, както и неговите деца – дъщеря му е биолог, а синът му – лекар патолог. По майчина линия Хайек е повлиян от своя дядо, професор по конституционно право и впоследствие президент на Статистическата камара на Австрийската империя.[6]

Академичната кариера на Хайек започва във Виенския университет, където духовният климат е пронизан от австрийската школа в икономическия анализ. Началото поставя Карл Менгер със своите „Принципи на икономическата наука" (1871), а теорията му се доразвива от Йожен Бьом-Баверк, Фридрих Визер и най-вече Лудвиг Мизес. Въпреки че негов пръв учител е Визер, самият Хайек твърди, че „няма друг човек като Мизес, на когото да дължи толкова много в интелектуално отношение"[7], както и на книгата му „Теория на парите и кредита" (1912). Хайек защитава два последователни доктората през 1921 г. и 1923 г. по право и икономика и става частен доцент по политическа икономия през 1929 г. През 1922 – 1927 г. работи под ръководството на Мизес, като взема актив-

[6] ***Machlup, F.*** *(1977).*

[7] ***Boettke, P.****(1992), p. 1. Визер е фабиански социалдемократ, което първоначално привлича Хайек, но впоследствие го отблъсква и го кара напълно да приеме антисоциалистическите позиции на Мизес. В последните години се появиха опити да се противопоставя Хайек на Мизес, като се твърди, че истинският либерал е Мизес, а теорията на Хайек е силно повлияна от студентските му години, прекарани в класа на Визер. Така днес в рамките на австрийското икономическо направление съществуват две течения: едното, мизесианското, на класическата австрийска школа – около Ротбарт, Салерно, Хоп, Де Жасей и др. (публикуващи най-вече в* ***The Review of Austrian Economics****), и другото – на новите австрийци, хайекианци като Кирзнер, Бьотке, Уайт, Доун, Селжин и др., публикуващи в* ***New Austrian Economics****. Вж. например критичните статии за Хайек в:* ***Hoppe, H.*** *(1994),* ***De Jasay, A.*** *(1996),* ***Salerno, J.*** *(1999). В методологията на двамата има определени различия: Мизес е традиционен рационалист, докато Хайек според собствените му думи е „еволюционен рационалист" за разлика от „конструктивисткия рационализъм". Въпреки „антирационалистките" елементи в теорията на Хайек може определено да се твърди, че под влиянието на Попър и заниманията му с психология той изгражда свой подход към човешкото поведение, който е развит по-късно от Саймън в неговата „процедурна рационалност". Като цяло аз не виждам противоречия в общите възгледи на двамата за човешката дейност и за обществено развитие. Виж интересния анализ на либерализма и неговата класификация на утилитаризъм (Фридман), рационализъм (Мизес) и еволюционизъм (Хайек), направен от полския автор Легутко (1995).*

но участие в неговия частен семинар[8], а от 1927 г. до 1931 г. е директор на Института за изследване на икономическия цикъл[9]. В този период той посещава няколко пъти САЩ и се удивлява на „наивността“ на американските икономисти в подхода им към икономическата криза и стопанската конюнктура.[10]

През 1930 – 1931 г. Лионел Робинс го кани в Лондонското училище по икономика, където Хайек изнася четири лекции, посрещнати с много голям интерес и издадени по-късно като отделна книга „Цени и производство“ (1931). За да подсили борбата си с Кейнс, Робинс кани Хайек в Англия, като помага да бъде назначен за професор по икономика и статистика.[11]

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*[8] През 1921 г. Хайек, тогава 22-годишен, започва заедно с Фюрт свой частен семинар, наречен **Geisteskreis** и дискутиращ теми от всички области на живота, включително музика, литература, теория на относителността и др. В този период Хайек общува и с големия австрийски философ Витгенщайн, което формира и интереса му към философията.*

[9] Институтът дълго време се състоял от трима души и бил спонсориран от фондация „Рокфелер“. След заминаването на Хайек за Лондон директор става Оскар Моргенщерн, под чието ръководство институтът се разраства и започва да прилага количествени методи.

*[10] Хайек заминава в САЩ, получавайки препоръка от Шумпетер. Там той прекарва 14 месеца главно в Нюйоркския и Колумбийския университет, като започва да пише докторат на тема „Съвместима ли е стабилизацията на стойността на парите с техните функции?“, останал незавършен. Посещава семинарите на Кларк и Митчел. Автобиографични бележки за живота на Хайек могат да бъдат намерени в: **Gamble, A.** (1996) и **Dostaler, G.** (1989).*

[11] Взаимоотношенията на Хайек с Кейнс са изключително интересни. Въпреки острите спорове те били приятели. Според самия Хайек това се дължи най-вече на факта, че и „двамата са считали заниманията си с икономика за второстепенни и са търсели обясненията на нещата далеч извън икономиката“. Има много научни елементи, които обединяват икономическите възгледи на Хайек и Кейнс: несигурността, акцентирането върху времевия фактор, значението на очакванията, ролята на парите и др. Мнението на Хайек за Кейнс е противоречиво. В своите спомени той твърди, че при последната си среща с Кейнс (две седмици преди смъртта му) последният споделя, че е дълбоко разочарован от своите последователи и ако е нужно, „е готов да напише книга, която да обърне отново общественото мнение“. В едно от последните си интервюта Хайек обяснява методологическите грешки на Кейнс с факта, че той слабо е познавал икономическата литература (особено класиците) и си е оставал „дилетант и самоук икономист“. Активизма на Кейнс Хайек обяснява още с неговото пренебрежение към морала (известно е, че Кейнс е участвал активно в дружеството Bloomsbury, познато като сдружение на артисти, отричащи устоите на обществото), намерило синтезиран израз в думите му: „Аз съм и ще остана аморалист.“ Въпреки всичко след смъртта на Кейнс Хайек споделя с жена си, че Кейнс „е най-великият живял

Престоят му в Англия е забележителен с два големи интелектуални двубоя. Първият е с Кейнс, Срафа и Калдор относно причините за цикъла и за ролята на парите. Тримата считат, че двигател на кризата е недопотреблението и за избягването ѝ е нужно стимулиране на съвкупното търсене, с което по същество оправдават инфлационното стимулиране на икономиката. Хайек, обратно, твърди, че причина на кризите е свръхпотреблението, което води до нарастване на кредита, оттук до разрушаване на естественото ниво на лихвения процент, а следователно и на структурата на производството между предметите за потребление и средствата за производство. Инфлацията според него разлага относителните цени, които са основните информационни сигнали.[12] Вторият двубой е този с Ланге, Лернер, Тейлър и Дикинсън за пазарния социализъм и за възможностите за пресмятане при централизираност на икономиката. Последните твърдят, че при централизирано управление планиращият орган може да използва т. нар. „сенчести цени", симетрични на пазарните при пазарната икономика. Плод на първия дебат е книгата на Хайек „Чиста теория на капитала" (1941), а на втория – „Пътят към крепостничеството" (1944) и „Индивидуализмът и икономическият ред" (1948). И в двете дискусии Хайек губи, което го принуждава да преразгледа своята научна програма и да се ориентира към извъникономически области.

През 1950 г. той се настанява в Чикаго, където прекарва до 1962 г. като професор по социални и политически науки. Резултат от неговите търсения е може би най-добрата му книга „Контрареволюцията на науката" (1952), както и най-системното излагане на либералните му възгледи в „Конституция на свободата" (1960).

някога икономист". Срещите на Хайек и Кейнс са описани от самия Хайек (Hayek, F., 1994), а също от ***Dostaler, G.*** *(1990, pp. 135 – 162, 1997).*

[12] *Неприязънта на Мизес и Хайек към инфлацията може да бъде обяснена и с личния им опит, когато в резултат от хиперинфлацията през 1923 г. семействата им губят голяма част от спестяванията си. Вж.* ***Polanyi, K., M. Mendell*** *(1989).*

Следваща стъпка е завръщането през 1962 г. на Хайек в Европа – в Университета във Фрайбург, Германия, като професор по икономика (наследява катедрата от Валтер Ойкен), където се пенсионира през 1967 г. През този период Хайек се отдава на усъвършенстването на своята теория за спонтанния ред и издава тритомника „Право, законодателство и свобода“ (1973 – 1979 г.). Впоследствие до 1974 г. приема поста почетен професор в университета в Залцбург, Австрия. През 1971 г. Виенският университет го прави почетен сенатор, а през 1974 г. заедно с Гунар Мюрдал получава Нобелова награда по икономика.[13] В последните си години Хайек се връща към любимата си тема за парите, като през 1977 г. с книгата си „Денационализация на парите“ (1977, 1978) поражда дискусия за децентрализацията на паричната емисия. През 1988 г. издава „Фаталната самонадеяност. Грешките на социализма“ – резултат от подготовката му за голям, но неосъществен интелектуален дебат със социалистите в Париж.

Фридрих Хайек никога не е желал да налага по силов път своите възгледи, никога не се е стремял към административни и съветнически постове.[14] Единственото и естественото място за него винаги са били университетът и академичната среда.

През април 1947 г. той заедно с още 39 учени от Европа и Америка създава дружеството „Монт Пелерен“, целта на което е дискутирането на „опасностите от разрушаването на свободното общество“. В устава и задачите му изрично е формулирано, че неговите членове няма да се занимават с „пропаганда на своите идеи и не ще принадлежат към никоя пар-

[13] По време на коктейла по случай връчването на Нобеловата награда Хайек споделя, че е против получаването ѝ и дълго се е колебал дали да я приеме, защото е нелогично да се придава толкова голяма тежест на кой да е икономист.

[14] С изключение на няколко години, през които заедно с Мизес поради материални причини работи във виенската търговска камара, Хайек никога не е преустановявал научната си дейност. Интересно е да се отбележи, че по същото време Мизес и Хайек създават своя Институт за изследване на бизнес цикъла, който дълго време се е помещавал на техните работни места в същата търговска камара.

тия“[15]. Те само „ще обменят мисли, с цел да спасят свободното общество“[16]. Хайек е председател на дружеството до 1960 г., след което става негов почетен председател.

II. Спонтанният ред срещу конструирания ред

Ако има нещо, с което името на Хайек се свързва веднага, то това е неговата теория за спонтанния ред и за еволюционното развитие на обществото. Според Хайек основните институции, като морала, правото, държавата, пазара, парите и др., възникват спонтанно от дейността на хората, а не са резултат от преднамерени човешки действия. Институционализмът на Хайек е много близо до теорията на еволюционните игри (суперигри), където институциите са решение на игрите (Shotter), а не са зададени ad hoc (Shubik).[17] Спонтанният ред е резултат от самоорганизацията на обществото и икономиката, което го доближава много до съвременната теория за хаоса, за формирането на комплексните и сложни структури (Пригожин).

Човешкото общество е управлявано от правила. Според Хайек „човек е по-скоро същество, спазващо правила, отколкото преследващо цели“[18]. От „индивидите не се изисква да постигнат съгласие относно целите, а само относно средствата, годни да служат на голям брой цели, които всеки се надява да използва успешно за достигане на собствените си цели“[19]. Човек „съблюдава тези правила, които той не е измислил и често дори не познава в детайли, въпреки че е в състояние да ги спазва“[20]. Спонтанният ред е резултат от селекция на тези правила

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[15] *В статията си „Защо не съм консерватор“ Хайек определя така функциите на учения: „Задачата на политическия философ може да се сведе до въздействие върху общественото мнение; не е негова работа да организира хората да действат. Той би могъл ефективно да върши това единствено ако не се интересува от политически възможното в момента, а като постоянно защитава „общите принципи, винаги едни и същи“. Вж.* ***Хайек, Ф.*** *(1996a), с. 241.*

[16] ***Machlup, F.*** *(1977), p. XII – XIII.*

[17] ***Mirowski, P.*** *(1993) Institutions as a Solution Concept in a Game Theory Context. ed. G. Hodgson, pp. 241 – 260;* ***Hodgson, G.*** *(1998), pp. 166 – 192).*

[18] ***Хайек, Ф.*** *(1996b), т. 1, с. 22.*

[19] ***Хайек, Ф.*** *(1998), т. 2, с. 15.*

[20] ***Хайек, Ф.*** *(1996b), т. 1, с. 22.*

и е противоположност на конструирания ред, където правилата са наложени по силов път. Спонтанният ред е другата дума за разрастващия се, възникващ ред (космос) като антоним на създадения ред, на създаденото общество (таксис). Тези два типа социална динамика са тясно обвързани с двата типа рационалност: еволюционна и конструктивистка. Първата помага на обществото, втората го руши. Механизмът на спонтанния ред не може да бъде познат и още повече възпроизведен изкуствено и именно това непознаване „често предизвиква паника и искания за правителствени действия“[21].

Рационализмът според Хайек има своите ограничения – човешкото поведение е съчетание на различни типове рационалност с ирационалното, на знанието с незнанието. В резултат от това не е възможно да се изграждат институции, правила на поведение по предварително начертан план. Да се прави това, значи да се „злоупотребява с разума“. Според Хайек социалното инженерство, което се опитва да пренася методите от точните в обществените науки, като поставя научно изчислени цели и се опитва да ги достигне с измислени за това инструменти, е причината за нестабилността и бавното развитие на човечеството. Австрийският учен нарича това „сервилничене на социалните науки пред точните“[22]. За Хайек традиционният рационализъм води до редица заблуди, например: „1) идеята, че е неразумно да следваме онова, което е неоправдано от научна гледна точка или не се доказва чрез наблюдение, 2) идеята, че е неразумно да следваме онова, което не разбираме, 3) идеята, че е неразумно да следваме определена посока, освен ако нейната цел не е предварително изцяло определена, 4) идеята, че е неразумно да правим нещо, освен ако неговите резултати не само са изцяло предварително известни, но и хем са изцяло наблюдаеми, хем са изгодни (утилитаристите).“[23]

[21] *Пак там, т. 1, с. 78.*
[22] ***Hayek, F.*** *(1952), p. 12.*
[23] ***Хайек, Ф.*** *(1997), с. 84 – 85.*

Единствено възможното развитие е еволюционната културна динамика, където, учейки се от своите грешки и успехи, индивидите и социалните групи напипват тези правила, които им носят по-добро материално състояние. Еволюцията не може да бъде справедлива, а „социалната справедливост“ е научен и терминологичен нонсенс.

Теорията за спонтанния разрастващ се ред е продължение на либералните идеи на Спиноза, Лок, Мандевил, както и на класическия английски либерализъм от XVIII в. и XIX в. Тя е своеобразно продължение на епистемологичната критика от страна на Менгер през 70-те години на XIX в. срещу историческия метод в социалните науки, даващ приоритет на конкретното пред абстрактното и базиращ се на събиране на емпирични факти.

Хайек многократно афишира своята симпатия към Кант, към неговата теория на познанието, пронизана от субективизма и скептицизма, като ги противопоставя на обективизма и тоталитаризма на Хегел. Спонтанният ред плътно се доближава до философската система на „отвореното общество“ на Карл Попър – друг голям либерал на XX в. (и също австриец).[24]

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[24] *През 1946 г. Хайек помага на Попър да се премести от Нова Зеландия, където е принуден да емигрира, в Лондон. В своите мемоари Попър споделя, че Хайек два пъти му спасява живота. Когато в продължение на година книгата на Попър „Отвореното общество“ не намира издател в САЩ, Попър се обръща към Хайек, който му помага да я издаде в Англия. Взаимодействието между Хайек и Попър е двупосочно. Не бива да се забравя, че първата си голяма статия „Нищетата на историзма“ Попър публикува в списание „Economica“, чийто главен редактор е Хайек. Вж.* ***Попър, К.*** *(1998) и* ***Watkins, J.*** *(1997), pp. 645 – 684. Според самия Попър той и Хайек през цялата си творческа дейност са имали двама врагове – историзма и сциентизма. Те разглеждат историзма като особен вид детерминизъм и сциентизъм, когато миналото и настоящето определят бъдещето, което противоречи на отвореното общество. Между Хайек и Попър има съществена разлика във философските системи: Попър е обективист и реалист, докато Хайек е субективист. В областта на методологията на науката Хайек заимства много от метода на фалшифицируемостта на теориите и развитието на науката чрез изместването на проблемите. Изключително сходни са подходите на двамата към информацията, знанието, обучението чрез метода на пробите и грешките, ролята на подражанието и др.*

III. Методологическият индивидуализъм срещу макроикономиката и икономическата политика

Основен постулат, върху който се гради системата на Хайек, е методологическият индивидуализъм, според който всеки обществен факт и процес трябва да бъде изведен от поведението на индивида, от неговата дейност. Базов разрез на този подход е *субективизмът*, разбиран като невъзможност да се дефинират предметите на човешката дейност като обективни, извън контекста на оценката на хората за тях. Отхвърлянето на макроикономиката идва логично: „нито агрегатите, нито целите и средствата реагират, а това са индивидуалните акции на хората, които ги ръководят“. Хайек отрича съществуването на макроикономиката и икономическата политика изобщо, а не само на нейния кейнсиански вариант (както често се твърди). За него споровете между монетаристите и кейнсианците, школата на рационалните очаквания и школата на неравновесието са спорове за детайлите в рамките на конструираната икономическа действителност. За Хайек самите понятия, с които борави макроикономиката, такива като БВП, индекс на потребителските цени, норма на безработица, съвкупни инвестиции и спестявания, парични агрегати и др. са безсмислени величини, лишени от съдържание.

Хайек разглежда макроикономиката като мощен инструмент за конструиране на икономиката по предварително начертан план, нещо напълно илюзорно и погрешно. Макроикономиката предполага холистичното виждане за развитието, където цялото възниква преди частите, а не произтича спонтанно от тяхното взаимодействие. Това виждане оправдава изграждането на специални органи – в случая държавата, която да се грижи цялото да не се разпадне и да го насочва в „правилна посока, по научно обоснован план“. В рамките на макроикономическата наука в една или друга степен се поставят цели, построяват се инструменти и се правят безкрайни опити чрез тях да се постигнат целите, като се изучат връзките помежду им. В процеса на разрастване и удължаване на тази

връзка инструментите стават междинни цели, а целите – крайни цели. Така веригата от цели и инструменти достига до абсурдни размери и губи всякакъв смисъл. Огромни интелектуални усилия се хвърлят в изучаването на макроикономическите зависимости, като цели поколения икономисти посвещават своя кратък живот на детайлизиране на някоя връзка. Тази кафкианска абсурдност според Хайек придобива застрашителни размери, защото макроикономистите и политиците започват да си вярват и да бранят със зъби и нокти източника на своето съществуване.

Нека вземем един пример – този с масово разпространения и до днес в учебниците модел ISLM. Въпреки редица модификации, по своята същност той си остава пример за манипулация и намеса в човешкия избор и хипотетично предполага, че държавата знае повече от останалите икономически агенти и че частният сектор и пазарът са нестабилни. Логиката на този модел е проста: лихвеният процент се формира едновременно на двата пазара – този на спестяванията и инвестициите (наречен неправилно реален) и този на търсенето и предлагането на пари (наречен паричен). В този модел държавата в лицето на централната банка може да манипулира предлагането на пари (при зададено тяхно търсене) и да превръща спестяванията в инвестиции „в правилната посока и в нужния обем“. Това става, като реалният лихвен процент се подменя с номинален (равен на реалния плюс очакваната инфлация), т. е. като се „инжектира“ инфлация. Икономическите агенти са заблудени, защото реалният, естественият лихвен процент (резултат от потребителския избор на предпочитание към настоящото или бъдещото потребление) е подменен с номинален лихвен процент, който те не могат напълно да предвидят. Така чрез контрола върху паричното предлагане държавата се „вмъква“ в основния за човека избор – между потребление и спестяване, и в основната за икономиката връзка – тази между спестяванията и инвестициите. Определено може да се каже, че няма друга така добре използвана подмяна, когато вместо една естествена

величина се подставя друга, с цел да се акумулират и пренасочват спестяванията на индивидите и по този начин да се руши оптималното разпределение на ресурсите.

Спорът между Хайек и Кейнс от 30-те години за природата на икономическия цикъл и причините за икономическите кризи (може би най-значителният спор по макроикономика през XX в.) може да бъде пречупен през призмата на дискусията за съществуването или не на макроикономиката и икономическата политика. Докато Кейнс твърди, че кризата е плод на несъвършенството на пазара и макроикономическата политика е призвана да спаси капитализма, то Хайек тръгва по точно противоположния път – кризата е резултат от „многото" държава и от разрушителната сила на вече присъстващата в началото на века икономическа намеса. Според Хайек още в първата си важна книга „Трактат за парите" (1930) Кейнс не успява да покаже как агрегираните величини произтичат от икономическия избор на индивидите.

Хайековата критика на макроикономиката се отличава фундаментално от популярната критика на друг Нобелов лауреат Робърт Лукас. Последният не отрича макроикономиката като такава, а твърди, че нейните цели никога не могат да бъдат постигнати. Той стъпва върху хипотезата, че при своите решения икономическите агенти са рационални (вземат предвид цялата разполагаема информация), което им помага да инкорпорират в своите очаквания целите и инструментите на държавата и по този начин да променят параметрите на икономическия макромодел и да неутрализират желаните от държавата резултати. Парадоксалните страни на този подход са две: *първо* (пръв забелязва това Хайек), в този модел икономическите агенти формират своите очаквания *отново* по правилата на макроикономически модел, научен в университета, от общуването или пък от вестниците и, *второ*, не се знае кой модел избират при формиране на своите очаквания – те могат да изберат различни модели (монетаристки, кейнсиански и дори марксистки). Моделът на Лукас е в сила само при условие, че всички икономически агенти са монетаристи (подобно на

това, че ако паричната маса нарасне, неминуемо също толкова ще е и повишението на цените). Докато Лукас критикува макроикономиката отвътре, Хайек я критикува отвън. За Хайек икономическите агенти не са рационални, или, ако си послужим с неговия по-мек израз, те са „еволюционно рационални" и поради децентрализираността на знанието и несъвършенството на информацията не могат да прогнозират. В тази светлина критиката на Лукас е едно безсмислено упражнение, тъй като сама по себе си макроикономиката е понятиен нонсенс.[25]

IV. Разпръснатото знание и несъвършената информация срещу социализма и планирането

В рамките на втория голям дебат – за възможностите на социализма, през 1937 г. Хайек публикува едно от най-значителните си есета „Икономическата наука и знанието", в което поставя въпроса за характера на човешкото знание и информацията.[26] За Хайек знанието и информацията са разпръснати, децентрализирани и не могат да бъдат съсредоточени в един или няколко центъра – всеки елемент от системата носи нужното за нейното функциониране знание. В системата на Хайек това разделение на знанието има същото водещо значение като разделението на труда в системата на Адам Смит. Всички социални и икономически категории могат да бъдат изведени от структурата на знанието и информацията. Пазарът, подменен по-късно от понятието „каталактика", е основният инструмент за създаване, предаване и разрушаване на информацията чрез движението на относителните цени (за Хайек общото ни-

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[25] Неслучайно в едно свое интервю Лукас твърди, че дълго време се е считал за хайекианец, но впоследствие след прочита на книгата на Кевин Хувър (не след прочита на самия Хайек!) се разочаровал. Вж. ***Snowdon, B., H, Vane, P. Wynarczyk*** *(1994), p. 244.*

[26] ***Hayek, F.*** *(1937), pp. 33 – 54. Самият Хайек оценява тази своя статия като най-доброто си икономическо произведение. Като продължение на „Икономическата наука и знанието" може да се разглежда книгата му „Използването на знанието в обществото",* ***Hayek, F.*** *(1945), с. 519 – 530. Неотдавна дебатът бе подновен от статията на Cockshott, W., A. Cottrell (1997), с. 177 – 202, които подробно анализират и критикуват аргументите на Хайек в статията му от 1945 г.*

во на цените или агрегираните ценови индекси са вредна измислица и не съществуват като категории). Пазарът е комплексна структура, постоянен процес, „процедура“ за откриване чрез метода на пробите и грешките. Планирането може да съществува само на ниво индивид. Това кара Хайек да разглежда равновесието като координация на индивидуалните планове, което зависи от разпределението на информацията (Хайек отхвърля модела на общото равновесие на Валрас, Ароу и Дебре като абстрактен, холистичен, даващ възможност за централизирано управление и следователно водещ към социализъм). В по-ранните си произведения той предпочита да говори за тенденция към равновесие, а по-късно предпочита термина „порядък“, разкриващ по-добре според него същността на конкуренцията.[27] Последната е процес на откривателство и според Хайек това е „дваж по-важно за развиващите се страни“[28].

Теорията на Хайек за разпръснатото знание и за невъзможността централизирано да се измерят и калкулират относителните цени е пряко насочен срещу теорията и практиката на социализма и макроикономическото планиране.[29] Конкретното приложение на Хайековата методология към социализма намира израз в най-популярната му книга „Пътят към крепостничеството“ (1944) с показателното подзаглавие „*Посвещава се на социалистите от всички партии*“. Според автора основният икономически недостатък на социализма е премахването на цените като информационни носители и опитите за концентриране на информацията в един център.

В действителност трудностите на пресмятането при социализма не са откритие на Хайек (което той и сам признава), а продължение и доразвитие идеите на Вебер, Брутзкус и най-вече на Мизес. Според Парето и неговия последовател Бароне (техните възгледи са използвани по-късно от Ланге, Тейлър, Лернер и Дикинсън) социалистическата икономика е възмож-

[27] ***Хайек, Ф.*** *(1968), с. 6 – 14.*

[28] *Пак там, с. 13.*

[29] *Вж. обзорната статия на Бьотке относно трудностите на пресмятане при социализма:* ***Boettke, P.*** *(1998).*

на теоретично, ако се придържа към механизма на изравняване на субективните пределни полезности и използва т. нар. „сенчести“ цени при разпределяне на ресурсите. По същество двамата считат, че механизмът на разпределение на ресурсите не зависи от правàта на собственост – дали тя ще е частна, или напълно държавна.

Напротив, според Хайек и Мизес *механизмът на разпределение на ресурсите е неразчленим от типа собственост.* Именно поради това според тях социализмът е невъзможен – „трудностите на калкулирането“ произтичат от липсата на *пазар на правото на собственост* и най-вече на право на собственост върху средствата за производство. Това води до орязване на пространството за действие на конкуренцията, парите и цените. А тъкмо последните са в основата на ориентирането на отделните индивиди и база за инициатива на предприемачите.

Според Мизес и Хайек единствено капитализмът е системата, която дава възможност за пресмятане, но само на равнище индивид – не и на макроикономическо ниво. Капитализмът е по-гъвкав от социализма, защото управлението се осъществява от много центрове, а не от един-единствен. Тук критиката на двамата е еднакво остра както към социализма, така и към съвременната практика на развитите страни.

V Свободните пари срещу централната банка

През 1936 г. под ръководството на Хайек Вера Смит защитава дисертация на тема „Произходът на централните банки“, в която прави не само исторически преглед на възникването на централните банки, но и представя механизма на „частните пари“.[30] В дисертацията си Смит недвусмислено показва, че появата на централните банки не почива върху икономическата логика на парите, а е резултат от брутална намеса на държавата в банковата и паричната област. За Смит естественото състояние на паричната система е децентрализираното парично предлагане. През 1977 г.

[30] ***Смит, В.*** *(1936).*

може би под влияние на нейната книга, както и на двете статии за свободните пари, появили се през 1974 г. – тези на Клейн и Роскоф[31], Хайек издава своята книга „Денационализация на парите“[32], в която, без да стига до технически детайли, събужда старата дискусия: необходими ли са, или не централните банки. Впоследствие литературата за конкурентната емисия на пари се разраства лавинообразно, като до най-дребните детайли се обсъжда функционирането на децентрализираната емисия, а днес дискусиите се пренасят дори вътре в рамките на новата теория.[33]

Подходът на Хайек към институционалната структура на паричната организация е логично продължение на неговия възглед за произхода, еволюцията и функциите на парите. Както всички останали категории във философско-икономическата система на Хайек, парите се разглеждат през призмата на еволюцията, спонтанността, информацията, човешкия избор, правилата и др.

Хайек следва подхода на Менгер от класическата му статия „За произхода на парите“ (1898), където парите генетически произлизат от натуралната размяна, след като хората си дадат сметка за предимствата на непряката размяна и за спестяването на трансакционни разходи.[34] Парите възникват по пътя на селекцията на различните видове средства за размяна, а не са продукт на социален договор. У Хайек парите са изведени от човешкия потребителски избор, те са една от формите на спестяване и зад тях *винаги стоят реални блага и услуги*. Затова тяхната основна задача е да съхраняват покупателната способност и поради това стойността им по дефиниция е неизменна.

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[31] ***Klein, B.*** *(1974);* ***Rockoff, H.*** *(1974).*

[32] ***Hayek, F.*** *(1976, 1978).*

[33] *Читателят може да се запознае с дискусията за свободните пари и с техния механизъм на действие от следните обзорни книги:* ***Down, K.*** *(1993);* ***Selgin, G.*** *(1988);* ***White, L.*** *(1984, 1993, 1995).*

[34] ***Menger, K.*** *(1892). Подходът на Менгер, Мизес и Хайек лежи в основата на новите микроикономически теории за ендогенното спонтанно възникване на парите от размяната, известни като модели на Киотаки и Райт. В двете си основни статии те недвусмислено показват, че възможността за няколко вида конкурентни средства за размяна е органически заложена като възможност в самия произход на парите. Вж.* ***Kiyotaki, N., R. Wright*** *(1989, 1991).*

Логиката на възникването определя и логиката на институционалното функциониране: децентрализирана емисия на пари, премахване на съществуващите централни банки и паричната политика. Централната банка и паричната политика не само водят до инфлация или дефлация (двете са еднакво вредни), но главното според Хайек е, че рушат системата от относителни цени, като вливат и изтеглят ликвидност.[35] Парите не са *неутрални* както в краткосрочен, така и в дългосрочен план. Хайек счита, че количествената теория (MV = PY) не само че не е вярна, но и не казва нищо за влиянието на парите. Първо, според него (подобно на Мизес) двойно увеличаване на паричната маса не води до двойно увеличаване на общото равнище на цените дори в дългосрочен план, защото увеличаването на парите изменя структурата на относителните цени и всички поведенчески променливи на хората – изменя се самата структура на касовите запаси. И, второ, количествената теория няма смисъл (даже оправдава наличието на централни банки), защото тя не показва как новата парична маса деформира структурата на относителни цени. Хайек отделя две пропорции като особено важни: съотношението между цените на капиталовите стоки и на предметите за потребление и съотношението между номиналния и естествения лихвен процент.

Познатите аргументи за съществуването на централна банка (основните от които са намеса при системен риск, парите като публично благо и наличието на странични ефекти в паричната област, необходимост от изглаждане на цикъла и др.) са само теоретични оправдания на вече съществуващата система. Хайек, а впоследствие и неговите последователи (в технически подробности) показват несъстоятелността на тези твърдения[36].

Системата на частните пари е не само генетически оправда-

[35] *По тези въпроси най-важни са следните трудове на Хайек:* ***Hayek, F.*** *(1933a, 1933b, 1984).*

[36] *В синтезиран вид критика на главните аргументи в защита на централната банка може да се намери в:* ***Selgin, G.*** *(1988).*

на, но тя е единствената система, която позволява автоматично уравновесяване между търсенето и предлагането на пари. Основен коригиращ механизъм е клирингът между банкнотите на търговските банки (често наричан механизъм на враждебен клиринг). Всяка емисия на банкноти от дадена банка над търсеното количество води до изтичане на резервите и към другите по-консервативни банки.

В рамките на теорията на свободните пари съществуват две направления.[37] Първото, традиционно и стоящо по-близо до Мизес, счита, че автоматичният механизъм при частните пари е в сила единствено ако парите са 100 % покрити със злато или някаква стока с неподвижна (или слабо подвижна) стойност. Втората група икономисти, по-близки до Хайек, твърдят, че коригиращият механизъм е в сила и при частично покритие (и дори при кредитни пари без покритие *(fiat money*). Селжен например предлага замразяване на паричната база и децентрализирането ѝ, след което тя ще циркулира единствено между банките, за да компенсира движението в търсенето и предлагането на банкноти от страна на търговските банки. Без да се спираме на технически детайли и, както сам Хайек твърди, „без да знаем какво точно ще стане“, системата на „частните пари“ противно на разпространеното мнение е проста, разбираема и не изисква специални умения от икономическите агенти. Ако трябва с няколко думи да обобщим това, което се печели от премахването на централната банка, то това е парична и икономическа стабилност.

В последните години масовото разпространение на децентрализираните информационни технологии и на електронните пари поставя пред централните банки непреодолими препятствия и дава допълнителна аргументация в подкрепа на „частните пари“. Накратко централните банки се сблъскват с два отричащи

[37] *Първото направление е представено от Мизес, Ротбард, Салерно, Хоп, Де Сото, Хюсман и др. Вж.* ***Rothbard, M.*** *(1992), pp. 97 – 108;* ***Salerno, J.*** *(1994), pp. 71 – 115;* ***Hoppe, H.*** *(1994), pp. 49 – 74;* ***Hulsmann, J.****(1996), pp. 3 – 53. Представители на второто са Хайек, Кирзнер, Тимберлайке, Уайт, Селжен, Доун и др. Вж. изчерпателния отговор на всички критики в:* ***Selgin, G., L. White*** *(1996), pp. 83 – 107.*

ги процеса. Първият е разпространението на многобройни заместители на парите, което води до свиване на сегмента от ликвидност, върху който банката може да има някакво влияние. Вторият е разпространението на електронните пари, когато икономическите агенти могат пряко да се разплащат, без да преминават през банковата система. Освен това търговските банки свеждат до минимум своите резерви, които държат в централната банка, и така като цяло търсенето на резервни пари се свива. Общият ефект резултира в бързо скъсяване баланса на централната банка, ограничава до минимум сеньоража и с течение на времето централната банка „счетоводно" престава да съществува.[38]

Много учени (сред които и Милтън Фридман[39]) са задавали въпроса, няма ли противоречие между многобройните предложения на Хайек за изменения в съществуващия ред в областта на парите и теорията му за спонтанния ред и ненамесата в естествената еволюция на обществото. Отговорът е прост и той е даден от близкия приятел на Хайек Фриц Махлуп, който формулира задачата на либерала: „*В едно нелиберално общество либералът трябва да бъде реформатор, за да помогне за установяването на свободата, в едно либерално общество той трябва да бъде консерватор, за да помогне да се запази свободата.*"[40]

*

100-годишнината от рождението на Хайек се отбелязва по един или друг начин от икономическите факултети на почти всички университети в Западна Европа, САЩ и Латинска Америка (достатъчно е да се влезе в страниците на Интернет). Източноевропейските страни не останаха по-назад: конференции се проведоха в Загреб, Любляна, Талин, Вилнюс, Москва, Рига, Варшава, Букурещ и дори в бомбардирания Белград.

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[38] *Според Доун възможна е ситуация, при която сеньоражът да стане отрицателна величина и централната банка да фалира. За повече подробности вж.* ***Down, K.*** *(1998);* ***Browne, F., D. Cronin*** *(1995).*

[39] ***Friedman, M., A. Schwartz*** *(1986), pp. 37 – 62.*

[40] ***Machlup, F.*** *(1970), p. 212.*

Нужно е да се замислим и да се запитаме защо годишнината от рождението на Хайек[41] не бе отбелязана в България при наличието на толкова много хора, наричащи себе си либерали.[42] В условията на *добре* функциониращ паричен съвет може със сигурност да твърдим, че поне в паричната област сме поблизо откогато и да било до препоръките на Хайек. Паричната политика е премахната, централната банка е с ограничени функции, а колебанията на паричната маса не са така значителни и произволи. Ролята на държавата е ограничена, правилата доминират над произвола. Защо тогава не бе отбелязана кръглата годишнина на Хайек? Още повече че някои от най-важните му трудове вече са преведени на български.

Отговорът оставям на читателите. Фактът обаче, че именно (и единствено) БНБ публикува този текст говори за нейната откритост и затова, че посоката на развитието ѝ е вярна.

[41] *Някои автори дори смятат, че е социалдемократ. Вж.* ***Норре, Н.*** *(1999).*

[42] *Икономическата теория на Хайек е била обект на анализ и в българската литература непосредствено след Втората световна война. Вж.* ***Христофоров, А.*** *(1946), с. 1 – 70.*

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The Currency Board in Bulgaria: Design, Peculiarities and Management of Foreign Exchange Cover

Dobrislav Dobrev

Abstract. The paper reviews the design of the currency board arrangement in Bulgaria. A comparison to an orthodox currency board is made. The main tools of monetary policy operations are examined to check consistency with currency board rules. The problems that could arise from using existing possibilities for such operations in contradiction with the operating principles of an orthodox currency board are discussed. An appropriate diagram of the main flow channels and balance sheets in the financial system is presented. The money supply process is examined in order to explain the main peculiarities in the design of the currency board in Bulgaria. A fundamental equation expressing the relationship between the factors affecting the stability of the currency board is derived. The role of reserve management operations in the functioning of the currency board is analyzed.

Резюме. В изследването се разглежда устройството на паричния съвет в България. Направен е сравнителен анализ с традиционен паричен съвет. Проучени са основните инструменти на паричната политика, за да се провери спазването на правилата на паричния съвет. Разглеждат се и проблемите, които може да възникнат при използването на съществуващите възможности за прилагане на някои инструменти на паричната политика в разрез с принципите на един традиционен паричен съвет. Представена е диаграма на основните обменни канали във финансовата система. Анализиран е също процесът на парично предлагане с цел да се обясни спецификата на устройството на паричния съвет в България. Изведено е и основно уравнение, което изразява взаимодействието между отделните фактори, влияещи върху стабилността на паричния съвет. С негова помощ е направен анализ на ролята на управлението на резервите за функционирането на паричния съвет.

Contents

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I. Reasons to Introduce a Currency Board Arrangement in Bulgaria

The currency board arrangement (CBA) in Bulgaria was introduced after a short episode of hyperinflation in December 1996 – February 1997 when major stabilization policy efforts failed and key institutions lost their credibility. The following sequence of events highlights the picture of the Bulgarian economy during that period:

- the government used to fund deficits of bankrupt state enterprises by supplying subsidies;
- the central bank used to fund government deficits by printing Bulgarian levs;
- commercial banks used to fund deficits of bankrupt state enterprises by supplying loans;
- the central bank used to refinance commercial banks by extending discount loans;
- insolvent commercial banks triggered a severe banking crisis;
- the Bulgarian lev depreciated substantially against all major currencies;
- the economy was driven into a hyperinflationary spiral;
- several stabilization policy attempts failed and key institutions lost their credibility.

It became clear that one of the main reasons for the hard economic environment was the lack of financial discipline due to noncompliance with contemporary laws and regulations. The government, in general being ready to fund bankruptcy through the politicized central bank, created a typical moral hazard problem for all economic agents.

Thus, the idea to introduce a **rule-based** instead of a **discretionary** mechanism of money supply regulation originated in a rather natural way as an ultimate measure to restore financial system credibility and revive the economy. The CBA in Bulgaria was assumed not only as a pure stabilization device but also as a tool to impose financial discipline and market-driven commercial culture upon all economic agents (Avramov, 1999, pp. 7 – 8).

A more detailed survey on the developments in the Bulgarian economy before and after the adoption of the CBA is beyond the scope of this study (see Minassian, Nenova, Yotzov, 1998, pp. 5 – 84; Yotzov, Nenovsky, Hristov, Petrova, Petrov, 1998, pp. 7 – 21; Gulde, 1999, pp. 2 – 5; Avramov, 1999, pp. 9 – 16). We would rather focus on the design of the financial system under the CBA in Bulgaria and the resulting im-

plications for the role of reserve management operations in the functioning of the currency board.

II. The CBA in Bulgaria versus an Orthodox CBA

The CBA in Bulgaria was introduced with the new Law on the Bulgarian National Bank (BNB) of 10 June 1997, issued by the 38th National Assembly. The **structure of the BNB** as defined by Article 19, Section 1 of the Law is comprised of three departments: an Issue Department, a Banking Department and a Banking Supervision Department. The Law sets **the monetary functions and operations of the Bank** according to the general principles of functioning of a typical currency board. There are, however, some differences rendering the Bulgarian CBA to a certain extent more flexible than an orthodox one.

1. Common Key Features

Article 20, Section 1 defines the main function of the Issue Department is to **maintain full foreign exchange cover** for the total amount of BNB monetary liabilities by taking actions needed for the efficient management of the Bank's international foreign exchange assets.

Article 29 of the Law **sets the official exchange rate** of the lev to the Deutschemark at BGL 1,000 per DEM 1 and establishes the rule to be used to determine the official exchange rate of the lev to the Euro when it becomes legal tender in Germany.

Article 45 stipulates that the BNB **may not extend credits to the State or any state agency**, except credits against purchases of special drawing rights from the IMF according to an established transparent procedure.

Thus the CBA in Bulgaria enjoys the key features of an orthodox CBA, listed in Table 1.

Table 1

THE CBA IN BULGARIA VERSUS AN ORTHODOX CBA: COMMON KEY FEATURES

An Orthodox Currency Board	The CBA in Bulgaria
Maintains full foreign exchange cover for its note, coin and deposit liabilities as set by law	
Maintains a truly fixed exchange rate with respect to the reserve currency as set by law	
Cannot finance domestic government spending as set by law	

2. Main Differences

Table 2 below lists the main differences between the CBA in Bulgaria and a typical currency board (the features of an orthodox CBA are defined according to Hanke and Schuler, 1994, pp. 2 –10). Most of them result from some specific considerations on the efficient functioning and credibility of the arrangement in the case of Bulgaria in view of the banking crisis preceding the adoption of the currency board.

Table 2

THE CBA IN BULGARIA VERSUS AN ORTHODOX CBA: MAIN DIFFERENCES

An Orthodox Currency Board	The CBA in Bulgaria
Usually supplies only notes and coins	Supplies notes, coins and deposits as well
Does not regulate commercial banks	Regulates commercial banks
Is not a lender of last resort	Strictly limited lender of last resort
Earns all seigniorage only from interest on its assets	Earns almost all seigniorage only from interest
Full convertibility (both current and capital account)	Full current account convertibility but still restricted capital account convertibility (due to be changed)

Article 28, Section 2 **defines the monetary liabilities** of the BNB as consisting of all banknotes and coins in circulation issued by the BNB and any balances on accounts held by other parties with the BNB, with the exception of the accounts held by the IMF. According to Article 43, the BNB is the official depository of the State. By Article 41 commercial banks are required to keep minimum reserve requirements with the BNB. Therefore, the CBA in Bulgaria **supplies notes, coins and deposits** (the government deposit and commercial bank reserves), while an orthodox CBA typically supplies only notes and coins. The reasons for this difference are discussed in the sections below with reference to minimum reserve requirements and the government deposit.

Article 20, Section 3 defines the main function of the Banking Supervision Department is to **supervise the banking system** in accordance with the rules provided for by law and the regulations for its enactment. According to Article 41, Section 1, the BNB determines by regulation the minimum reserve requirements which commercial banks are required to keep with the BNB. By Article 41, Section 2 the BNB establishes by a regulation any other terms and requirements for the mainte-

nance of the stability of the banking system. Currently there are about 15 different **regulations issued by the BNB** such as Regulation No. 21 on the Minimum Required Reserves, Regulation No. 6 on Extending Collateralized Loans to Banks, Regulation No. 8 on the Capital Adequacy, Regulation No. 11 on Liquidity Management and Supervision, Regulation No. 4 on Foreign Currency Positions, Regulation No. 9 on the Evaluation of Risk Exposures of Banks and the Allocation of Provisions to Cover the Risk Related Thereto, *et alia*. By contrast, a typical currency board does not regulate commercial banks. Banking regulations in a currency board are few and are enforced by the ministry of finance or an office of bank regulation (Hanke and Schuler, 1994, p. 7). In Bulgaria, however, the banking crisis that preceded the adoption of the CBA suggested that the soundness of banks would be vital for the viability of the CBA itself. Therefore, a strong office of bank regulation was needed. Given its existing supervisory infrastructure, the BNB appeared to be the most appropriate institution for that purpose. Nevertheless, it is difficult to say whether the following two peculiarities regarding the Banking Supervision Department are an advantage or disadvantage of this approach:

- in order to carry out its activities the Banking Supervision Department shares both the budget of the BNB and all existing facilities within the Bank;
- the activities of the Banking Supervision Department are coordinated to some extent with those of the other departments through the Managing Board of the BNB.

The most important deviation from the principles of an orthodox currency board in respect of regulation, however, is the maintenance of minimum reserve requirements with the BNB as provided for by the Law (and regulated by the Banking Supervision Department). Its impact is discussed in more detail in the section devoted to monetary policy operations.

Article 20, Section 2 of the Law on the BNB states that the Banking Department shall perform the **lender of last resort function** in case any systemic risk for the stability of the banking system arises. On the contrary, an orthodox CBA is not a lender of last resort (LLR). This difference is also mainly due to the banking crisis that preceded the adoption of the CBA in Bulgaria. A strictly limited LLR function in the case of Bulgaria was assumed to render higher credibility to the arrangement than no LLR because of the fragile stability of the banking system. To this end, the Law on the BNB establishes a clear procedure for the LLR function under a systemic risk. It is discussed in more de-

tail in the section devoted to monetary policy operations.

Article 30 gives the BNB the right to charge reserve currency exchange transactions against levs up to 0.5 percent from the official exchange rate. Actually, by a decision of the Managing Board the BNB sells Deutschemarks at the official exchange rate of BGL 1,000 per DEM 1 and buys them at BGL 995 per DEM 1. Therefore, the CBA in Bulgaria earns a small portion of its seigniorage from commissions, while a typical currency board earns seigniorage only from interest on its assets. In reality, income from commissions is far below 1 percent of total income and covers mainly the expenses for servicing transactions with the public. Hence, the CBA in Bulgaria **earns almost all seigniorage only from interest on its assets**.

The last difference between an orthodox CBA and the CBA in Bulgaria (of those listed in Table 2) regards the convertibility of the domestic currency. Although it has full current account convertibility, **the Bulgarian lev is not fully convertible yet**, because of the restrictions on capital account transactions arising from the old Law on Transactions in Foreign Exchange Valuables and Currency Control[1]. By contrast, a typical currency board has full convertibility of its currency. This feature is important, because it enables market forces alone to determine the money supply process through a self-adjusting equilibrium of the balance of payments (see Hanke and Schuler, 1994, pp. 29 – 41). Capital account liberalization, however, enhances the probability of self-fulfilling currency crises due to increased mobility of portfolio investments (see Nenovsky, Hristov, Petrov, 1999, p. 25). Therefore, it is difficult to say whether the CBA in Bulgaria would have benefited or suffered if unrestricted capital account transactions had been permitted from the very beginning of its functioning.

3. Equal Advantages

The main advantages of the CBA in Bulgaria are summarized in Table 3. Essentially they are the same as the main advantages of an orthodox currency board system. The Law on the BNB provides for a maximum **transparency** on its design and also on its activities, since by Article 49 the balance sheet of the Issue Department is published on a weekly basis. The CBA was established and fulfilled its main purpose quickly, i. e. its adoption resulted in a **rapid monetary reform** (see Yotzov, Nenovsky, Hristov, Petrova, Petrov, 1998, pp. 7 – 8; Gulde, 1999, pp. 19 – 20). **Monetary policy has been bound to the rules**

[1] This is going to be changed with the adoption of an entirely new law.

listed in Table 1, so that the monetary base cannot increase independently of the monetary authority of the country whose currency has been chosen as reserve and **it is impossible to create inflation** by discretionary issuing of domestic currency. **Protection from political pressure** has been guaranteed to the extent that hardly there will ever be a consensus in the National Assembly to change the Law on the BNB. Yet the design of the CBA in Bulgaria has been flexible enough (Table 2) to address the specific problems of the banking system that were in place before its adoption. As a result, the adoption of the CBA in Bulgaria was successful and the most important advantage of an orthodox currency board **– high credibility –** has been achieved.

Table 3

THE CBA IN BULGARIA VERSUS AN ORTHODOX CBA: EQUAL ADVANTAGES

An Orthodox Currency Board	The CBA in Bulgaria
Transparency	
Rapid monetary reform	
Rule-bound monetary policy	
Protection from political pressure	
Cannot create inflation	
High credibility	

Thus, in the case of Bulgaria the success of the CBA critically depended on the special design of the currency board, being both sufficiently rule-bound to be credible, while allowing flexibility at the margin on account of the banking crisis (see Gulde, 1999, pp. 14 – 15). All the same, mainly because of the existing small room for monetary policy operations, the CBA in Bulgaria is not considered orthodox but a currency board-like system. It falls in the same group with Argentina and Estonia, whose central banks also mimic currency boards (Hanke and Schuler, 1994, pp. 47 – 57).

III. Monetary Policy Operations

In a fully liberalized system, including full convertibility (both current and capital account), the central bank cannot set both an independent domestic monetary policy and the exchange rate (see Gray and

Hoggarth, 1996, p. 8; Hanke and Schuler, 1994, p. 19; Latter, 1996, p. 24). Therefore, a typical currency board has to accept the interest rate and the quantity of domestic money corresponding to the fixed exchange rate and there should be no room for monetary policy operations. It is important to know why the Law on the BNB has left some room for such operations in the case of Bulgaria, and what kind of problems could arise from their use in contradiction with the operating principles of an orthodox CBA.

1. Reserve Requirements

Reserve requirements are subject to Regulation No. 21 on the Minimum Required Reserves, issued by the BNB according to Article 41 of the Law on the BNB. Its main provisions are as follows:

- the basis on which the amount of minimum required reserves is determined includes banks' liabilities both in Bulgarian levs and foreign currency (Article 2);
- banks maintain minimum required reserves in the amount of 11 percent of their deposit base (Article 3) either in levs, Euro, US dollars or Swiss francs (Article 4);
- reserve requirements are averaged on a monthly basis (Articles 6 – 8) but should a bank use over 50 percent of them, it shall pay interest for the excess over the 50 percent for each day of use (Article 11);
- the BNB may decide to pay interest on the lev component of the minimum required reserves but its rate may not exceed the income which the BNB receives from its investments in Euro (Article 5).

The level of reserve requirements has been set at 11 percent and has not been changed since the adoption of the CBA in Bulgaria. This is not strange in the context of the long-run role of reserve requirements as a monetary policy tool to influence the money multiplier and the money supply by changing the level of requirements in a discretionary manner, which is incompatible with the principles of a currency board. Hence, although not provided for by law, the option of changing the level of reserve requirements should be viewed as almost theoretical (maybe existing only for severe emergencies generating systemic risk for the stability of the banking system).

In the case of the CBA in Bulgaria, reserve requirements play predominantly their short-run role to **suppress excessive volatility of daily market interest rates** by allowing reserve averaging and permitting banks to have an automatic recourse to their cash balances with the BNB on a daily basis. However, the BNB currently does not pay interest

on reserve requirements. Less than fully remunerated reserve requirements are a tax on the banking system, which is absent in a typical currency board. Therefore, the option to remunerate reserves should be used by the BNB in order to minimize distortions and get closer to an orthodox approach. The extent to which remuneration of reserves is possible can be determined with the general equation derived in the section devoted to the role of reserve management.

The most radical solution, however, is to eliminate reserve requirements, leave the banks themselves to determine the amount of reserves held with the BNB for settlement purposes (as suggested in Nenovsky and Hristov, 1998, p. 41) or/and make reserves fully remunerated (as suggested above).

2. Lender of Last Resort (LLR)

The strictly limited LLR function of the Banking Department is subject to Regulation No. 6 on Extending Collateralized Loans to Banks as required by Articles 19 and 33 of the Law on the BNB. The main provisions are as follows:

- in the event of a liquidity risk affecting the stability of the banking system the BNB may extend credits to solvent banks experiencing acute need of liquidity but only against collateral of liquid assets (Articles 19 and 33 of the Law, Article 2 of the Regulation);
- the existence of a liquidity risk is determined by Articles 4 and 5 of the Regulation as a function of the delays of settlement transactions in the Banking Integrated System for Electronic Transfer (BISERA);
- credits may be extended only up to the amount of available funds on the Banking Department deposit placed with the Issue Department (Article 33 of the Law, Article 2 of the Regulation);
- credits may be extended only as a temporary short-term support with original term of up to 30 days, and renewed no more than twice (Article 33 of the Law, Article 8 of the Regulation);
- the decisions on loan applications have to be made by the Managing Board of the BNB under clear lending procedures, described in Articles 12 – 14 of the Regulation.

In a typical currency board system there is no LLR function because foreign exchange transactions may operate as a standing facility – the market can always adjust its holdings of domestic currency reserves by executing foreign exchange transactions against the reserve currency. However, banks may experience liquidity problems for a very short term if foreign exchange transactions can be settled only in two days (which

is the international standard and the normal practice in Bulgaria). Reserve averaging discussed above helps to overcome this problem to a certain extent but only when there is no systemic liquidity risk in the banking system as a whole. Given the fragile stability of the banking system in Bulgaria at the time of CBA adoption, it was reasonable to leave this strictly limited LLR function. It is applicable only to systemic risk situations as provided for by law and hardly could be used to abuse the operating principles of an orthodox currency board. On the contrary, the LLR function in the case of Bulgaria has even contributed to the arrangement credibility.

3. Open Market Operations (OMO)

The Law on the BNB prohibits open market operations, since by Article 45 the BNB may not extend credits in whatever form to the government except credits against purchases of special drawings rights from the IMF. Securities issued or guaranteed by the government are not permissible as reserves (Article 28, Section 3) and can serve only as collateral against credits according to the LLR function discussed above (Article 33 of the Law and Article 6 of Regulation No. 6). The abolishment of OMO as a monetary policy tool of the BNB is fully in line with the principles of an orthodox currency board.

However, some small room for OMO-like operations has been left to the Ministry of Finance. According to Article 43, Section 3, the BNB acts as an agent for government and government guaranteed debt. This function is subject to Regulation No. 5 on the Terms and Procedure for Issuance, Acquisition and Redemption of Book-entry Government Securities. Its main provisions are as follows:

- the BNB organizes the activities in relation to the sale of government securities on behalf and for the account of the government according to a contract signed with the Ministry of Finance (Article 2);
- government securities are acquired in the primary market through auctions organized by the Fiscal Services Department of the BNB according to a predetermined schedule or by a decision of the Minister of Finance as established by Articles 3 – 8;
- secondary market transactions between primary dealers, nonprimary dealers and physical and legal persons are registered by the Fiscal Services Department of the BNB according to a set of clear procedures established by Articles 9 – 22;
- the Ministry of Finance provides the necessary funds for the redemption of the government securities and interest thereon in a

special account opened with the BNB no later than one working day prior to redemption (Article 27);
- reverse repurchase of government securities prior to maturity is allowed by a decision of the Minister of Finance at the auctions held by the BNB by replacing them with government securities of a new issue or by redemption of the nominal value and interest thereon (Article 30).

It is clear that the role of the Fiscal Services Department of the BNB in the government securities market is a passive one (just an agent of the Ministry of Finance), while the Ministry of Finance plays an active role by determining the schedules of new issues, the amounts issued and the amounts repurchased prior to maturity. This in theory enables the Ministry of Finance to influence the liquidity of the banking system and money supply in an OMO-like manner, since according to Article 43, Section 1 of the Law on the BNB the funds of the government are deposited with the BNB. The problem is discussed in more detail in the section devoted to the government deposit, because it arises, first of all, from the presence of government funds in the financial system, not from government debt management by the Ministry of Finance.

4. Base Interest Rate

The BNB is obliged to announce the base interest rate in compliance with Article 35 of the Law on the BNB, which also gives the Managing Board the right to determine the method to be used. Currently the base interest rate is announced as the average yield on three-month government treasury bills for each auction held by the Fiscal Services Department in the primary market (see above)[2]. As a result, the market is distorted in two major respects:
- in order to minimize its costs the Ministry of Finance is interested in deliberately forcing the yield down (and hence the base interest rate) by reducing the supply of treasury bills;
- interbank rates may be influenced by the base interest rate announced by the BNB if banks use it as a benchmark.

Although the BNB does not set but only announces the base interest rate, there is a contradiction with the currency board rules. Under a fixed exchange rate regime the market alone should determine interest rates (see Gray and Hoggarth, 1996, p. 8; Hanke and Schuler, 1994, pp. 40 – 41; Latter, 1996, p. 24). It is true that reducing the cost of financing of the government could seem a benefit in the short run, but in the

[2] Initially one-week treasury bills were used.

long run this could become an obstacle to building an efficient financial market, since participants tend to avoid markets where prices appear to be artificially controlled.

One possible solution could be to change the method of announcing the base interest rate. For example, it could be driven by the interbank market like LIBOR and other similar reference rates. However, this could generate other problems because of the underdeveloped interbank market in Bulgaria. Another more radical solution is to abolish the base interest rate (see Nenovsky and Hristov, 1998, p. 41). But this would require changing the Law on the BNB and several other laws that refer to the base interest rate announced by the BNB. Therefore, at least for the time being, elimination would be rather difficult.

5. Commissions

The BNB is bound to exchange reserve currency against levs on the basis of spot exchange rates, which cannot depart from the official exchange rate by more than 0.5 percent, inclusive any fees and commissions (Article 30 of the Law on the BNB). The Managing Board has decided to sell Deutschemarks at BGL 1,000 per DEM 1 and buy at BGL 995 per DEM 1. In theory the Managing Board has the right to change these rates (for example to sell at BGL 1,005 per DEM 1 and buy at BGL 1,000 per DEM 1). However, any such change may affect the foreign exchange market and could trigger a shock in the monetary system due to changes in capital movements. Therefore, the option to change commissions should remain only theoretical, unless maybe a decision on charging no commission is taken. In fact, in an orthodox approach commission fees are supposed to worsen the link to the reserve currency, especially for short-term capital movements, because they impose high costs relative to the benefits of arbitrage (Hanke and Schuler, 1994, pp. 76 – 77). Hence, an orthodox currency board does not earn seigniorage on fees. To place low limits on commission fees of financial intermediaries, it is sufficient to give the public the choice of dealing directly with the currency board, as it is in the case of the Bulgarian CBA. The social benefits are considered to be much higher than the income that commission fees could bring to the currency board (Hanke and Schuler, 1994, pp. 76 – 77). However, there is also a sound objection to this statement because short-term capital movements are able to trigger shocks in the monetary system. Therefore, social benefits could be higher when, by applying permanently fixed low commission fees, the currency board discourages short-term arbitrageurs and speculators. Anyway, the Bulgarian market has already adjusted to the current commission fees

and it seems best to avoid any changes.

6. Purchase of Gold

According to the old Law on Transactions in Foreign Exchange Valuables and Currency Control, the BNB is permitted to purchase gold extracted in Bulgaria[3]. By Article 28, Section 6 of the Law on the BNB gold is included in the international foreign exchange reserves covering the monetary liabilities of the BNB. Therefore, the purchase of gold against Bulgarian levs as an operation is quite similar to the purchase of reserve currency against levs as both of them increase the amount of domestic currency in circulation. This feature is absent in a typical currency board. In fact, if the BNB were allowed to both purchase and sell unlimited amounts of gold against Bulgarian levs, then gold could play the role of domestic securities for OMO. In practice, however, the BNB may only purchase gold against levs and after the adoption of the CBA in Bulgaria the amounts purchased have substantially decreased. If market forces alone determine whether production of gold will result in an increase of the amount of domestic currency in circulation (by exchanging gold against reserve currency and then converting it into domestic currency) then there is no contradiction with the rules of an orthodox CBA. Therefore, it would be better to eliminate the right of the BNB to purchase gold against domestic currency. The BNB should be enabled to execute any transactions in gold only against the reserve currency (or other foreign currencies).

IV. The Financial System under the CBA in Bulgaria

The financial system under the Bulgarian CBA has the following three main layers:

1. The **Issue Department** and the **Banking Department** of the BNB;

2. Commercial banks (supervised by the **BNB Banking Supervision Department**);

3. The public (including nonbanking financial institutions).

The **government** is another special participant in the financial system:

- it keeps its funds deposited with the Issue Department of the BNB;
- it organizes the market for government securities through the **BNB Fiscal Services Department** and services the domestic government debt;

[3] Now this is going to be changed with the adoption of an entirely new law.

- it borrows from the **IMF** and other international financial institutions and services the foreign government debt;
- it collects taxes and spends on salaries, pensions, subsidies, etc. in the budgetary sector;
- it also receives part of the seigniorage earned by the BNB.

Because of specific balance sheet items and corresponding flow channels, the financial system under the CBA in Bulgaria differs from that of an orthodox currency board and from a typical central bank.

1. Balance Sheets

Figure 1 represents the main items on the aggregated balance sheets of the Issue Department, the Banking Department, commercial banks and the public (items on the left-hand side are assets, items on the right-hand side are liabilities).

The balance sheet of the Issue Department contains the following items:

FX – foreign exchange reserves (as defined by Article 28 of the Law on the BNB);
C – currency in circulation;
R – reserves of commercial banks;
G – the government deposit with the Issue Department[4];
B – the Banking Department deposit with the Issue Department (the excess of the lev equivalent of foreign exchange reserves over the total amount of BNB monetary liabilities as defined by Article 28 of the Law on the BNB).

Figure 1

MAIN BALANCE SHEET ITEMS IN THE FINANCIAL SYSTEM OF THE CBA IN BULGARIA

Issue Department		Banking Department		Commercial Banks		Public	
FX	C R G B	B L^d RG ...	L^{IMF} ...	C R L S FX^B ...	D L^d ...	C D S FX^P ...	L ...

[4] Actually, **G** includes also a negligible amount (less than 1 percent of **FX**) of nongovernment deposits. For the sake of simplicity we do not separate them from the funds of the government, since their impact on the financial system is only marginal and it is essentially the same as the effect caused by the funds of the government.

The balance sheet of the Banking Department includes:

B – the Banking Department deposit with the Issue Department;
L^d – discount loans extended to commercial banks according to the strictly limited LLR function of the Banking Department (as already discussed above);
RG – receivables from government (corresponding to government borrowings from the IMF);
L^{IMF} – borrowings from the IMF;
... – other items, inherited from the balance sheet of the BNB before the adoption of the CBA in Bulgaria and not related to its functioning (on the liability side – capital, reserves, *et alia*; on the asset side – IMF quota, *et alia*).

The items on the balance sheet of the commercial banks are as follows:

C – currency (held by banks);
R – reserves of commercial banks;
L – loans extended to the public;
S – domestic government securities;
D – deposits of the public;
L^d – borrowings from the Banking Department (discount loans);
FX^B – net foreign assets held by banks;
... – other items (on the liability side – capital, reserves, *et alia*; on the asset side – investments, *et alia*).

The main items on the aggregated balance sheet of the public have already appeared above:

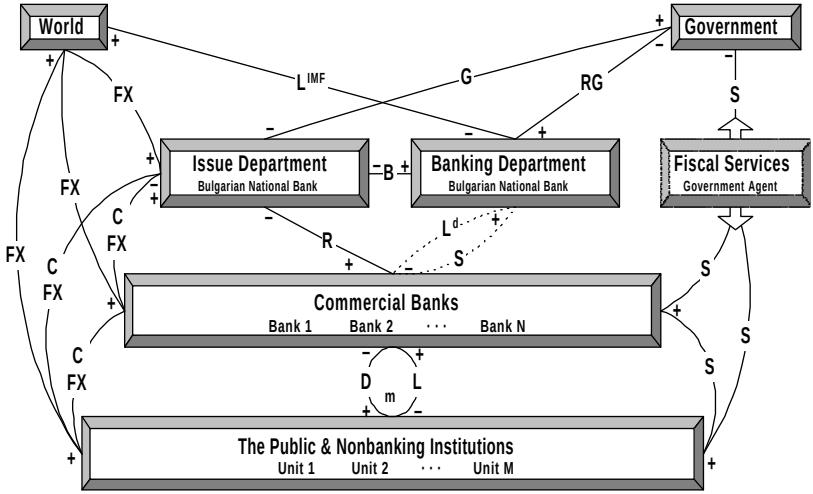
C – currency (held by the public);
D – deposits with commercial banks;
S – domestic government securities;
L – borrowings from commercial banks;
FX^P – net foreign assets held by the public;
... – other items.

2. Flow Channels

The main flow channels in the financial system correspond to the main items in the balance sheets (**FX**, **C**, **R**, **D**, **L**, **S**, **G**, **L^{IMF}**, **RG, B**, **L^d**). They are represented in Figure 2 as arrows connecting the different layers in the financial system. The 'plus' and 'minus' signs indicate whether an item appears on the asset or liability side of the balance sheets between which the corresponding flow occurs.

Figure 2

FLOW CHANNELS IN THE FINANCIAL SYSTEM OF THE CBA IN BULGARIA



The Issue Department issues domestic currency (**C**) against foreign exchange reserves (**FX**), which connect it to the world. It is linked to the Banking Department through its deposit (**B**). The government issues securities (**S**) to the commercial banks and the public (the Fiscal Services Department of the BNB being just an agent for that purpose) and deposits all of its funds with the Issue Department (**G**). Government foreign debt operations go as flow (**G**, **FX**) through the Issue Department but borrowings from the IMF ($\mathbf{L^{IMF}}$) also go as a separate item to the Banking Department liabilities. Thus, if utilized by the government within 90 days (as provided for by Article 45 of the Law on the BNB) they increase by equal amounts **FX**, $\mathbf{L^{IMF}}$ as well as the Banking Department receivables from government (**RG**) and the government deposit with the Issue Department (**G**). Otherwise, except **FX** and $\mathbf{L^{IMF}}$ they increase only the size of the Banking Department deposit (**B**) and serve as IMF support for the CBA. The commercial banks (supervised by the Banking Supervision Department) maintain reserves with the Issue Department (**R**) and only in the event of a liquidity risk (as defined by the Law on the BNB and Regulation No. 6) they may borrow limited amounts from the Banking Department against collateral ($\mathbf{L^d}$, **S**). The flow (**D**, **L**), circling between the commercial banks and the public, gives rise to a deposit multiplication process characterized by a specific

money multiplier **m**. The commercial banks and the public can also exchange domestic currency (**C**) and foreign assets (**FX**), which independently connect them to the world. Finally, it is important to note that Figure 2 represents only the flow channels in the financial system and not the exact economic events (such as tax collection, salary payments, trade, production, government debt operations, transfer of seigniorage earned by the Issue Department to the government, etc.), which lead to flow generation.

3. Money Supply

Let $\mathbf{M^b}$ be the monetary base, **M** – the money supply and **m** – the money multiplier.

Then,

$$\mathbf{M^b = C + R = FX - G - B},$$

$$\mathbf{M = C + D = m \cdot M^b},$$

$$\mathbf{m = (1 + c)/(c + r)},$$

where **c** is the cash to deposits ratio and **r** is the reserves to deposits ratio.

Hence, under the CBA in Bulgaria the money supply is determined by

$$\mathbf{M = m \cdot [FX - G - B]}.$$

From this equation the following important conclusions can be drawn:

• *ceteris paribus*, changes in **FX**, which are not related to equal changes in **B** or **G**, proportionally cause identical changes in the money supply. Such changes arise from exchange of domestic currency against reserve currency by the public or the commercial banks;

• *ceteris paribus*, changes in **B**, which are not related to equal changes in **FX**, proportionally cause inverse changes in the money supply. Such changes arise from covering the BNB operating and investment costs and possible exercise of the LLR function of the Banking Department;

• *ceteris paribus*, changes in **G**, which are not related to equal changes in **FX**, proportionally cause inverse changes in the money supply (see also Nenovsky and Hristov, 1998, pp. 16 – 18). Such changes arise from issuance and redemption of securities, tax collection, payment of salaries, pensions and subsidies from the state budget and all other types of budgetary operations executed in the domestic market.

The first conclusion reveals the exact meaning of the concept of '*rule-bound monetary policy*', which is one of the key features of any currency board system. The second one is not surprising, knowing that in general the money supply is positively related to the level of discount loans (Mishkin, 1992, p. 350), which is strictly limited in the case of the CBA in Bulgaria. The third conclusion, however, is an embarrassing one, since it could be interpreted as a possibility to conduct monetary policy through the government deposit, which contradicts the currency board rules. We address this important issue in a separate section.

4. The Government Deposit

The presence of the government deposit in the liabilities of the Issue Department is something atypical of a currency board. An immediate negative consequence, which we have just discussed, is the fact that the Ministry of Finance, wittingly or not, conducts monetary policy operations by controlling domestic inflows to and outflows from its funds **G**. Solutions have been proposed to switch the government deposit to commercial banks or even to a separate institution (Nenovsky and Hristov, 1998, p. 40). However, we would argue that in the case of Bulgaria the least dangerous solution for the financial system as a whole is to keep all funds of the government deposited with the Issue Department.

First of all, let us estimate the relative size of government funds two years after the introduction of the currency board: **G** accounts for about 30 percent of the money supply[5] (broad money) in Bulgaria and about 40 percent of the foreign exchange reserves **FX**. Next, let us see what really stays behind the opportunity to effect monetary policy operations with government funds: the possibility to decide whether to keep money invested in the domestic market or abroad. Finally, let us see what happens when the funds of the government are deposited with the Issue Department: according to the currency board rules all funds are invested abroad (the international financial markets).

Now, let us see what would happen if the funds of the government were deposited outside the Issue Department: somebody would be allowed to decide in a discretionary manner whether to invest the money in the domestic market or abroad (no matter whether it would be the managing board of a separate institution or a big commercial bank). This could be much more dangerous for the financial system, given the huge size of funds and the sorry record before the adoption of the CBA

[5] Note that government funds are not included in the money supply when deposited with the Issue Department.

of conducting monetary policy operations in favor of bankrupt institutions seeking for liquid assets.

It is interesting to note that the two extreme cases of investing all government funds abroad or investing them in the domestic market are **dual** in the following sense:

- if all funds are invested abroad, then budgetary operations in the domestic market cause changes in money supply, while such operations in the international markets (e. g. foreign debt operations) do not affect it;
- if all funds are invested in the domestic market, then domestic budgetary operations do not affect money supply, while budgetary operations in the international markets cause changes.

Investing all funds in the domestic market is only theoretically possible under a currency board and any mixture between the two extreme cases is equivalent to giving somebody else the power to affect the money supply in a discretionary manner. This will not be a problem if there is an efficient market to absorb the huge amount of government funds but this is not the case of Bulgaria. Hence, in our view, the least dangerous solution for the stability of the banking system is to keep the funds of the government deposited with the Issue Department (at least for the time being), despite the ability of the Ministry of Finance to influence money supply by domestic budgetary operations. There is yet another advantage of this approach: it provides maximum transparency on the activities of the government because of the weekly publishing of the Issue Department balance sheet.

It is clear that monetary policy will always exist in one form or another based on rules or discretion (Nenovsky and Hristov, 1998, p. 40). The CBA in Bulgaria just shifts greater responsibility for financial conditions from the banking sector to the budgetary policies of the government.

V. The Role of Reserve Management Operations

Reserve management operations play a key role in the functioning of a currency board. However, it is not a simple task to describe it without going into rather technical details. It is easier to advise on quite general issues concerning prudence (like Enoch and Gulde 1997, pp. 18 – 20; Hanke and Schuler, 1994, pp. 78 – 80) or to criticize mistaken understanding (as revenue maximization is criticized in Gulde, 1999, p. 17). Nevertheless, what we have tried to do is to provide a more in-depth cover of this role, avoiding any tremendous sophistication.

The **main objectives** of reserve management operations evolve from

the Law on the BNB:

- to guarantee full foreign exchange cover for the monetary liabilities of the Issue Department with quality foreign assets (Articles 20 and 28);
- to guarantee unconstrained exchange of domestic currency against reserve currency (Article 30);
- to guarantee an annual excess of revenue over expenditure (Article 8).

These objectives are directly assigned to the Treasury Directorate (within the Issue Department), which executes all transactions needed for the efficient management of foreign exchange reserves.

The Law stipulates the following **main restrictions** on reserve management operations:

- all convertible foreign currencies are permitted (Article 28);
- the currency mismatch in the balance sheet for any foreign currency other than the Deutschemark should not be higher than two percent (Article 31);
- permissible holdings are gold, notes and coins, funds on accounts with foreign central banks or institutions, debt instruments and repurchase agreements, whereof obligations should be assigned one of the two highest ratings by two international rating agencies (Article 28)[6].

The highest possible ratings prevent from default losses from reserve management operations. Thus, the Law eliminates **credit risk**. For the sake of simplicity it could be also assumed that there is no **operational risk**.

Therefore, any failure to meet the main objectives of reserve management operations could result only from uncontrolled market risk, i. e. **currency risk** and **interest rate risk**.

The presence of more than one foreign currency in the assets of the Issue Department is atypical of a currency board and it is due to the peculiarities in the design of the CBA in Bulgaria:

- the government deposit contains accounts in several foreign currencies;
- reserves of commercial banks are also allowed to be in foreign currencies;
- monetary gold is also included in the foreign exchange reserves[7].

[6] Although formally allowed by the Law, the use of derivatives is strictly limited and, at least for the time being, it is virtually prohibited.

[7] By Article 28 of the Law on the BNB gold is valued at DEM 500 per troy ounce, or at the market value, if lower.

Currency risk is strictly limited, because of the strictly limited currency mismatch in the balance sheet (only gold could generate substantial unrealized losses but they are also limited to the extent that price of gold could not fall below the relatively high worldwide costs of extraction).

There are no specific limits set by the Law on interest rate risk.

Any negative change in the market value of assets leads to an equal negative change in the excess cover for the monetary liabilities of the Issue Department, which is measured by the size of the Banking Department deposit (**B**). Since the size of **B** does not depend only on the effect of reserve management operations but also on other factors, it is appropriate to apply an A/L approach in order to distinguish between (and measure separately) the effects of all different factors that cause changes to it. This is the starting point for quantification of our analysis.

1. The Banking Department Deposit

The excess cover for the liabilities of the Issue Department, measured by the size of the Banking Department Deposit, should never fall below a certain lower limit $\mathbf{Z \geq 0}$, threatening the credibility of the CBA. Let $\mathbf{B \geq Z}$ be the size of the Banking Department deposit at time **T** (measured in Bulgarian levs) and the currency structure of the balance sheet of the Issue Department (see Figure 3) is defined by:

i = 1, 2, ..., n – currency number staying for BGL, EUR, USD, JPY, CHF, XAU, *et alia*;

$\mathbf{A_i \geq 0}$ – the amount of assets in currency number **i**;

$\mathbf{L_i \geq 0}$ – the amount of liabilities in currency number **i**;

$\mathbf{e_i \geq 0}$ – the exchange rate of currency number **i** against the Bulgarian lev.

Figure 3

THE BANKING DEPARTMENT DEPOSIT: EXCHANGE RATE AND VOLUME EFFECTS

Issue Department (at Time T)	
	B
$A_1 \cdot e_1$	$L_1 \cdot e_1$
$A_2 \cdot e_2$	$L_2 \cdot e_2$
...	...
$A_n \cdot e_n$	$L_n \cdot e_n$

Issue Department (at Time T+ΔT)	
	B+ΔB
$[A_1+\Delta A_1] \cdot [e_1+\Delta e_1]$	$[L_1+\Delta L_1] \cdot [e_1+\Delta e_1]$
$[A_2+\Delta A_2] \cdot [e_2+\Delta e_2]$	$[L_2+\Delta L_2] \cdot [e_2+\Delta e_2]$
...	...
$[A_n+\Delta A_n] \cdot [e_n+\Delta e_n]$	$[L_n+\Delta L_n] \cdot [e_n+\Delta e_n]$

Let at time $\mathbf{T+\Delta T}$ the amounts of assets and liabilities and the exchange rates have changed to $\mathbf{A_i+\Delta A_i}$, $\mathbf{L_i+\Delta L_i}$ and $\mathbf{e_i+\Delta e_i}$ (see Figure 3) causing the size of the Banking Department deposit to change to $\mathbf{B+\Delta B}$. Then

$$\mathbf{B=\sum_i \left[A_i-L_i\right]\cdot e_i},$$

$$\mathbf{B+\Delta B=\sum_i \left[A_i+\Delta A_i-L_i-\Delta L_i\right]\cdot\left[e_i+\Delta e_i\right]}.$$

Let the average amounts of assets and liabilities and the average exchange rates be defined as:

$$\mathbf{\overline{A}_i=0.5\cdot\left[A_i+\left(A_i+\Delta A_i\right)\right]},$$

$$\mathbf{\overline{L}_i=0.5\cdot\left[L_i+\left(L_i+\Delta L_i\right)\right]},$$

$$\mathbf{\overline{e}_i=0.5\cdot\left[e_i+\left(e_i+\Delta e_i\right)\right]}.$$

Then, the change **ΔB** in the size of the Banking Department deposit can be attributed to the **exchange rate effect** (caused by changes in exchange rates and mismatches in the currency structure of the balance sheet) and the **volume effect** (caused by a change in the volume of assets and liabilities) as follows:

$$\mathbf{\Delta B=\sum_i\left\{\left[\overline{A}_i-\overline{L}_i\right]\cdot\Delta e_i+\left[\Delta A_i-\Delta L_i\right]\cdot\overline{e}_i\right\}}.$$ [8]

Part of the change in volume is due to external inflows and outflows to each currency group of assets and liabilities and the remaining part is due to a change in the market value (caused by accrued interest and unrealized and realized capital gains and losses). Let $\mathbf{ACF_i}$ be the net inflow/outflow in currency number **i** on the asset side and $\mathbf{LCF_i}$ be the net inflow/outflow on the liability side. Then the change in volume of assets and liabilities can be separated into a change in **market value** plus an external **inflow/outflow** as follows (see Figure 4):

$$\mathbf{\Delta A_i=\left(\Delta A_i-ACF_i\right)+ACF_i},$$

$$\mathbf{\Delta L_i=\left(\Delta L_i-LCF_i\right)+LCF_i}.$$

[8] In this equation the mutual effect of the two factors is equally distributed between the two terms related to them.

Figure 4

THE BANKING DEPARTMENT DEPOSIT: MARKET VALUE AND INFLOW/OUTFLOW EFFECTS

Issue Department (at Time T+ ΔT)	
	B+ΔB
$[A_1+(\Delta A_1-ACF_1)+ACF_1]\cdot[e_1+\Delta e_1]$	$[L_1+(\Delta L_1-LCF_1)+LCF_1]\cdot[e_1+\Delta e_1]$
$[A_2+(\Delta A_2-ACF_2)+ACF_2]\cdot[e_2+\Delta e_2]$	$[L_2+(\Delta L_2-LCF_2)+LCF_2]\cdot[e_2+\Delta e_2]$
...	...
$[A_n+(\Delta A_n-ACF_n)+ACF_n]\cdot[e_n+\Delta e_n]$	$[L_n+(\Delta L_n-LCF_n)+LCF_n]\cdot[e_n+\Delta e_n]$

Hence, the change in the Banking Department deposit can be split further into: **exchange rate effect**, **assets market value effect**, **liabilities market value effect**, and **inflow/outflow effect**:

$$\Delta B = \sum_i \left\{ \left[\bar{A}_i - \bar{L}_i\right]\cdot \Delta e_i + \left[\Delta A_i - ACF_i\right]\cdot \bar{e}_i - \right.$$
$$\left. - \left[\Delta L_i - LCF_i\right]\cdot \bar{e}_i + \left[ACF_i - LCF_i\right]\cdot \bar{e}_i \right\} ,$$

where:

$\sum_i \left[\bar{A}_i - \bar{L}_i\right]\cdot \Delta e_i$ is the **exchange rate effect**;

$\sum_i \left[\Delta A_i - ACF_i\right]\cdot \bar{e}_i$ is the **assets market value effect**;

$\sum_i \left[\Delta L_i - LCF_i\right]\cdot \bar{e}_i$ is the **liabilities market value effect**;

$\sum_i \left[ACF_i - LCF_i\right]\cdot \bar{e}_i$ is the **inflow/outflow effect**.

The final step is to split the inflow/outflow effect by noting that it can be generated in the following ways:

- as a result of asset inflows and outflows (part of $\mathbf{ACF_i}$), which are not matched by equal liability inflows and outflows (part of $\mathbf{LCF_i}$). In this group fall the **net operating and investment costs** of the bank paid in foreign currency (e.g. expenditure on equipment, income from commission fees, etc.) and any **net borrowings from the IMF**, which have remained unutilized by the government in order to provide support for the CBA.
- as a result of liability inflows and outflows (part of $\mathbf{LCF_i}$), which are not matched by equal asset inflows and outflows (part of $\mathbf{ACF_i}$). In this group fall the **net operating and investment costs** of the bank paid in domestic currency (e.g. expenditure on salaries and office supplies, income from service fees) and also the net

amount of discount loans extended to commercial banks according to the **LLR function** of the Banking Department.

It is straightforward to identify the **LLR net effect** among all $\mathbf{LCF_i}$ and also the **IMF net effect** among all $\mathbf{ACF_i}$. The remaining part of the **inflow/outflow effect** equals the **BNB operating and investment costs net effect**. Hence, the final decomposition into different factors of the change in the size of the Banking Department deposit is given by the following equation:

$$\Delta B = \begin{bmatrix} \text{Exchange} \\ \text{Rate Effect} \end{bmatrix} + \begin{bmatrix} \text{Assets Market} \\ \text{Value Effect} \end{bmatrix} - \begin{bmatrix} \text{Liabilitie s Market} \\ \text{Value Effect} \end{bmatrix} - \begin{bmatrix} \text{BNB Operating and} \\ \text{Investment Costs Net} \end{bmatrix} - \begin{bmatrix} \text{LLR} \\ \text{Net} \end{bmatrix} + \begin{bmatrix} \text{IMF} \\ \text{Net} \end{bmatrix} \qquad (*)$$

It is important to note that the exact magnitude of each one of the six factors can be computed with the help of the formulas used to derive it, given that the exact values of all variables that have appeared so far are available (see Figures 3 and 4). In addition, it is not a problem to subdivide each one of them into subfactors for each different currency (see above formulas).

The derived fundamental equation (*) gives the exact relationship between all different factors that affect the size of the Banking Department deposit and can be used for three main purposes:

1. to check the future stability of the CBA in Bulgaria by performing scenario simulations for all factors (including worst case scenario);
2. to impose limits on the magnitude of one factor by setting the expected magnitude of the other ones (i.e. risk management);
3. to explain changes in the size of the Banking Department deposit in subsequent balance sheets of the Issue Department by measuring the magnitude of each separate factor.

We will combine the first two of these ideas in order to reveal in a more quantitative way the exact role of reserve management operations for the successful functioning of the CBA in Bulgaria.

2. Full Foreign Exchange Cover

Showing that the CBA has full cover for its liabilities with quality foreign assets is the key to assuring confidence in the Bulgarian lev and is the core objective of reserve management operations as set by Article 20, Section 1 of the Law on the BNB.

Since the critical minimum level of the size of the Banking Depart-

ment deposit has been assumed to be $\mathbf{Z \geq 0}$, it follows that $\mathbf{B + \Delta B \geq Z \geq 0}$ (i. e. $\mathbf{\Delta B \geq Z - B \geq -B}$) at any time $\mathbf{T + \Delta T}$. From a reserve management point of view this means that **the maximum amount of potential losses (both realized and unrealized) is strictly limited so that even in a worst case scenario the size of the Banking Department deposit should not fall below the critical level Z**.

The maximum amount of potential losses (both realized and unrealized) is measured by the worst possible **exchange rate effect** and **assets market value effect** in the derived fundamental equation (*). It can be interpreted as the maximum value of reserves that has been put at risk during reserve management operations[9]. Thus, the above inequality and the link (*) **strictly limit the maximum value that can be put at risk during reserve management operations**. The limit can be estimated by projecting the magnitude of the other effects in (*) in a worst case scenario.

In a worst case scenario, as already stated above, **B** should not fall below its credibility margin $\mathbf{Z \geq 0}$, i. e.

$$\mathbf{\Delta B \geq Z - B \geq -B}.$$

Ideally, this requirement should be satisfied without borrowing from the IMF, since there should be no need to support the currency board externally. Thus, **the IMF net effect** should remain zero[10]. From (*) it follows that in order to guarantee the efficient functioning of the currency board without external support from the IMF, the following conditions should be satisfied:

$$\mathbf{\Delta B = \begin{bmatrix} Exchange \\ Rate\ Effect \end{bmatrix} + \begin{bmatrix} Assets\ Market \\ Value\ Effect \end{bmatrix} - \begin{bmatrix} Liabilitie\ s\ Market \\ Value\ Effect \end{bmatrix} - \begin{bmatrix} BNB\ Operating\ and \\ Investment\ Costs\ Net \end{bmatrix} - \begin{bmatrix} LLR \\ Net \end{bmatrix}} \qquad (**)$$

$$\mathbf{\Delta B \geq Z - B \geq -B}$$

From (**) it follows that the size of the Banking Department deposit could be affected negatively by four different types of expenses:

- unrealized and realized losses during reserve management operations, measured by the **exchange rate effect** and the **assets market value effect**;

[9] This should not be confused with VaR, which excludes worst case scenarios.

[10] The option to have an external backing for the stability of the CBA should be viewed as a special important feature, which contributes for its credibility. But ideally if the functioning of the CBA is efficient it should not be used.

- remuneration of funds deposited with the BNB (government funds, bank reserves), measured by the **liabilities market value effect**;
- BNB net expenses, measured by the **BNB operating and investment costs net effect**;
- discount loans extended under the strictly limited LLR function of the Banking Department, measured by the **LLR net effect**.

This means that in a worst case scenario the four types of expenses have to share the permitted amount of change **Z – B.** Let $\mathbf{H \geq 0}$ be a projection of the magnitude of both the liabilities market value effect and the BNB operating and investment costs net effect from time **T** to time $\mathbf{T + \Delta T}$. In reality, given their specifics, these expenses cannot fall below a certain limit (i. e. always $\mathbf{H > 0}$).

Therefore, the maximum amount available for LLR in a worst case scenario depends on the maximum value that has been put at risk for reserve management purposes:

$$\begin{bmatrix}\mathbf{LLR}\\ \mathbf{Net}\end{bmatrix} \leq \mathbf{B - Z} + \begin{bmatrix}\mathbf{Exchange}\\ \mathbf{Rate\ Effect}\end{bmatrix} + \begin{bmatrix}\mathbf{Assets\ Market}\\ \mathbf{Value\ Effect}\end{bmatrix} - \mathbf{H}$$

Conversely, if there is a certain lower limit on the funds that should remain available for LLR even in a worst case scenario, then the maximum value that could be put at risk for reserve management purposes is limited by:

$$\begin{bmatrix}\mathbf{Exchange}\\ \mathbf{Rate\ Effect}\end{bmatrix} + \begin{bmatrix}\mathbf{Assets\ Market}\\ \mathbf{Value\ Effect}\end{bmatrix} \geq \mathbf{Z - B + H} + \begin{bmatrix}\mathbf{LLR}\\ \mathbf{Net}\end{bmatrix}$$

Thus, the following important conclusion can be drawn:

The maximum value that can be put at risk for reserve management purposes depends on the desired minimum amount of funds available for LLR, the projected liabilities remuneration and BNB operating and investment costs (**H**), the size of the Banking Department deposit (**B**) and its minimum credibility level (**Z**).

Therefore, reserve management operations should be based primarily on strong risk management techniques. Absolute measures of risk should be applied (such as dollar duration) rather than relative measures (such as duration) and worst case scenarios should be simulated by using the two conditions (**).

An important consequence from the last derived inequality is that under certain assumptions about the worst case **exchange rate effect**, the permissible worst case **assets market value effect** can be estimated, i.e. **a limit on the permissible interest rate risk of the foreign exchange**

reserves can be computed. This limit can be expressed in different form for any measure of risk.

3. Unconstrained Exchange of Reserve Currency

Given that full foreign exchange cover is guaranteed with the help of the techniques developed in the previous section, then in theory the CBA would survive a worst case scenario both in the international and domestic financial markets. However, this is still not sufficient from the point of view of the second main objective of reserve management, which is to guarantee unconstrained exchange of domestic against reserve currency. Reserves would be structured in a rather inefficient way if temporary unrealized losses have to be realized in order to meet obligations of the CBA under normal circumstances in the domestic market. The risk to have to realize otherwise unrealized losses during reserve management operations is a **liquidity risk**. Therefore, **the liquidity risk should be strictly limited by applying appropriate maturity constraints on the structure of reserves**.

This could be done by analyzing the structure of the obligations of the CBA in Bulgaria, which include:

- domestic currency in circulation;
- the government deposit;
- commercial bank reserves.

For example, it is important to estimate:

- the so-called 'hard core' of domestic currency in circulation, which could never be exchanged against reserve currency;
- the maximum amount of domestic currency that could be exchanged against reserve currency in a short period of time (in a worst case domestic scenario).

Similarly, the structure of government funds should be examined. Different funds could be managed more efficiently as separate portfolios. However, it should be kept in mind that the assets covering the funds of the government inevitably put at risk part of the size of the Banking Department deposit, because of the interrelationship (*). As a result, a lower value remains to be put at risk for more efficient management of the assets covering the money in circulation and the reserves of commercial banks.

4. Minimum Level of Revenue

The third main objective of reserve management requires that the revenue over an investment horizon of one year should exceed total BNB expenses, i. e. $\mathbf{\Delta B \geq 0}$ in a year. If we assume that the **net LLR ef-**

fect during the year is zero, from (**) it follows:

$$\begin{bmatrix}\textbf{Exchange}\\ \textbf{Rate Effect}\end{bmatrix}+\begin{bmatrix}\textbf{Assets Market}\\ \textbf{Value Effect}\end{bmatrix}\geq$$

$$\geq\begin{bmatrix}\textbf{Liabilitie s Market}\\ \textbf{Value Effect}\end{bmatrix}+\begin{bmatrix}\textbf{BNB Operating and}\\ \textbf{Investment Costs Net}\end{bmatrix}\geq \textbf{H}$$

Therefore, a certain minimum rate of return (depending on the size of reserves) should be achieved with a very high probability (e.g. 95 percent), meanwhile trying to maximize the expected return (at the cost of higher risk). Under certain assumptions about the worst case **exchange rate effect**, the derived inequality implicitly imposes a second upper limit on the **interest rate risk** of foreign exchange reserves (the 'full cover' requirement has imposed the first limit, see above). For different measures of risk this limit can be expressed in different form.

In order to achieve this objective without failing to meet the other objectives[11], the Treasury Directorate of the BNB has developed an appropriate method for strategic asset allocation (benchmarking). The method reflects the main strategic issues discussed above. It is interesting that, for the time being, the first limit on interest rate risk (the one imposed by the 'full cover' requirement) is slack. With the current size of reserves it is less constraining than the one imposed by the 'minimum level of revenue' requirement. **Thus, foreign exchange reserves have been structured according to a benchmark, which guarantees the stability of the CBA in Bulgaria even in worst case scenarios.**

VI. Conclusions

The CBA in Bulgaria shares the key features of an orthodox currency board but its design is more flexible in view of the banking crisis that preceded its adoption. All the same, it has brought to the Bulgarian economy the same advantages as an orthodox currency board, since most of the differences tend to enhance rather than undermine its credibility.

The design of the currency board could be rendered closer to the orthodox approach by:

- remunerating reserves of commercial banks;
- changing the method of announcing the base interest rate;

[11] Note that a portfolio of fixed income securities can generate an acceptable positive return for a year but it could have a significant unrealized negative return (threatening the full cover for liabilities) in the first several months.

• abolishing purchases of gold against domestic currency.

The flow channels in the financial system under the CBA in Bulgaria differ from those of an orthodox currency board and a central bank. Since all government funds are deposited with the Issue Department, money supply is affected, wittingly or not, by budgetary operations in the domestic market. However, this seems to be the best solution for the stability of the financial system (at least until an efficient financial market develops in Bulgaria), despite the fact that the Ministry of Finance could conduct monetary policy operations to a certain extent.

The stability of the CBA in Bulgaria depends on the size of the Banking Department deposit with the Issue Department. A fundamental equation expresses the relationship between all the factors affecting the size of the Banking Department deposit. It can be used for three main purposes:

1. to check the future stability of the CBA in Bulgaria by performing scenario simulations for all factors (including worst case scenario);

2. to impose limits on the magnitude of one factor by setting the expected magnitude of the other ones (i.e. risk management);

3. to explain changes in the size of the Banking Department deposit in subsequent balance sheets of the Issue Department by measuring the magnitude of each separate factor.

An appropriate analysis of the equation leads to the conclusion that reserve management operations play a key role for the stability of the CBA:

- the maximum value that can be put at risk for reserve management purposes should be strictly limited in line with the initial size of the Banking Department deposit, the projected liabilities remuneration and BNB operating and investment costs and the desired amount of funds available for LLR;
- adequate constraints on the maturity structure of foreign exchange reserves should be imposed in order to avoid realization of losses that otherwise could remain unrealized;
- the value put at risk for reserve management purposes should be strictly limited in line with the requirement to achieve excess of revenues over expenses over a one-year investment horizon with a very high probability.

In order to meet these objectives, an appropriate method for strategic asset allocation and benchmark construction has been developed by the Treasury Directorate of the BNB. Foreign exchange reserves have been structured according to a benchmark, which guarantees the stability of the CBA in Bulgaria even in worst case scenarios.

Appendix

Handouts of the Presentation at the Operational Monetary Policy Seminar, June 23 – 25, 1999, De Nederlandsche Bank, Amsterdam

The Role of Reserve Management Operations in the Functioning of a Currency Board

Experience of the Treasury Directorate of the Bulgarian National Bank

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BULGARIAN NATIONAL BANK

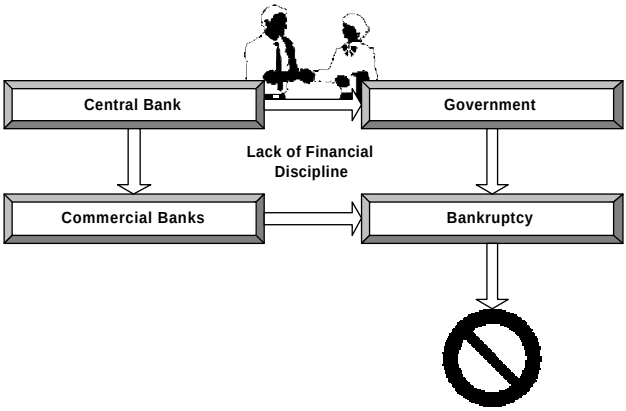
OBJECTIVES

- Review the reasons to adopt the CBA in Bulgaria;
- Compare the CBA in Bulgaria with an orthodox CBA;
- Examine the main tools of monetary policy operations and check consistency with orthodox currency board rules;
- Present the flow channels and balance sheets in the financial system under the CBA in Bulgaria;
- Examine the money supply process and explain the peculiarities in the design of the CBA in Bulgaria;
- Derive an equation expressing the interrelationship between the factors affecting the stability of the CBA in Bulgaria;
- Analyze the role of reserve management operations in the functioning of the CBA in Bulgaria.

Main Reasons to Adopt the CBA in Bulgaria

- The government used to fund deficits of bankrupt state enterprises by supplying subsidies;
- The central bank used to fund deficits of the government by printing Bulgarian levs;
- Commercial banks used to fund deficits of bankrupt state enterprises by supplying loans;
- The central bank used to refinance commercial banks by extending discount loans;
- Insolvent commercial banks triggered a banking crisis;
- The Bulgarian lev depreciated against all major currencies;
- The economy was driven into a hyperinflationary spiral;
- Several stabilization policy attempts failed and key institutions lost their credibility.

Main Reasons to Adopt the CBA in Bulgaria



Main Reasons to Adopt the CBA in Bulgaria

- **Introduce a rule-based instead of a discretionary mechanism of money supply regulation;**
- **Impose financial discipline and market-driven commercial culture upon all economic agents;**
- **Restore financial system credibility;**
- **Revive the economy.**

The CBA in Bulgaria versus an Orthodox CBA

- **The CBA in Bulgaria was introduced with the new Law on the Bulgarian National Bank (BNB) of 10 June 1997;**
- **The Law sets the official exchange rate of the Bulgarian lev against the Deutschemark at BGL 1,000 per DEM 1;**
- **The Law defines the structure of the BNB as comprised of three departments:**
  - an **Issue Department** to maintain full foreign exchange cover for the total amount of BNB monetary liabilities;
  - a **Banking Department** to act as lender of last resort in case of systemic risk for the stability of the banking system;
  - a **Banking Supervision Department** to supervise the banking system;
- **The Law sets the monetary functions and operations of the BNB in accordance with the general principles of operation of a currency board.**

The CBA in Bulgaria versus an Orthodox CBA

Common key features:

An Orthodox Currency Board	The CBA in Bulgaria
Maintains full foreign exchange cover for its note, coin and deposit liabilities as set by law	
Maintains a truly fixed exchange rate with respect to the reserve currency as set by law	
Cannot finance domestic government spending as set by law	

The CBA in Bulgaria versus an Orthodox CBA

Main differences:

An Orthodox Currency Board	The CBA in Bulgaria
Usually supplies only notes and coins	Supplies notes, coins and deposits as well
Does not regulate commercial banks	Regulates commercial banks
Is not a lender of last resort	Strictly limited lender of last resort
Earns all seigniorage only from interest on its assets	Earns almost all seigniorage only from interest
Full convertibility (both current and capital account)	Full current account convertibility but still restricted capital account convertibility (due to be changed)

The CBA in Bulgaria is more flexible mainly because of the problems in the banking system before its adoption

The CBA in Bulgaria versus an Orthodox CBA

Equal advantages:

An Orthodox Currency Board	The CBA in Bulgaria
Transparency	
Rapid monetary reform	
Rule-bound monetary policy	
Protection from political pressure	
Cannot create inflation	
High credibility	

Monetary Policy Tools
1. Reserve Requirements

Subject to Regulation No. 21 on the Minimum Required Reserves according to Article 41 of the Law on the BNB:

- 11 percent of banks' deposit base;
- both in Bulgarian levs and foreign currency;
- averaged on a monthly basis but banks have to pay interest for the excess over the 50 percent for each day of use;
- the BNB may decide to pay interest on the lev component.

Comments on consistency with currency board rules:

- reserve requirements are a tax on the banking system, which is absent in an orthodox currency board;
- the option to change the level of requirements should not be used;
- the option to remunerate reserves should be used as soon as possible;
- the most radical solution is to eliminate reserve requirements, leave the banks themselves to determine the amount of reserves held with the BNB for settlement purposes and make reserves fully remunerated.

Monetary Policy Tools
2. Lender of Last Resort (LLR)

Subject to Regulation No. 6 on Extending Collateralized Loans to Banks as set by Articles 19 and 33 of the Law on the BNB:

- only in the event of a liquidity risk and against collateral of liquid assets;
- only up to the amount of available funds on the Banking Department deposit placed with the Issue Department;
- only as short term support up to 30 days and renewed no more than twice;
- liquidity risk is determined by the delays of settlement transactions in the Banking Integrated System for Electronic Transfer (BISERA).

Comments on consistency with currency board rules:

- knowing the fragile stability of the banking system in Bulgaria it is reasonable that a strictly limited LLR function has been left;
- in the case of Bulgaria the LLR function has only contributed to the credibility of the currency board arrangement.

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Monetary Policy Tools
3. Open Market Operations (OMO)

The Law on the BNB prohibits OMO, since the BNB may not extend credits in whatever form to the State.

However, the Ministry of Finance has some room for OMO:

- the BNB acts as **an agent** for government and government guaranteed debt;
- all auctions are organized by the Fiscal Services Department of the BNB;
- all transactions are registered by the Fiscal Services Department of the BNB;
- the Ministry of Finance provides the necessary funds for the redemption of the government securities no later than one working day prior to redemption;
- reverse repurchase of government securities prior to maturity is allowed by a decision of the Minister of Finance.

Comments on consistency with currency board rules:

- the lack of OMO for the BNB is in line with orthodox currency board rules;
- the Ministry of Finance is able to use OMO only due to the presence of the government deposit in the liabilities of the Issue Department.

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Monetary Policy Tools
4. Base Interest Rate

Subject to Article 35 of the Law on the BNB:

- the BNB is obliged to announce (not to set!) the base interest rate;
- the Managing Board has the right to determine the method to be used;
- currently the base interest rate is announced as the average yield on three-month government treasury bills after each auction held by the Fiscal Services Department in the primary market.

Comments on consistency with currency board rules:

- currently the market is distorted in two major respects:
  - to minimize its costs the Ministry of Finance is interested in deliberately forcing the yield down by reducing supply of treasury bills;
  - interbank rates may be influenced by the base rate if banks use it as a benchmark
- in a fixed exchange rate regime the market alone should determine interest rates;
- hence, at least the method of announcement should be changed (e.g. LIBOR).

Monetary Policy Tools
5. Commissions

Subject to Articles 29 and 30 of the Law on the BNB:

- the official exchange rate is set at BGL 1,000 per DEM 1 (and the corresponding rate to the Euro when it becomes legal tender in Germany);
- the BNB is obliged to exchange reserve currency against levs on the basis of spot exchange rates, which cannot depart from the official exchange rate by more than 0.5 percent, inclusive any fees and commissions;
- the Managing Board has decided to sell Deutschemarks at BGL 1,000 per DEM 1 and buy at BGL 995 per DEM 1.

Comments on consistency with currency board rules:

- commission fees are supposed to worsen the link to the reserve currency;
- however, permanent low commission fees discourage short-term arbitrageurs;
- any change of commission fees would affect short-term capital movements;
- the market has already adjusted and it seems best to avoid any changes;

Monetary Policy Tools
6. Purchase of Gold

Subject to the old Law on Transactions in Foreign Exchange Valuables and Currency Control (now to be changed):

- producers offer the BNB to purchase gold extracted in Bulgaria;
- gold is included in the international foreign exchange reserves of the BNB;
- after the adoption of the CBA the amount of gold purchased by the BNB has substantially decreased.

Comments on consistency with currency board rules:

- such features are absent in an orthodox currency board;
- market forces alone should determine whether production of gold results in an increase of domestic currency in circulation (by exchanging gold against the reserve currency and converting it into domestic currency);
- if the BNB were allowed to both purchase and sell gold against Bulgarian levs, then gold could even play the role of domestic securities for OMO;
- hence, the right of the BNB to purchase gold against domestic currency should be abolished.

The Financial System under the CBA in Bulgaria

Three main layers:

1. The **Issue Department** and the **Banking Department** of the BNB;
2. **Commercial banks** (supervised by the Banking Supervision Department);
3. **The public** (together with the nonbanking financial institutions);

The Government is another special participant:

- it keeps its funds deposited with the Issue Department of the BNB;
- it organizes the market for government securities through the Fiscal Services Department of the BNB and services the domestic government debt;
- it borrows from the IMF and other international financial institutions and services the foreign government debt;
- it collects taxes and spends on salaries, pensions, subsidies, etc. in the budgetary sector;
- it also receives part of the seigniorage earned by the BNB.

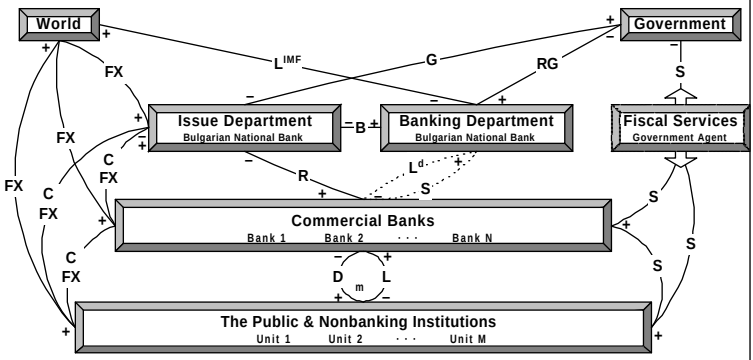
The Financial System under the CBA in Bulgaria: Balance Sheets

Issue Department		Banking Department		Commercial Banks		Public	
FX	C R G B	B L^d RG ...	L^{IMF} ...	C R L S FX^B ...	D L^d ...	C D S FX^P ...	L ...

Main balance sheet items:

FX – foreign exchange reserves (as set by Article 28 of the Law on the BNB);
C – currency in circulation;
R – reserves of commercial banks;
G – the government deposit with the Issue Department;
B – the Banking Department deposit with the Issue Department;
L^d – discount loans extended according to the strictly limited LLR function;
RG – receivables from government (due to borrowings from the IMF);
L^{IMF} – borrowings from the IMF;
L – loans extended to the public by commercial banks;
D – deposits of the public with commercial banks;
S – domestic government securities;
⋯ – other unimportant items.

The Financial System under the CBA in Bulgaria: Flow Channels



The Financial System under the CBA in Bulgaria: Money Supply

Let M^b be the monetary base, M - the money supply and m - the standard money multiplier. Then,

$$M^b = C + R = FX - G - B$$

$$M = m \cdot [FX - G - B]$$

Conclusions:

- *ceteris paribus*, changes in FX, which are not related to equal changes in B or G, proportionally cause identical changes in the money supply M (c.f. the rule-bound money supply in an orthodox currency board);
- *ceteris paribus*, changes in B, which are not related to equal changes in FX, proportionally cause inverse changes in the money supply M (e.g. LLR);
- *ceteris paribus*, changes in G, which are not related to equal changes in FX, proportionally cause inverse changes in the money supply M (i.e. the Ministry of Finance, wittingly or not, conducts monetary policy operations by controlling domestic inflows to and outflows from its funds G).

The Financial System under the CBA in Bulgaria: The Government Deposit

- **The two extreme cases of investing all government funds abroad or investing them in the domestic market are dual:**
  - if all funds are invested abroad, then budgetary operations in the domestic market cause changes in money supply, while such operations in the international markets (e.g. foreign debt operations) do not affect it;
  - if all funds are invested in the domestic market (which is possible only theoretically), then domestic budgetary operations do not affect money supply, while international operations cause changes;
- **Any mixture between the two extreme cases is equivalent to giving somebody else the power to affect the money supply in a discretionary manner;**
- **Hence, the least dangerous solution for the stability of the financial system is to keep the funds of the government deposited with the Issue Department (at least until an efficient financial market develops in Bulgaria).**

The Role of Reserve Management Operations

- **Main objectives of reserve management operations (Law):**
  - to guarantee full foreign exchange cover for the monetary liabilities of the Issue Department with high-quality foreign assets;
  - to guarantee unconstrained exchange of domestic currency against reserve currency;
  - to guarantee an annual excess of revenue over expenditure;
- **Main restrictions on reserve management operations (Law):**
  - all convertible foreign currencies are permitted because of the liabilities:
    - the government deposit contains accounts in several foreign currencies;
    - reserves of commercial banks are also allowed to be in foreign currencies;
    - monetary gold is also included in the foreign exchange reserves;
  - the currency mismatch in the balance sheet for any foreign currency other than the Deutschemark should not be higher than two percent;
  - permissible holdings are gold, notes and coins, funds on accounts with foreign central banks or institutions, debt instruments and repurchase agreements, whereof obligations should be assigned one of the two highest ratings by two international rating agencies.

The Role of Reserve Management Operations

- **Main risks of reserve management operations:**
  - credit risk: default losses eliminated due to highest possible ratings;
  - market risk:
    - currency risk: potential losses strictly limited, because of the strictly limited currency mismatch in the balance sheet (gold price could not fall that much!)
    - interest rate risk: potential losses unlimited (at least in theory);
  - other risks (e.g. operational): potential losses assumed to be zero;
- **Any negative change in the market value of the assets leads to an equal negative change in the excess cover for the monetary liabilities of the Issue Department, which is measured by the size of the Banking Department Deposit (B);**
- **It is appropriate to apply an A/L approach in order to distinguish between (and measure separately) the effects of all the different factors that cause changes to B .**

The Role of Reserve Management Operations: The Banking Department Deposit

Issue Department (at Time T)	
	B
$A_1 \cdot e_1$	$L_1 \cdot e_1$
$A_2 \cdot e_2$	$L_2 \cdot e_2$
…	…
$A_n \cdot e_n$	$L_n \cdot e_n$

Issue Department (at Time T+ΔT)	
	B+ΔB
$[A_1+\Delta A_1]\cdot[e_1+\Delta e_1]$	$[L_1+\Delta L_1]\cdot[e_1+\Delta e_1]$
$[A_2+\Delta A_2]\cdot[e_2+\Delta e_2]$	$[L_2+\Delta L_2]\cdot[e_2+\Delta e_2]$
…	…
$[A_n+\Delta A_n]\cdot[e_n+\Delta e_n]$	$[L_n+\Delta L_n]\cdot[e_n+\Delta e_n]$

Currency Structure of the Balance Sheet of the Issue Department:

- i = 1, 2, …, n – currency number (BGL, EUR, USD, JPY, CHF, XAU,...);
- A_i – the amount of assets in currency number i;
- L_i – the amount of liabilities in currency number i;
- e_i – the exchange rate of currency number i against the Bulgarian lev;
- B – size of the Banking Department Deposit;
- Δ* – change of variable * from time T to time T+ΔT.

The Role of Reserve Management Operations: The Banking Department Deposit

Let us define the average amounts of assets and liabilities and the average exchange rates for the time period [T, T+ ΔT] as:

$$\overline{A}_i = 0.5 \cdot [A_i + (A_i + \Delta A_i)]$$

$$\overline{L}_i = 0.5 \cdot [L_i + (L_i + \Delta L_i)]$$

$$\overline{e}_i = 0.5 \cdot [e_i + (e_i + \Delta e_i)]$$

Then the change in the size of the Banking Department deposit can be attributed to exchange rate effect and volume effect as:

$$\Delta B = \sum_i \left\{ [\overline{A}_i - \overline{L}_i] \cdot \Delta e_i + [\Delta A_i - \Delta L_i] \cdot \overline{e}_i \right\}$$

The Role of Reserve Management Operations: The Banking Department Deposit

Issue Department (at Time T+ ΔT)	
$[A_1+(\Delta A_1-ACF_1)+ACF_1]\cdot[e_1+\Delta e_1]$ $[A_2+(\Delta A_2-ACF_2)+ACF_2]\cdot[e_2+\Delta e_2]$ … $[A_n+(\Delta A_n-ACF_n)+ACF_n]\cdot[e_n+\Delta e_n]$	B+ΔB $[L_1+(\Delta L_1-LCF_1)+LCF_1]\cdot[e_1+\Delta e_1]$ $[L_2+(\Delta L_2-LCF_2)+LCF_2]\cdot[e_2+\Delta e_2]$ … $[L_n+(\Delta L_n-LCF_n)+LCF_n]\cdot[e_n+\Delta e_n]$

Let ACF_i be the net inflow/outflow of currency i on the asset side and LCF_i be the net inflow/outflow on the liability side. Then the change in volume can be separated into a change in market value plus an external inflow/outflow as follows :

$$\Delta A_i = (\Delta A_i - ACF_i) + ACF_i$$

$$\Delta L_i = (\Delta L_i - LCF_i) + LCF_i$$

The Role of Reserve Management Operations: The Banking Department Deposit

Thus, the change in the Banking Department Deposit can be further split into: exchange rate effect , assets market value effect , liabilities market value effect , and inflow/outflow effect as:

$$\Delta B = \sum_i \{[\bar{A}_i - \bar{L}_i]\cdot\Delta e_i + [\Delta A_i - ACF_i]\cdot\bar{e}_i - [\Delta L_i - LCF_i]\cdot\bar{e}_i + [ACF_i - LCF_i]\cdot\bar{e}_i\}$$

$\Rightarrow$ $\sum_i [\bar{A}_i - \bar{L}_i]\cdot\Delta e_i$ is the exchange rate effect;

$\Rightarrow$ $\sum_i [\Delta A_i - ACF_i]\cdot\bar{e}_i$ is the assets market value effect;

$\Rightarrow$ $\sum_i [\Delta L_i - LCF_i]\cdot\bar{e}_i$ is the liabilities market value effect;

$\Rightarrow$ $\sum_i [ACF_i - LCF_i]\cdot\bar{e}_i$ is the inflow/outflow effect.

The Role of Reserve Management Operations: The Banking Department Deposit

The final step is to split the inflow/outflow effect by noting that it can be generated in the following ways:

- as a result of asset inflows and outflows (part of $\mathbf{ACF}_i$), which are not matched by equal liability inflows and outflows (part of $\mathbf{LCF}_i$). In this group fall the net operating and investment costs of the bank paid in foreign currency (e.g. expenditure on equipment, income from commission fees, etc.) and also any net borrowings from the IMF, which have remained unutilized by the government in order to provide support for the CBA;
- as a result of liability inflows and outflows (part of $\mathbf{LCF}_i$), which are not matched by equal asset inflows and outflows (part of $\mathbf{ACF}_i$). In this group fall the net operating and investment costs of the bank paid in domestic currency (e.g. expenditure on salaries and office supplies, income from service fees) and also the net amount of discount loans extended to commercial banks according to the LLR function of the Banking Department.

The Role of Reserve Management Operations: The Banking Department Deposit

The final decomposition into different factors of the change in the size of the Banking Department deposit is given by the following fundamental equation:

$$\Delta B = \begin{bmatrix}\text{Exchange}\\ \text{Rate Effect}\end{bmatrix} + \begin{bmatrix}\text{Assets Market}\\ \text{Value Effect}\end{bmatrix} - \begin{bmatrix}\text{Liabilities Market}\\ \text{Value Effect}\end{bmatrix} - \begin{bmatrix}\text{BNB Operating and}\\ \text{Investment Costs Net}\end{bmatrix} - \begin{bmatrix}\text{LLR}\\ \text{Net}\end{bmatrix} + \begin{bmatrix}\text{IMF}\\ \text{Net}\end{bmatrix}$$

It gives the exact relationship between all the different factors that affect the size of the Banking Department deposit (i.e. the stability of the CBA) and can be used for three main purposes:

1 To check the future stability of the CBA in Bulgaria by performing scenario simulations for all factors (including worst case scenario);
2 To impose limits on the magnitude of one factor by setting the expected magnitude of the others (i.e. risk management);
3 To explain changes in the size of the Banking Department deposit in subsequent balance sheets of the Issue Department by measuring the magnitude of each separate factor.

The Role of Reserve Management Operations: Full Foreign Exchange Cover

- Ideally, the stability of the CBA should be achieved without external support, i.e. the IMF net effect should remain zero;
- Let $Z \geq 0$ be the critical size of B, threatening the CBA stability;
- Then, even in a worst case scenario, the following conditions should be satisfied:

$$\Delta B = \begin{bmatrix}\text{Exchange}\\ \text{Rate Effect}\end{bmatrix} + \begin{bmatrix}\text{Assets Market}\\ \text{Value Effect}\end{bmatrix} - \begin{bmatrix}\text{Liabilities Market}\\ \text{Value Effect}\end{bmatrix} - \begin{bmatrix}\text{BNB Operating and}\\ \text{Investment Costs Net}\end{bmatrix} - \begin{bmatrix}\text{LLR}\\ \text{Net}\end{bmatrix}$$

$$\Delta B \geq Z - B \geq -B$$

- Thus, the four types of expenses have to share the permitted amount of change Z - B even in a worst case scenario.

The Role of Reserve Management Operations: Full Foreign Exchange Cover

- Let $H > 0$ be a projection of the magnitude of both the liabilities market value effect and the operating costs net effect from time T to time T+ ΔT;
- Then, the maximum amount available for LLR in a worst case scenario depends on the maximum value that has been put at risk for reserve management purposes:

$$\begin{bmatrix}\text{LLR}\\ \text{Net}\end{bmatrix} \leq B - Z + \begin{bmatrix}\text{Exchange}\\ \text{Rate Effect}\end{bmatrix} + \begin{bmatrix}\text{Assets Market}\\ \text{Value Effect}\end{bmatrix} - H$$

- Conversely, if there is a certain lower limit on the funds that should always be available for LLR then the maximum value to be put at risk for reserve management purposes is limited:

$$\begin{bmatrix}\text{Exchange}\\ \text{Rate Effect}\end{bmatrix} + \begin{bmatrix}\text{Assets Market}\\ \text{Value Effect}\end{bmatrix} \geq Z - B + H + \begin{bmatrix}\text{LLR}\\ \text{Net}\end{bmatrix}$$

The Role of Reserve Management Operations: Full Foreign Exchange Cover

- The maximum value that can be put at risk for reserve management purposes depends on the desired minimum amount of funds, available for LLR, the projected liabilities remuneration and BNB operating and investment costs (H), the size of the Banking Department deposit (B) and its minimum credibility level (Z);
- Under certain assumptions about the worst case exchange rate effect , the permissible worst case asset market value effect can be estimated, i.e. a limit on the permissible interest rate risk of the foreign exchange reserves can be computed;
- Reserve management operations should be based primarily on strong risk management techniques;
- Absolute measures of risk should be applied (such as dollar duration) rather than relative measures (such as duration);
- Worst case scenarios should be simulated (rather than VaR).

The Role of Reserve Management Operations: Unconstrained Exchange of Reserve Currency

- Reserves would be structured in a rather inefficient way if temporary unrealized losses have to be realized in order to meet obligations of the CBA under normal circumstances in the domestic market (liquidity risk);
- Liquidity risk should be strictly limited by applying adequate maturity constraints on the structure of reserves;
- The obligations of the CBA should be carefully analyzed:
  - domestic currency in circulation:
    - the so-called 'hard core' should be estimated
    - the maximum amount that could be exchanged against reserve currency in a short period of time (in a worst case domestic scenario) should be estimated
  - the government deposit:
    - different funds could be managed more efficiently as separate portfolios
    - it should be kept in mind that the assets covering the government funds put a risk part of the size of B according to the derived fundamental equation so that less could be put at risk for efficient management of the other assets
  - reserves of commercial banks:
    - . . .

The Role of Reserve Management Operations: Minimum Level of Revenue

- Over an investment horizon of one year revenue should exceed total BNB expenses, i.e. $\Delta B \geq 0$ in a year;
- If we assume that the net LLR effect over the year is zero, then from the fundamental equation it follows:

$$\begin{bmatrix}\text{Exchange}\\ \text{Rate Effect}\end{bmatrix}+\begin{bmatrix}\text{Assets Market}\\ \text{Value Effect}\end{bmatrix}\geq\begin{bmatrix}\text{Liabilities Market}\\ \text{Value Effect}\end{bmatrix}+\begin{bmatrix}\text{BNB Operating and}\\ \text{Investment Costs Net}\end{bmatrix}\geq H$$

- Therefore, a certain minimum target level of return (depending on the size of reserves) should be achieved with a very high probability (e.g. 95 percent);
- Under certain assumptions about the worst case exchange rate effect the derived inequality implicitly imposes a second upper limit on interest rate risk of foreign exchange reserves (as the 'full cover' objective has already done so).

The Role of Reserve Management Operations: Benchmark Construction

- In order to achieve the three main objectives of reserve management, the Treasury Directorate of the BNB has developed an appropriate method for strategic asset allocation and benchmark construction;
- The method is consistent with the described strategic issues;
- It is interesting to note that, for the time being, the first limit on interest rate risk (the one imposed by the 'full cover' requirement) is slack: with the current size of reserves it is less constraining than the one imposed by the 'minimum level of revenue' requirement;
- Thus, the foreign exchange reserves of the BNB have been structured according to a benchmark, which guarantees the stability of the CBA in Bulgaria even in worst case scenarios .

SUMMARY

- We have reviewed the reasons to adopt the CBA in Bulgaria;
- We have compared it with an orthodox CBA;
- We have examined the main tools of monetary policy operations for consistency with orthodox CBA rules;
- We have presented the flow channels and balance sheets in the financial system under the CBA in Bulgaria;
- We have examined the money supply process and explained the peculiarities in the design of the CBA in Bulgaria;
- We have derived an equation for the interrelationship between the factors affecting the stability of the CBA;
- We have analyzed the role of reserve management operations in the functioning of the CBA in Bulgaria.

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Monetary Regimes and the Real Economy

(Empirical Tests before and after the Introduction of the Currency Board in Bulgaria)

Nikolay Nenovsky, Kalin Hristov

Abstract. This paper provides elements of a response to a long-debated issue in economics on the sources of shocks and the direction of the relationship between real economy and monetary variables. In modern literature this discussion boils down to the following extreme views: "The direction of impulses moves from money to real variables" and "the direction of impulses moves from real variables to money." During the period under review Bulgaria experienced a shift in the monetary regime: From discretionary central bank to a static currency board (cb). Empirical data makes it possible to analyze the effect of this institutional change on real sector dynamics. The present study will help clarify a question of present interest for Bulgaria: Does the CB inhibit real sector development or not? The study is a sketch of the discussion of what the cb can and cannot do. There are four theoretical views on the real monetary relationship: The monetarist theory (Friedman Schwartz), the theory of rational expectations (Lucas Barro), the real business cycle theory (rbc) and the Austrian analysis (Mises, Hayek). The hypothesis that the cb has a limited influence on the real economy is confirmed. Monthly data for the period January 1995 March 1999 is used.

Резюме. Изследването дава елементи на отговор на един отдавна задаван и дискутиран в икономическата теория въпрос за източниците на шоковете и посоката на влияние между реалната икономика и паричните променливи. В съвременната литература тази дискусия може да бъде сведена до следните две крайни мнения: посоката на импулсите идва от парите към реалните величини и посоката на импулсите идва от реалните величини към парите. България през изследвания период смени два парични режима: дискреционна централна банка и статичен паричен съвет (ПС). Емпиричният материал дава възможност за анализ на влиянието на тази институционална смяна върху динамиката на реалния сектор. Настоящото изследване би помогнало да се осветли актуалният за българската действителност въпрос, спира ли ПС развитието на реалната икономика, или не. Изследването представлява щрих в дискусията относно това какво може и какво не може ПС. Четири са теоретичните виждания за връзката „парично – реално": монетаристката теория (Friedman – Schwartz), теорията за рационалните очаквания (Lucas – Barro), теорията на реалния бизнес цикъл (RBC) и австрийският анализ (Mises, Hayek). Потвърдена е изказаната хипотеза, че ПС има ограничено влияние върху реалната икономика. Използвани са месечни данни за периода януари 1995 г. – март 1999 г.

Contents

It is indeed evident that money is nothing but the representation of labor and commodities, and serves only as a method of rating or estimating them. Where coin is in greater plenty, as a greater quantity of it is required to represent the same quantity of goods, it can have no effect, either good or bad – any more than it would make an alteration on a merchant's books, if, instead of the Arabian method of notation, which requires few characters, he should make use of the Roman, which requires a great many.

D. Hume, Of Money, 1752, p. 32

I. Objects of the Study

The traditional and most commonly used argument against the currency board relates to the following: as the CB restricts money supply and a growing economy needs more money, real sector development is therefore inhibited (implicitly assuming that impulses come from money to the real economy). This critique builds on the quantity theory of money: **MV = PY**, where **M** is the money supply, **V** is the velocity of money, **P** is the general price level and **Y** is the volume of domestic output[1]). Dynamization of the above equation by inclusion of rates highlights the critique against the CB: $\dot{\mathbf{m}}/\mathbf{m} + \dot{\mathbf{v}}/\mathbf{v} = \dot{\mathbf{p}}/\mathbf{p} + \dot{\mathbf{y}}/\mathbf{y}$. The opponents of CB argue that with constant velocity of money (i.e. stable money demand – for unknown reason) a possible constraint on money supply may lead to a slower growth and/or deflation[2].

The assertion that the CB is restrictive contradicts logic because in practice the CB may restrict as well as increase money supply. Therefore it acts symmetrically.

A more appropriate point of attack on the CB may be seen in money supply *volatility* rather than the direction of money supply movement because with any failed attempt at sterilization (replacement of external sources of reserve money with domestic in order to preserve reserve money) a change in net foreign assets may cause shocks in the money supply.

It should be noted that the CB requires full liberalization of all markets and variables except for the exchange rate. The purity of this mechanism ensures automatic balance of money demand and supply mainly through interest rate and price movements.

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[1] *Without going into detail we state that the equation on exchange as well as the more sophisticated versions of the quantity theory give a wrong idea of the mechanisms by which money affects the behavior of economic agents. For more detail, see* ***Mises*** *(1912).*

[2] *Under this monetary regime, deflation is an indication of the smooth operation of the CB rather than a signal of severe restriction. It indicates that prices are flexible and the economy adjusts through the real, not through the nominal variables (****Tsang, S.****, 1999).*

Also, it is often argued that CB positive effects are limited to the achievement of a temporary financial stabilization.

In practice, attacks against the CB have never been substantiated, the specific channels of the CB effect on economic activity have never been identified and criticism has never been tested empirically.

From the beginning we would like to note that the present analysis is not aimed at studying the business cycle in Bulgaria after the economic changes evolving since the early 1990s, i.e. this study *does not adhere completely to the real business cycle theory*. The objective of this study is different and relates to the following two assumptions.

First, the theoretical interpretation and empirical testing of the direction and magnitude of the relationship between monetary and real macroeconomic variables under different monetary regimes over the period 1991 – 1999 (prior to the introduction of the CB and thereafter).[3] Determining the direction of impulses from real to monetary economy and/or vice versa makes it possible to draw certain conclusions on the efficiency of different economic policies. *In this paper we are not concerned with the channels of monetary and real sector interaction and assume them as existent.*

Second, defining a possible scope of action by monetary authorities and selecting the optimum[4] monetary regime. We derive from the assumption that the optimum monetary regime should be based on clear evidence of the relationship and the direction of the relationship between money and real economy. If impulses move from the real sector to money, then the problems of the Bulgarian economy are entirely structural (microeconomic) and cannot be solved through monetary measures. The optimum monetary regime may be that regime which leads to price stability and provides stimuli for individual agents at a

[3] *During the review period two monetary regimes are identified. The first, within the period 1991 − June 1997, is a regime of discretionary monetary policy which comes closest to the pragmatic approach to monetary policy described in literature. The second period, from July 1997 until now, is a period of currency board rules. In monetary rules literature this regime is considered as a private case of exchange rate targeting. For detailed presentation of monetary regimes, see* ***Mishkin, F.*** *(1999). The two periods − prior to the introduction of the CB and after that − may be also viewed as regimes of floating (controlled) and fixed exchange rate respectively. This gives the opportunity of comparing the direction of the monetary − real causality under the two regimes. A similar study on the efficiency of monetary policy under a floating and fixed exchange rate for the USA, Germany and France is made by* ***Bruno, C.*** *(1997).*

[4] *We use the word 'optimum' because it is widely and commonly used, being fully aware that it is impossible to measure the optimum in an economy. At an individual level, it is subjective and at macro level it results from unintentional relationships between economic agents. See* ***Salin*** *(1990, 1991).*

micro level in order to overcome structural disequilibria[5].

We would like to note that *the results obtained and conclusions drawn refer to the operation of the Bulgarian monetary regimes during the review period.* These results should not be automatically transferred to other countries or other periods in the development of the Bulgarian economy.

There is also the question of whether the argument of CB creating hard budget constraints on economic agents (government, financial institutions, households) contradicts the argument that it follows real economy movement. Such contradiction is irrelevant because the idea of the CB is to leave economic agents 'alone' in the market, i.e. to reduce additional shocks on the real sector that may be triggered by the central bank and its discretionary monetary policy.

II. Theoretical and Methodological Fundamentals of the Study

Four Theoretical Interpretations of Money – Income Causality

One of the earliest discussions in economic theory relates to money and real economy causality. In modern literature this debate boils down to the following two extreme views: "impulses come from money to real variables" and "impulses come from real variables to money", as well as to many intermediate assertions. Although this issue may seem minor at first sight, its answer is of crucial importance for economic policy, particularly monetary policy[6]. Depending on the answers to this question four trends may be distinguished in economics literature: the monetarists, the theory of rational expectations, the real business cycle and the Austrian analysis. We intentionally do not concern the

[5] *In support of our thesis we will cite the architect of the Argentine currency board* ***D. Cavallo****: "... Macroeconomic stabilization was just the starting point. The real core of the program was its insistence on* ***microeconomic reform****. By that, we mean a series of structural changes geared at reducing or eliminating distortions in goods and factor markets. The extent and depth of* ***microeconomic reform*** *in Argentina between 1991 and 1996 was unprecedented, maybe greater than in any other country during the similar time span."*

[6] *On the importance of this discussion, see the general studies on this issue:* ***Ahmed, S.*** *(1993);* ***Backus, D., P. Kehoe*** *(1992);* ***Bergman, B., M. Bordo, L. Jonung*** *(1998);* ***Blanchard, O.*** *(1990);* ***Christiano, L., M. Eichenbaum, Ch. Evans*** *(1998);* ***Fuhrer, J., S. Schuh*** *(1998);* ***Leeper, E., Ch. Sims, T. Zha*** *(1996);* ***Boschen, J. F, L. O. Mills*** *(1995);* ***Beandry, P., M. Saito*** *(1998);* ***Mc Candless, G., W. Weber*** *(1995);* ***Bernanke, B., I. Mihov*** *(1995, 1998);* ***Thoma, M.*** *(1994).*

Keynesian approach pleading for discretionary monetary policy because in our opinion the inconsistency of this approach has been proved both from a theoretical and practical point of view[7].

According to the ***monetarist*** view, money supply dynamics is the major source of real income volatility[8]. The well-known analysis of the monetary history of the United States by *Friedman* and *Schwartz* (1963) was a pioneering work in this respect. By studying carefully the behavior of time series of money supply and income, they found that money supply changes precede income changes. Hence they drew the theoretical conclusion that money causes real sector movement. Subsequently their methodology was applied to almost all developed countries. For this theory to be capable of sending messages to monetary policy, some auxiliary theoretical hypotheses had to be adopted. The first states that money demand is a function of permanent income (*Friedman – permanent income hypothesis*). The second identifies monetary policy neutrality in the long run as well as growing influence of income volatility under discretionary monetary policy (*Friedman, 1969*). The message to monetary policy is clear: it should be governed by a definite rule which in Friedman's theory boils down to permanent money supply growth.

The second step in the attack against discretionary monetary policy is the *Lucas* approach and the theory of rational expectations. Monetary policy is *super neutral*, i.e. it is neutral even in the short run. Here impulses also come from money to the real economy but the shocks in money supply are divided into anticipated and unanticipated. The ***Lucas*** critique *(1976)* may be used as an auxiliary theorem. It states that economic agents are rational (take into account the whole set of information, not only the dynamics of the observed variable) and therefore monetary policy is inefficient because the parameters of the model incorporate economic expectations and are not permanent. Shocks come only from the unanticipated component of money supply which

[7] *Of course, the search for nominal and real rigidities by the new Keynesians continues (**Blanchard, O.**, 1990). Over the recent years efforts have been made to synthesize the different 'neo' trends (**Goodfriend, M., R. King,** 1997). These efforts explained by the desire to build a theory which all economists would expound are not only irrelevant but also methodologically wrong. They do build on the logic of social science development and reveal utter ignorance of economics methodology. The specificity of social sciences is that the impulse for their development comes from diversity and inner competition.*

[8] *For detailed presentation of the monetarist theory on money supply and real income causality, see: **Friedman, M., A. Schwartz** (1963); **Friedman, M.** (1969); **Tobin, J.** (1970); **Lucas, R.** (1994); **Romer, Ch., D. Romer** (1994); **Hoover, K., S. Perez** (1994); **Smith, B.** (1994); **Miron, J.** (1994).*

surprises agents and they cannot distinguish general price level movement from relative prices movement[9]. The *Sargent – Wallace* model is based on the *Lucas* approach, stating that monetary policy does not have a systematic effect on the real economy (1975).

The third wave of attacks is related to the ***real business cycle*** theory[10] which makes monetary policy entirely senseless. In this case impulses come from the real economy to money, the latter following closely real sector dynamics. Money enters the production function. It follows real sector development (*reverse causation*) and adapts to different kinds of shocks, triggered mainly from supply. In these models money supply is endogenous and monetary policy tools are inefficient and have no systematic effect on economic agents.

Within the real business cycle theory the major transmission channels of real shock influence on money are two: through transaction services of banks and financial intermediaries and through the expectations of economic agents. In the first case the dynamics of deposits (called *secondary money*) reflects real sector development and the optimum behavior of economic agents. Deposits and financial services enter the production function. Impulses from the real economy pass through secondary money and reach the monetary base (*primary money*). In the second case economic agents' expectations about income and production dynamics cause changes in demand for money and credit and hence in the money supply.

The fourth, and probably the most severe criticism of monetary policy and monetary variables manipulation was that launched by the ***Austrian analysis*** (*Menger, K., Mises, L., Hayek, F., Selgin, G., Salin, P.*)[11]. Although chronologically this approach originated first, at the beginning of the century, it took almost a century to rediscover it. In practice, the first three analysis schemes may be viewed as consistent denunciation of the traditional Keynesian scheme of money management and as restoration of early century monetary analysis. The Austrian analysis is an orderly constructed system which relates money to individual choice, consumption, savings and investment. Any manipulation

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[9] *For detailed presentation, see:* ***Barro, R.*** *(1977, 1978, 1981);* ***Lucas, R. E.*** *(1972, 1975, 1976, 1996);* ***Lucas, R., T. Sargent*** *(1979);* ***Sargent, T., N. Wallace*** *(1975).*

[10] *For detailed presentation of the models on the real business cycle, see:* ***Kydland, F., Ed. Prescott*** *(1982, 1990);* ***Long, J., Ch. Plosser*** *(1983);* ***King, R., Ch. Plosser*** *(1984, 1994);* ***Prescott, Ed.*** *(1986, 1998, 1999);* ***Plosser, Ch.*** *(1989);* ***McCallum, B.*** *(1990);* ***King, R., S. Rebelo*** *(1998);* ***Farmer, R.*** *(1997).*

[11] ***Menger, K.*** *(1892),* ***Mises, L.*** *(1912, 1928),* ***Hayek, F.*** *(1931, 1933),* ***White, L.*** *(1984, 1995),* ***Selgin, G.*** *(1988),* ***Salin, P.*** *(1990).*

of money supply destroys the fundamental principles of economic choice. Money is not neutral and its dynamics is decisive for real sector trajectory. It influences real economy through the output structure and relative prices, being the chief information signal.

Money *nonneutrality* exists both in the short and in the long run. Hayek, for example, considers that the quantity theory is not only wrong but it does not state anything about money influence. First, according to him (Mises's interpretation is similar), a double increase in money supply does not result in a double increase in the general level of prices even in the long run because money growth changes the structure of relative prices and all behavioral variables of individuals, i.e. the very structure of cash stock is changed. And second, the quantity theory has no practical value as it does not show how the new money supply distorts the structure of relative prices. Hayek singles out two key proportions: the ratio between prices of capital goods and consumer goods and the ratio between the nominal and the natural interest rate. The central bank and monetary policy not only cause inflation or deflation (both are equally harmful); the point is they destroy the system of relative prices by injecting or withdrawing liquidity. The Austrian analysis states that the most appropriate system leading to optimization of the quantity of money is the system of private, competitive money. Only in this case money supply fluctuations arising from money demand and supply have a disruptive effect on the real economy.

Under ***currency board*** the central bank has no monetary policy tools at its disposal and therefore it is unable to 'shock' money supply[12]. The latter is a result of developments in the balance of payments (change in the monetary base) and real economy behavior (change in the multiplier). Thus passive money supply additionally enhances the importance of studying the direction of monetary – real impulses because it is crucial to know whether money adjusts rapidly to changes in the real economy. If it does, then *any criticism of the static character of the currency board is irrelevant*.

Empirical and Statistical Methodology

On the Variables Used as Approximators of Real Income

In examining the relationship between real and monetary variables as approximators of real economy development we use monthly sales

[12] *We will not consider here the possibilities of government deposit affecting reserve money. This is comprehensively examined in:* ***Nenovsky, N., K. Hristov, 1998***.

income in industry and net sales income in trade. [13] This is prompted by the lack of monthly data on gross domestic product and industrial output index which may serve as approximators of GDP. The analyzed period is short and we cannot use quarterly data on GDP dynamics which is available since 1994.[14] Availability of data on the above-mentioned variables which we use as approximators of real activity in the economy determines the period of our study (January 1995 – March 1999).

On the Definition of Money

In terms of money supply indicators, in this paper we use the conventional division of monetary aggregates (reserve money, quasi-money, broad money) well-known in monetary statistics, as well as the division of *money into primary and secondary*, introduced by *Rolnick and Weber*. Such division of money is logically consistent and the change in the monetary regime in Bulgaria with the introduction of the currency board does not make it impossible to examine relationships between real and nominal variables because of data inconsistency. Dividing money depending on whether it is determined by the real economy's behavior or the government's policy eliminate the shortcomings of traditional monetary aggregates.

For the purposes of the analysis we introduce the following division of the components of money supply over the review period: *determined by monetary authorities and determined by real economy development (by the behavior of households and firms*[15]). Following the *Rolnick, We-*

[13] *We are aware of the statistical incompleteness of these indicators. This implies to statistics characteristics in general. Monetary statistics also has its shortcomings. The real sector dynamics can be measured by survey indicators such as business climate, assessment of production activity, instability of the economic environment, plans for investment,* et al. *Such series of data exist and will be used in a forthcoming sequel of this article.*

[14] ***Chow*** *and* ***Lin*** *(1971) derive a procedure through which quarterly data may be distributed over the months of the respective quarter so as to generate monthly data on the analyzed variable. Data available in Bulgaria does not allow us to apply this paradigm to generate monthly GDP data on the basis of available official data on a quarterly basis. For a short description of this paradigm, see also* ***Robertson, J., E. Tallman*** *(1999).*

[15] *The importance of dividing money into primary and secondary may be seen in the theories describing fiduciary and commodity money.* ***Tobin, J.*** *(1963) proved the importance of fiduciary money considering commercial banks as financial intermediaries creating circulation funds (bank deposits − secondary money), which are fundamentally different from those created by the government (primary money).* ***Wallace, N.*** *(1977) formalizes J. Tobin's approach using the so-called overlapping generation models. Other conditions being equal, changes in growth rates of primary money lead directly to changes in inflation rates. This is not true for the commercial banks (secondary money). Banks change their liabilities when there is a change in technology and propensity to saving and investment in the economy. As a result, changes in bank li-*

ber approach (1995, 1997) we define the first as *primary money* and the second as *secondary money*.[16]

The ***first type*** includes reserve money over the period of discretionary monetary policy (1991 – July 1997) and minimum required reserves of commercial banks after the introduction of the currency board (without excess reserves). The government deposit in the balance sheet of the Issue Department, as shown in *Nenovsky, N., K. Hristov* (1998), affects indirectly primary money and may be viewed as a real shock affecting it. For the real economy the behavior of primary money is exogenously set and is determined by the preferences of those implementing economic policy.

The ***second type*** arises spontaneously from the needs of households, companies and financial intermediaries. In terms of volume this component encompasses the better half of money supply: banknotes (when unconditionally exchanged for reserve currency or a good in commodity money), all types of deposits, and part of commercial banks' reserves (excess reserves). In this study we have included in secondary money all types of deposits over the period preceding the introduction of the currency board. After June 1997 secondary money consists of banking system deposits and banknotes and coins in circulation (as these are unconditionally exchanged for the reserve currency).[17]

At a constant level of minimum required reserves primary money is a function of the indirect influence of the government deposit in the balance sheet of the Issue Department and secondary money. Then the only channels for discretion in money supply management are the central bank's policy in respect of minimum reserves and the government's policy in respect of revenue and expenditure (management of the government's deposit with the BNB).

On the Statistical Techniques

In the analysis of the relationship between real and monetary variables we use a wide range of statistical and econometric techniques following the chronology of development of the theories expounding the

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abilities may not be related to changes in inflation. When these are related, the nature of the relationship (positive or negative) will be determined by the nature of changes in fundamentals. In other words, impulses are triggered from the real economy to secondary money.

[16] *For detailed presentation of the division into primary and secondary money, see:* ***Rolnick, A., W. Weber*** *(1995).* ***Rolnick, A., W. Weber*** *(1997). Such a division is a kind of accommodation of inside and outside money made initially by* ***Gurley, Shaw*** *(1960).*

[17] *Banknotes and coins under a currency board arrangement are exchangeable for other fiduciary money (the reserve currency) which in practice is primary money for the country whose currency has been chosen as reserve.*

relationship between monetary and real variables. First we examine the dynamics of the two types of variables over the periods of the two monetary regimes. Examination of their variances provides us with the answer of their relative stability over the two periods. Meanwhile we analyze the correlation of monetary series (at levels and growth rates) with the variables approximating real economic activity (monthly sales incomes in industry and net sales income in trade).

After reviewing the volatility and correlation between real and monetary variables in the spirit of the monetarist approach, we seek to answer the question of whether changes in monetary aggregates precede changes in real variables. In this study we analyze the relationship between cyclical components of the series describing the monetary and the real sectors of the economy. To this end, we separate the series into cyclical and trend components using *Hodrick – Prescott* filter (*Hodrick – Prescott, 1996*)[18]. We examine the cyclical components derived to establish whether changes in the cyclical part of money supply precede changes in the cyclical part of the variables describing the real sector, i.e. we seek to answer the question whether money supply is pro-cyclical or anti-cyclical.

In checking the theories of rational expectations and the real business cycle we apply the widely used in recent years econometric approach of *vector autoregression (VAR)*. This approach, introduced in econometric analysis by *Sims* (1972, 1980, 1992), does not divide variables into endogenous and exogenous as in structural econometrics[19].

In applying the theory of rational expectations following *Barro's* approach (1976, 1977, 1978) we divide changes in money supply into anticipated and unanticipated and check through the *impulse response function* how these components would affect the variables used by us as

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[18] *We leave aside the imperfections of this filter. In the analysis we take into account that series also contain a seasonal component and that is why we clear them from its influence. Decomposition of variables is detailed in the third section of this paper.*

[19] *With VAR models every variable is presented as a linear function of its past values, the past values of the other variables and components with nonrandom behavior as constant and time trend. As results obtained from VAR models are very sensitive in terms of model specification (levels or first differences; presence or absence of constant and trend), the characteristics of series should be examined carefully. Therefore series should be examined to determine whether they are* ***trend stationary*** *or* ***difference stationary****. We use ADF (or PP)* ***unit root test****. Before constructing the VAR models we test variables for cointegration (****Johansen Cointegration Test****). For detail description of VAR models, see:* ***Sims, Ch.*** *(1980, 1986, 1992, 1998);* ***Todd, T.*** *(1990);* ***Rudenbusch, G.*** *(1998);* ***Hamilton, J.*** *(1994);* ***Cochrane, J.*** *(1998);* ***Robertson, J., E. Tallman*** *(1999);* ***Evans, Ch., K. Kuttner*** *(1998);* ***Abadir, K., K. Hadri, E. Tzavalis*** *(1999);* ***Bagliano, F., C. Favero*** *(1997);* ***Favero, C.*** *(1998);* ***Bernanke, B., I. Mihov*** *(1995);* ***Faust, J.*** *(1998) It is also important to trace the variables in the vector in terms of exogenous order.*

real sector approximators. In contrast to *Barro*, we do not use a structural model for estimation of the anticipated component of money supply[20]. The assumption on which we build upon in using the *time series* method for the estimation of the anticipated component of monetary aggregates is that the estimate is a function only of the realized values of that variable in previous periods. At the same time we reckon that the already realized levels of money supply contain in themselves the *full information* on macroeconomic variables. Building on this logic, through the ARIMA model [21] we generate the anticipated component of individual monetary aggregates once we derive the unanticipated component (by subtraction) from real data. The next step involves, through the *impulse response function*, assessment of the influence of the anticipated and unanticipated components of monetary aggregates on variables, used as approximators of real economic activity.

While the above theories assumed that impulses come from monetary variables to real ones, the real business theory postulates *reverse causation*. Here we apply the *Granger causality test* within the VAR model and variance decomposition to determine to what extent the cyclical component of real variables causes cyclical recurrence in monetary aggregates and vice versa. After we define the direction of impulses through the *Granger causality* and *variance decomposition* we use the *impulse response function* to estimate the size of the effect on monetary variables caused by changes in real variables and vice versa.

III. The Models

Variables and Statistical Data

The present study uses monthly data for the period January 1995 – March 1999. Data is provided from the BNB monetary statistics on reserve money, quasi-money and broad money. The variables which we use as approximators of the real economy development are: the retail sales index at constant prices (1995 = 100) and the industrial sales index against average monthly sales in 1997 as basis. Calculations of primary and secondary money are made by the authors based on monthly data of BNB monetary survey (for description of the components of primary and secondary money and data on these series, see Appendix 2).

[20] *See* ***Barro*** *(1976, 1977, 1978).*

[21] *Detailed description of the unit root tests is presented in the other section of this paper where models and results obtained are described.*

The analysis of this period points to the fact that two different monetary regimes existed in Bulgaria during the period under review: discretionary monetary policy and currency board rule-bound policy. From the point of view of *Lucas* critique (1976) the change in monetary regimes requires analysis of data and relationships in different subperiods as a result of the so-called *regime shifts* which makes the assumption of constant coefficients impossible.[22] Following this logic we examine the relationships between real and monetary variables in the two subperiods: January 1995 – June 1997 under discretionary monetary policy and July 1997 – March 1999 under the currency board.[23] The following variables are used:

PM – primary money
SM – secondary money
M0 – reserve money
M1 – narrow monetary aggregate
M3 – broad money (money supply)
QM – quasi-money
E – monthly average BGL/USD exchange rate
P – price level (December 1994 = 100)
IR – base interest rate
IIR – interbank interest rate
IS – industrial sales index (ISI) based on average monthly sales in 1997
RS – retail sales index (RSI) at constant prices (1995 = 100).

In constructing the models the above variables (without interest rates) are presented in logarithm (the small capitals of the above variables in the text mean the logarithm of that series).

Series Decomposition and Unit Root Test

We assume the analyzed series as having cyclical component, seasonal component and trend. Before decomposing the series into trend and cyclical component we adjust the seasonally variable series. Sea-

[22] *For more detail, see* ***Lucas, R. E.*** *(1976).*

[23] *On the other hand, the insufficient number of observations may lead to somewhat biased results. In theoretical literature there are studies which prove that models which do not incorporate changes in parameters, despite the regime shift, produce better results than models which incorporate changes in parameters due to regime shifts. For further detail, see:* ***Sims, Ch.*** *(1998).*

sonal adjustment removes the seasonal factor and makes it possible to decompose series into cyclical component and trend. After the seasonal adjustment the series look like this:

$$y_t = y_t^g + y_t^c \qquad t = 1, \ldots, T,$$

where

y_t is the series;

y_t^g is the series trend;

y_t^c is the cyclical component of the series.

The purpose of series decomposition is to separate the cyclical component of reviewed series and to examine the relationships and directions of influence between the cyclical components of monetary and real variables.[24] In this study we use the *Hodrick – Prescott filter*[25] to derive the cyclical component of the analyzed variables (see Appendix 2 for the graphical presentation of decomposed series). We subtract the trend generated through the HP filter from initial values to obtain the cyclical component of the respective series. The series obtained are stationary provided that initial series are trend stationary.

Being aware of the importance of whether initial series are trend stationary or difference stationary we check the variables for stationarity (unit root test) before detrending them.[26] If *trend stationary,* shocks have a temporary effect and a return to the trend occurs, while under *difference stationary* series shocks have a permanent effect. When initial series comprise a unit root, cyclical components are also nonstationary. Therefore, the latter are examined for stationary at first differences *(difference stationary* (DS). If initial series do not contain a unit root, cyclical components obtained after the elimination of the trend are stationary and we use these variable levels.

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[24] *In practice various techniques for isolation of a stationary cyclical component are used. These approaches are:* ***two-sided moving average****; first differences; clearing from linear or square time trend;* ***Kalman filter****;* ***BN decomposition****,* ***HP filter****;* ***BK filter****,* ***Beveridge, S., Ch. Nelson*** *(1981). Comparison of the advantages and disadvantages of the above-mentioned approaches and development of a new method for decomposition of nonstationary series into trend and cyclical component are presented in* ***Baxter, M., M. King*** *(1995).*

[25] *See* ***Hodrick, R., Ed. Prescott*** *(1977). For assessment of approaches to detrending economic series and analysis of HP filter see* ***King, R., S. Rebelo*** *(1993);* ***Hamilton*** *(1994);* ***Cogley, Nason*** *(1995);* ***Guay, A. P. St-Amant*** *(1996);* ***Ehlgen, J.*** *(1998).*

[26] *See* ***Nelson, Ch., C. Plosser*** *(1982);* ***Caporale, G., C. Hassapis, N. Pittis*** *(1998);* ***Hamilton, J.*** *(1994);* ***McCallum, B.*** *(1993);* ***Murrey, Ch., Ch. Nelson*** *(1998);* ***Phillips, P., Z. Xiao*** *(1998);* ***Rudebusch, G.*** *(1992);* ***Gil-Alana, L., P. Robinson*** *(1997).*

Critical values (McKinnon Critical Value – PP) *without constant and trend are as follows: for 1% (-2.66), 5% (-1.95) and 10% (-1.62).*[27]

Table 1

Variables	*PP* test			Integration and lags	
monthly data	levels	*1Δ*	*2Δ*	*I*	lags
PM	*0.68*	*-7.15*		*1*	*3*
SM	*1.48*	*-3.68*		*1*	*3*
M0	*1.17*	*-2.37*		*1*	*3*
M1	*3.14*			*0*	*3*
MQ	*-1.51*	*-5.43*		*1*	*3*
M3	*-0.85*	*-4.35*		*1*	*3*
E	*-0.98*	*-4.63*		*1*	*3*
P	*-1.11*	*-4.29*		*1*	*3*
IS	*0.11*	*-5.19*		*1*	*3*
RS	*-0.64*	*-6.02*		*1*	*3*

Results of the tests suggest that all reviewed series are **I(1)** by the first series without constant and trend with the exception of the monetary aggregate **M1** which is **I(0)** in all test combinations.

Variability of Real and Monetary Variables and Correlation between Them

Table 2

Variability of Real and Monetary Variables

	Standard Deviation		
	Whole Period	Before CB	After CB
RS	0.19	0.17	0.12
IS	-	-	0.10
Nominal money stock			
Primary money	*0.63*	*0.68*	*0.18*
Secondary money	*1.15*	*0.70*	*0.09*
Reserve money			
Nominal	1.34	0.73	0.14
Real	0.39	0.50	0.10
M1			
Nominal	1.45	0.74	0.21
Real	0.39	0.49	0.17

[27] *The optimum number of lags is determined through the minimization of the AIC criterion. Unit root tests with trend and constant display similar results.*

Quasi-money			
Nominal	0.97	0.69	0.07
Real	0.61	0.51	0.02
Broad money (M3)			
Nominal	1.10	0.71	0.10
Real	0.49	0.48	0.05
Interest rate			
Base interest rate	1.64	1.02	0.08
Interbank interest rate	2.10	0.98	0.24
Price level			
Consumer price index	1.57	1.18	0.11
Exchange rate	1.48	1.22	0.10

The review of the dynamics of major monetary variables in real and nominal terms in the periods prior to and after the introduction of a currency board indicates absolutely divergent behavior, reflecting the different philosophy of these two monetary systems. Variability comparison between the two periods of monetary variables rejects the traditional criticism of the currency board, associated with high variability of monetary aggregates and the interest rate under this monetary system (*Roubini, N., 1998*). This criticism is based on the logic that capital inflows and outflows reflect directly on the dynamics of reserve money, money supply and interest rates under the currency board arrangement and existing capital market globalization. Therefore, economists criticizing the currency board on the basis of particular theoretical assumptions think that a discretionary monetary policy is able to neutralize these shocks and to stabilize money supply and the interest rate. Data from Table 2 reveals that these accusations against the currency board are unjustified, and the discretionary monetary policy pursued between 1995 and 1997 had a destabilizing rather than a stabilizing effect (resulting in high variability of monetary aggregates, inflation and interest rates). Undoubtedly, the low variability of monetary aggregates and the interest rate may be explained by the lack of complete liberalization of the capital account and significant capital inflows in Bulgaria. Low capital inflows atypical of the countries under a currency board pose another question which partly relates to the subject of this paper: is a currency board arrangement enough credible for Bulgaria? Do countries like Bulgaria need more radical arrangement (dollarization)?[28]

[28] *The countries under a currency board arrangement are traditionally characterized by significant capital inflows.* ***Kaminsky, G., L. Leiderman (1998)*** *consider high real interest rates in the countries under a currency board as a signal of insufficient confidence in these countries to maintain this monetary system. Real interest rates in Bulgaria do not indicate such dynamics*

In addition, the low variability of monetary aggregates during the period of currency board operation may be explained by the role of the government deposit in the Issue Department balance sheet. In our article of 1998 *(Nenovsky, N., K. Hristov, 1998)* we focused on the opportunity to pursue a quasi monetary policy through government deposit management. On the other hand, due to government deposit inclusion in the Issue Department balance sheet, shocks caused by foreign debt payments may be absorbed by this deposit which helps avoid their direct effect on reserve money and money supply. That is the government deposit has a stabilizing impact by smoothing fluctuations in reserve money, money supply and interest rates.

Variability of the retail sales indices by which the real economy is approximated are relatively similar in both periods, while the period after the introduction of a currency board indicates lower volatility than in the previous period. Stabilization of price levels and interest rates (evidenced by lower volatility of these variables following the introduction of a currency board) reflect the lower variability of the retail sales index after the introduction of a currency board.

Table 3

Correlation between Monetary Variables and Retail Sales Index

	Whole Period	**Before CB**	**After CB**
RS	1.00	1.00	1.00
IS	0.81	0.98	0.75
Nominal money stock			
Primary money	*-0.17*	*-0.85*	*-0.15*
Secondary money	*0.01*	*-0.99*	*0.42*
Reserve money			
Nominal	-0.04	-0.74	0.10
Real	0.50	0.89	0.30
M1			
Nominal	-0.23	-0.86	-0.07
Real	0.56	0.90	0.42
Quasi-money			
Nominal	-0.05	-0.99	0.47
Real	0.23	0.73	-0.15

but very low capital inflows in the country pose the question about the credibility of the currency board in Bulgaria.

Broad money (M3)			
Nominal	-0.03	-0.99	0.47
Real	0.39	0.75	0.34
Interest rate			
Base interest rate	-0.10	-0.27	0.07
Interbank interest rate	-0.13	-0.41	-0.03
Price level			
Consumer price index	-0.30	-0.90	0.03
Exchange rate	0.004	-0.97	0.48

Table 4

Correlation between Monetary Variables and Industrial Sales Index

	Whole Period	Before CB	After CB
RS	-	-	0.75
IS	-	-	1.00
Nominal money stock			
Primary money	-	-	*-0.30*
Secondary money	-	-	*0.34*
Reserve money			
Nominal	-	-	0.21
Real	-	-	0.49
M1			
Nominal	-	-	0.04
Real	-	-	0.57
Quasi money			
Nominal	-	-	0.19
Real	-	-	-0.10
Broad money (M3)			
Nominal	-	-	0.28
Real	-	-	0.46
Interest rate			
Base interest rate	-	-	-0.09
Interbank interest rate	-	-	-0.10
Price level			
Consumer price index	-	-	-0.17
Exchange rate	-	-	0.24

Data from Tables 3 and 4 indicating the correlation between monetary variables and indices approximating the real economy reject the view that the real economy may be influenced through money supply management. Prior to the introduction of the currency board both indi-

ces were negative, correlated with all monetary aggregates, the exchange rate and inflation. This rejects the broadly acknowledged view that monetary policy can stimulate real sector growth. The negative relationship between retail sales index and industrial producer price index, and inflation confirms the view that price stability achieved under a currency board arrangement is the major prerequisite for a sustainable real sector growth[29].

Tables 3 and 4 confirm the hypothesis of a stronger relationship between secondary money and the real economy. Following the introduction of a currency board the tie of primary money to the **RS** and **IS** significantly weakened. The correlation between changes in monetary aggregates and these in real variables is negative. This suggests that currency management has an adverse (as it limits) rather than stabilizing and stimulating effect on the real economy. Lower correlation of primary money after the introduction of a currency board may be considered as a positive sign: the 'adverse' effect on the dynamics of both indicators of the real economy diminishes. These correlation characteristics are similar in secondary money: the 'repressive' effect of primary money on the real economy cannot be completely overcome although it is minimized.

Similar tendency occurred in the price impact on the real economy. Price movements may have both a stimulating and repressive effect on the real sector. Following the introduction of a currency board the repressive effect weakened dramatically which is evidenced by the two tables. After the peg of the lev to the Deutschemark (euro) USD/BGL exchange rate movements indicate a positive correlation with the real economy.

Monetarist Interpretation of Impulse Direction in the Economy

As we have already mentioned in the second section of this article, the monetarist view on the relationship between real and monetary variables may be summarized in the following two statements: first, changes in the volume of money are the major factor determining the business cycle (they precede, cause and are positively related to changes in the real income). Second, changes in the volume of money

[29] *Actually, this thesis was recognized in the economic theory long ago and any suspicion in Bulgaria signals poor knowledge of the conception on the role of the central bank and monetary policy in modern economic theory. For more detail, see:* ***Taylor, J.*** *(1997),* ***Fischer, S.*** *(1997),* ***Christiano, L., M. Eichenbaum, Ch. Evans*** *(1998).*

precede and are the major reason behind the general price level growth.[30]

Only the first statement is subject to study in this paper. It describes the relationship *between money supply dynamics and 'real' activity*. The methodology of the following two tables is similar to that of *Kydland, F., E. Prescott (1990)*. However, they study the correlation only between lags in cyclical components within the framework of the real business cycle theory.

The following three tables present the correlation between the retail sales index and major monetary variables before and after the introduction of a currency board, and the correlation between the industrial sales index and major monetary variables after the introduction of a currency board (no data is available prior to the introduction of a currency board). Correlation dynamics is analyzed by *6 leads* and *6 lags*. When the correlation is (0), the series are not correlated, when it is close to (+1) they are positively correlated, and when the correlation is close to (-1) they are negatively correlated. **X(t)** is the current correlation (synchronous correlation).

The first two tables show that the correlation between the retail sales index and monetary variables prior to the introduction of a currency board is significantly greater and negative (the increase in monetary variables leads to a sales decline), while after the introduction of a currency board it is lower and positive (the increase in monetary variables leads to a growth in the index). The assumption that the correlation of the retail sales index with secondary money is much stronger than with primary money under both monetary systems is confirmed. It should be highlighted that secondary money is endogenous and it follows the real economy dynamics. The current correlation **[X(t)]** of the retail sales index with primary money is (-0.85) prior to the introduction of a currency board and (+0.02) after its introduction, and the correlation with secondary money is (-0.99) and (+0.46), and the correlation with prices (-0.90) and (+0.36) respectively.

The current correlation with the industrial sales index after the introduction of a currency board is as follows: with primary money (-0.24) and secondary money (+0.36), that is the increase in primary money results in a decline in the sales index, while secondary money is synchronous with the industrial sales index.

[30] *James Tobin rejects that* post hoc ergo propter hoc.

Table 5

Correlation between Monetary Variables and Retail Sales Index (January 1995 – June 1997)

	Correlation												
Variable X	**X (t-6)**	**X (t-5)**	**X (t-4)**	**X (t-3)**	**X (t-2)**	**X (t-1)**	**X (t)**	**X (t+1)**	**X (t+2)**	**X (t+3)**	**X (t+4)**	**X (t+5)**	**X (t+6)**
Primary money	0.40	0.55	0.31	0.29	0.28	0.11	-0.85	-0.07	-0.08	-0.32	-0.49	0.95	-0.19
Secondary money	-0.04	0.20	0.33	0.21	0.39	-0.36	-0.99	0.37	0.25	0.40	0.26	-0.89	-0.31
Reserve money	0.01	0.24	0.41	0.23	0.83	-0.43	-0.74	-0.15	-0.35	0.54	-0.36	-0.90	-0.22
M1	-0.05	0.41	0.36	-0.03	0.48	0.54	-0.86	0.07	-0.38	0.18	0.18	-0.82	-0.79
Quasi-money	0.04	0.25	0.40	0.24	0.24	-0.32	-0.99	0.56	0.68	0.55	-0.49	-0.53	-0.04
Broad money (M3)	0.01	0.24	0.37	0.21	0.33	-0.32	-0.99	0.60	0.48	0.56	-0.11	-0.70	-0.29
Exchange rate	0.22	0.12	0.59	0.07	0.19	-0.47	-0.97	0.37	0.24	0.95	-0.57	-0.62	-0.04
Consumer price index	-0.04	0.05	-0.02	0.26	0.31	0.25	-0.90	-0.75	-0.11	-0.46	0.39	0.67	-0.48

Table 6

Correlation between Monetary Variables and Retail Sales Index (July 1997 – March 1999)

	Correlation												
Variable X	**X (t-6)**	**X (t-5)**	**X (t-4)**	**X (t-3)**	**X (t-2)**	**X (t-1)**	**X (t)**	**X (t+1)**	**X (t+2)**	**X (t+3)**	**X (t+4)**	**X (t+5)**	**X (t+6)**
Primary money	0.90	-0.03	-0.01	-0.12	-0.09	-0.24	0.02	0.21	0.19	0.15	0.41	-0.15	-0.60
Secondary money	-0.11	-0.06	-0.13	-0.09	0.009	0.18	0.46	0.48	-0.32	-0.01	-0.03	-0.16	0.28
Reserve money	-0.02	0.08	0.11	0.03	0.03	-0.02	0.26	0.24	-0.06	0.28	0.03	0.19	0.25
M1	-0.11	0.02	0.07	0.08	0.03	0.01	0.13	0.32	-0.09	0.21	0.23	0.03	0.46
Quasi-money	0.12	-0.06	-0.22	-0.26	0.008	0.24	0.53	0.64	-0.24	-0.09	-0.006	-0.17	0.04
Broad money (M3)	0.07	-0.08	-0.17	-0.18	-0.03	0.15	0.56	0.55	-0.29	-0.001	0.007	-0.21	0.12
Exchange rate	0.11	-0.08	-0.24	-0.21	0.004	0.18	0.57	0.46	-0.43	-0.04	0.09	-0.23	0.05
Consumer price index	0.28	0.008	-0.09	-0.25	-0.21	-0.04	0.36	0.87	-0.03	-0.13	-0.07	-0.15	-0.04

Table 7

Correlation between Monetary Variables and Industrial Sales Index (July 1997 – March 1999)

	Correlation												
Variable X	**X (t-6)**	**X (t-5)**	**X (t-4)**	**X (t-3)**	**X (t-2)**	**X (t-1)**	**X (t)**	**X (t+1)**	**X (t+2)**	**X (t+3)**	**X (t+4)**	**X (t+5)**	**X (t+6)**
Primary money	0.63	-0.36	0.27	-0.07	-0.27	0.11	-0.24	0.41	0.007	-0.03	0.34	-0.11	-0.41
Secondary money	-0.11	0.24	-0.28	0.14	0.26	-0.09	0.36	0.24	-0.40	0.32	-0.13	-0.09	0.54
Reserve money	0.17	0.19	-0.03	0.29	0.10	-0.03	0.35	0.09	-0.18	0.44	-0.27	0.40	0.15
M1	-0.14	0.31	-0.05	0.20	0.22	-0.04	0.24	0.26	-0.26	0.41	0.08	-0.13	0.63
Quasi-money	0.01	0.15	-0.24	0.05	0.20	0.06	0.13	0.48	-0.41	0.18	0.007	-0.19	0.40
Broad money (M3)	0.001	0.15	-0.24	0.11	0.20	-0.01	0.29	0.37	-0.41	0.30	-0.08	-0.15	0.48
Exchange rate	0.10	0.07	-0.34	0.20	0.12	-0.06	0.22	0.33	-0.45	0.22	-0.02	-0.21	0.41
Consumer price index	-0.008	0.19	-0.11	-0.15	0.14	0.12	-0.05	0.60	-0.39	0.17	0.03	-0.27	0.35

A more significant positive (leading) correlation with past periods of primary money (prior to the introduction of a currency board) suggests that shocks on the exogenous part of money supply contributed to the real sector drop (Table 5).

Secondary money caused less fluctuations in retail sales. After the introduction of a currency board (Table 6) the adverse effect of secondary money has been overcome but a strong correlation of retail sales index with the sixth lag of primary money occurred (+0.90). This could be interpreted as relatively greater significance of a shock on primary money after the introduction of a currency board due to relatively calm economic agents under this monetary regime. The first following lag of secondary money is positively correlated with the current value of the retail sales index (+0.48), that is impulses come from the real economy to secondary money.

It should be noted that above tests (based on the correlation study) do not indicate causation but only functional dependence which is the major disadvantage of these tests.

The Theory of Rational Expectations and the Relationship between Real and Monetary Variables

Testing the relationship between monetary and real variables within the theory of rational expectations, we use the Barro's approach (1978) by dividing money supply growth into anticipated and unanticipated. The relationship between obtained money supply components and real variables is studied, seeking to answer whether the anticipated money supply component is neutral in respect of the real economy. The anticipated money supply component which is not subject to direct study[31] is assessed through the ARIMA model. Projected values obtained are considered as anticipated money supply growth rates and the difference between realized rates and anticipated rates appears as the unanticipated component of money supply growth.

Tested major VAR models are summarized in the table below. All variables are in logarithms and first differences (see stationary tests).[32]

[31] *The test of this hypothesis is impeded by the fact that economic agents' expectations could not be directly reviewed, i.e. no data on the anticipated money supply component could be obtained. The assessment approach applied to anticipated and unanticipated money supply components is presented in Appendix 3.*

[32] *VAR models and results from the tests are available and may be obtained at request (E-Views 3.1 format).*

Model	Variables	Lags[33]
VAR (1)	rs, pmf, smf	4
VAR (2)	is, pmf, smf	4
VAR (3)	rs, m0f, qmf, m3f	4
VAR (4)	is, m0f, qmf, m3f	4
VAR (5)	rs, upm, usm	4
VAR (6)	is, upm, usm	4
VAR (7)	rs, um0, uqm, um3	4
VAR (8)	is, um0, uqm, um3	4

Tables 8, 9 and 10 display the results of the relationship (studied through VAR models) between the anticipated component of monetary aggregates composed by us (primary and secondary money) and indices of retail sales and industrial sales in the periods prior to and after the introduction of a currency board. The neutrality of anticipated components of primary and secondary money on both indices approximating the real economy, postulated in the theory of rational expectations, is confirmed to a great extent by the impulse response and variance decomposition. Prior to the introduction of a currency board shocks caused by monetary variables had a significant and constant effect on retail sales index which rejects the hypothesis of neutrality of primary and secondary money. Since the introduction of a currency board the shocks on anticipated components of monetary variables have an insignificant and quickly subsiding effect, with the variance of indices of retail sales and industrial sales accounting for a small percentage (see variance decomposition). The only exception of this are impulses resulting from the anticipated component of primary money to the industrial sales index which has a cyclical behavior and gradually subsided. The neutrality of these shocks on the anticipated component of primary money is also rejected by the fact that they account for approximately 40% of the variance of industrial sales. Actually, this result is expected under a currency board arrangement since the dynamics of primary money is impacted to a great extent by the balance of payments dynamics.[34]

[33] *The optimum number of lags is determined by minimizing the AIC criterion. For discussion on the optimum structure of lags under VAR models see:* ***Kamas*** *(1995).*

[34] *Here, as proved by* ***Nenovsky, N., K. Hristov****, the role of government deposit management in the Issue Department balance sheet should be also taken into account. Given the government's policy of maintaining a relatively constant deposit level (to a great extent attributable to exter-*

On the other hand, the strong dependence of industry on external markets and correspondingly the impact of industrial sales on the balance of payments and primary money establishes the interdependence of both variables.

Table 8

Effect of Anticipated Components of Primary and Secondary Money on Retail Sales Index (January 1995 – June 1997)

	Impulse Response			Variance Decomposition		
Period	D(LRS)	D(LPMF)	D(LSMF)	D(LRS)	D(LPMF)	D(LSMF)
1	0.050976	0.000000	0.000000	100.0000	0.000000	0.000000
2	0.034429	0.008395	-0.014047	93.39067	1.739330	4.870004
3	-0.016002	0.000449	-0.026515	80.62151	1.410378	17.96811
4	-0.012030	0.006660	0.004777	80.12146	2.202444	17.67610
5	-0.007728	-0.011222	-0.001733	78.43193	4.452713	17.11536
6	-0.009567	-0.026858	0.004536	69.43028	15.40906	15.16066
7	0.024733	-0.007513	0.024008	66.06051	13.60223	20.33726
8	0.012085	0.011953	-0.007212	65.04946	14.83460	20.11594
9	-0.009964	0.001885	-0.021193	61.95041	13.90015	24.14944
10	0.008143	0.009817	-0.008176	61.06914	14.64883	24.28203
11	-0.009941	-0.004223	-0.008966	60.82500	14.52362	24.65138
12	-0.009806	-0.020968	0.010303	57.71078	18.18917	24.10004

Table 9

Effect of Anticipated Components of Primary and Secondary Money on Retail Sales Index (July 1997 – March 1999)

	Impulse Response			Variance Decomposition		
Period	D(LRS)	D(LPMF)	D(LSMF)	D(LRS)	D(LPMF)	D(LSMF)
1	0.099929	0.000000	0.000000	100.0000	0.000000	0.000000
2	-0.004132	-0.014232	0.012540	96.52777	1.954681	1.517552
3	-0.017114	-0.021498	-0.000522	92.60431	5.978787	1.416906
4	-0.056014	0.019878	0.005914	91.47213	7.216985	1.310888
5	-0.008587	0.001548	-0.006914	91.20449	7.172775	1.622733
6	0.031194	0.019739	0.002973	89.48744	8.972745	1.539811
7	0.030075	-0.011405	-0.008840	88.95980	9.147554	1.892644
8	0.015073	-0.012216	0.000797	88.34725	9.796896	1.855855
9	-0.032517	-0.005700	-0.000390	88.85024	9.400914	1.748844
10	-0.006795	0.004167	0.007574	88.52587	9.432695	2.041434
11	-0.021703	0.010589	0.002246	88.27070	9.723629	2.005668
12	0.025450	0.001017	-0.004481	88.55537	9.405848	2.038785

nal restrictions: so-called performance criteria established by the IMF) in the three-year stand-by agreement, we have disregarded this effect.

Table 10

Effect of Anticipated Components of Primary and Secondary Money on Industrial Sales Index (July 1997 – March 1999)

	Impulse Response			Variance Decomposition		
Period	D(LIS)	D(LPMF)	D(LSMF)	D(LIS)	D(LPMF)	D(LSMF)
1	0.061045	0.000000	0.000000	100.0000	0.000000	0.000000
2	-0.027259	0.024226	0.003303	88.20265	11.58207	0.215279
3	0.000655	-0.044042	0.013642	62.13870	35.12252	2.738781
4	0.015670	0.028109	0.000139	57.30234	40.30333	2.394332
5	-0.021504	-0.005607	-0.014239	58.01091	37.51015	4.478942
6	0.015581	-0.015680	0.000902	57.57369	38.17157	4.254740
7	-0.004327	0.015612	0.006315	55.97516	39.49205	4.532790
8	-0.000616	-0.011497	0.002133	55.20018	40.28393	4.515897
9	0.007029	0.009650	-0.001123	54.90053	40.63590	4.463576
10	-0.009485	-0.001169	-0.005154	55.14999	40.17583	4.674179
11	0.005804	-0.007950	0.001490	54.94471	40.40471	4.650577
12	-0.002268	0.007264	0.002797	54.64345	40.65959	4.696958

The results of the VAR model on the effect of assessed anticipated components of standard monetary aggregates in monetary statistics (reserve money, quasi-money and broad money) on the variables approximating the real economy indicate similar results to these obtained by dividing money into primary and secondary. The hypothesis of neutrality of quasi-money and broad money to the retail sales index proved true prior to the introduction of a currency board. Shock response indicates an insignificant and quickly subsiding effect of shocks caused by these monetary variables the retail sales index. Concurrently, the results suggest a significant effect of changes in the anticipated reserve money component on the retail sales index, which rejects the hypothesis of neutrality of these shocks on the real economy.

The function of shock response indicates that the shock caused by reserve money in the first three periods results in a sales decrease, and three periods are required for subsiding of the shock. The results after the introduction of a currency board show neutrality of anticipated reserve money component, quasi-money and broad money. Certain impact of the impulses coming from reserve money occurs, but their effect was weaker than that in the period of discretionary monetary policy (less than 20% accounting for the variance of the retail sales index).

The analysis of the relationship between monetary aggregates and the industrial sales index under a currency board arrangement indicates neutrality of anticipated broad money component and lack of neutrality in respect of reserve money and quasi-money. As was explained, this result is natural and entirely based on the logic of money supply under a currency board.

Table 11

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (January 1995 – June 1997)

Period	Impulse Response				Variance Decomposition			
	D(LRS)	D(LM0F)	D(LQMF)	D(LM3F)	D(LRS)	D(LM0F)	D(LQMF)	D(LM3F)
1	0.042964	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	0.020701	-0.018854	0.006708	0.000258	85.02675	13.28868	1.682089	0.002484
3	-0.017041	-0.037736	0.003737	-0.002643	58.15507	40.34821	1.336782	0.159936
4	-0.014305	-0.002792	-0.002316	-0.009265	58.75026	37.91471	1.364499	1.970536
5	-0.024755	0.002527	-0.005113	-0.002135	63.05682	33.43988	1.686568	1.816734
6	-0.006194	0.002605	-0.018840	0.008493	58.61181	30.85027	7.632123	2.905796
7	0.058825	0.008396	-0.013875	0.007456	71.56490	19.45848	6.634694	2.341926
8	0.038514	-0.022559	0.009740	-0.002535	71.43748	20.32582	6.258644	1.978054
9	0.001268	-0.043745	0.010404	-0.003143	60.87911	31.24337	6.120261	1.757256
10	-0.013678	-0.007138	-0.001830	-0.008036	60.88496	30.92560	6.010812	2.178635
11	-0.057819	0.009239	-0.000879	-0.005531	67.94796	25.30180	4.827404	1.922841
12	-0.044829	0.017409	-0.016846	0.001382	69.16185	23.53928	5.615022	1.683844

Table 12

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (July 1997 – March 1999)

	Impulse Response				Variance Decomposition			
Period	D(LRS)	D(LM0F)	D(LQMF)	D(LM3F)	D(LRS)	D(LM0F)	D(LQMF)	D(LM3F)
1	0.076148	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	-0.005791	-0.022615	0.001070	-0.019841	86.55063	7.590274	0.017005	5.842095
3	-0.018650	-0.013722	0.004090	-0.008465	83.93362	9.503910	0.242724	6.319748
4	0.002943	-0.005372	-0.005320	-0.003881	83.13791	9.788267	0.620356	6.453463
5	-0.011487	0.042775	-0.006366	0.016529	65.03144	26.32271	0.892117	7.753737
6	-0.053171	-0.015274	0.007238	0.004885	71.15581	21.71479	1.081928	6.047468
7	0.065949	0.005897	0.010203	0.015755	76.72108	16.06621	1.382440	5.830267
8	-0.026465	-0.006686	-0.023785	-0.032982	71.01920	14.36206	4.046430	10.57231
9	0.052212	0.011579	0.019474	0.022959	71.23443	12.64937	5.001263	11.11493
10	-0.061745	-0.046365	-0.001782	-0.023297	68.51328	17.03226	3.936313	10.51814
11	0.096198	0.048914	-0.005022	0.012724	71.23622	17.92788	2.889759	7.946133
12	-0.158368	-0.051214	-0.007550	-0.027556	77.98243	14.40184	1.803426	5.812306

Table 13

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Industrial Sales Index (July 1997 – March 1999)

	Impulse Response				Variance Decomposition			
Period	D(LIS)	D(LM0F)	D(LQMF)	D(LM3F)	D(LIS)	D(LM0F)	D(LQMF)	D(LM3F)
1	0.043463	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	-0.034221	0.031079	-0.003874	-0.015536	71.45839	22.55484	0.350473	5.636299
3	0.009283	-0.015046	0.042512	0.005665	48.89890	18.53005	28.32094	4.250108
4	0.034413	0.029685	-0.038289	-0.006187	43.28795	20.72639	32.86944	3.116222
5	-0.068382	-0.031418	0.017204	0.003670	56.37356	19.15644	22.43443	2.035571
6	0.044313	0.009947	0.012188	0.022973	58.61577	16.88167	19.94500	4.557556
7	0.001212	0.000785	-0.008104	-0.036990	54.44607	15.68173	18.84961	11.02259
8	-0.009216	0.018933	-0.022359	0.022625	51.17220	16.28465	19.89392	12.64924
9	0.005262	-0.032286	0.065061	-0.002977	41.17735	16.94352	31.69302	10.18611
10	0.017545	0.058943	-0.071912	-0.010970	31.65169	22.32485	38.07096	7.952497
11	-0.046216	-0.068516	0.076430	-0.000859	27.79846	26.15782	40.16058	5.883141
12	0.065940	0.075457	-0.083944	0.022752	26.97431	27.80016	40.12423	5.101305

The results of the VAR model on the relationship between unanticipated components of primary and secondary money and the two indices approximating the real economy entirely reject the thesis of the theory of rational expectations about the effect of unanticipated changes in money supply on real variables. In both periods prior to and after the introduction of a currency board unanticipated components of primary and secondary money are neutral in respect of retail and industrial sales indices (with the exception of the impact of unanticipated component of primary money on the industrial sales index after the introduction of a currency board). These results confirm the thesis of super neutrality of money and contradict to some extent the results obtained from the test of the relationship between anticipated components of monetary aggregates and real variables (in some cases reserve money and primary money are not neutral).

The results are also impacted by the manner of generating anticipated and unanticipated components of monetary aggregates. The use of the ***time series*** approach (ARIMA) may result in improper assessment of anticipated components of monetary aggregates with unanticipated components being included in anticipated ones.[35]

Table 14

Effect of Unanticipated Components of Primary and Secondary Money on Retail Sales Index (January 1995 – June 1997)

Period	Impulse Response			Variance Decomposition		
	D(LRS)	D(UPM)	D(USM)	D(LRS)	D(UPM)	D(USM)
1	0.062126	0.000000	0.000000	100.0000	0.000000	0.000000
2	0.040105	-0.011396	0.002218	97.59427	2.317919	0.087816
3	-0.022683	-0.007292	0.012791	94.44961	2.889766	2.660626
4	-0.016867	0.003509	0.002439	94.42759	2.943487	2.628922
5	-0.017159	0.013494	0.017460	88.45038	5.088153	6.461464
6	-0.017164	0.005068	-0.008477	87.78133	5.161495	7.057174
7	0.016720	-0.009786	-0.018229	83.77090	5.857073	10.37202
8	0.013490	-0.007663	0.001941	83.51059	6.363752	10.12565
9	0.006331	0.010291	0.001270	82.57711	7.446864	9.976026
10	0.007341	-0.003327	0.001524	82.55850	7.514378	9.927126
11	-0.014037	-0.004854	0.008400	82.09087	7.532587	10.37654
12	-0.013093	0.003900	0.000285	82.28283	7.544683	10.17248

[35] *Studying these dependences* ***Barro, R.*** *(1978) used a structural model for assessment of the anticipated component of monetary aggregates. Money supply growth is estimated as a function of past growth rates of money supply and unemployment and current changes in the variable reflecting the fiscal sector state. In this study the R. Barro's approach is not applied due to diffi-*

Table 15

Effect of Unanticipated Components of Primary and Secondary Money on Retail Sales Index (July 1997 – March 1999)

Period	Impulse Response			Variance Decomposition		
	D(LRS)	D(UPM)	D(USM)	D(LRS)	D(UPM)	D(USM)
1	0.102522	0.000000	0.000000	100.0000	0.000000	0.000000
2	-0.015025	0.009915	0.030497	91.25900	0.835528	7.905475
3	-0.017712	-0.013925	-0.013327	88.75587	2.347097	8.897029
4	0.008381	-0.007983	-0.011719	87.41517	2.797940	9.786894
5	-0.032788	0.014722	0.011559	86.20665	4.048101	9.745249
6	0.019039	-0.003795	-0.008564	86.03092	4.021904	9.947174
7	0.004603	-0.000422	0.005539	85.86988	4.008830	10.12129
8	-0.017436	0.001319	-0.003695	86.06857	3.934910	9.996522
9	0.021536	-0.003382	-0.000359	86.42247	3.887863	9.689671
10	-0.001641	0.003204	0.007588	86.04688	3.936374	10.01674
11	-0.018606	0.000368	-0.005793	86.16838	3.843147	9.988474
12	0.016644	-0.004689	-0.003251	86.23174	3.905390	9.862868

Table 16

Effect of Unanticipated Components of Primary and Secondary Money on Industrial Sales Index (July 1997 – March 1999)

Period	Impulse Response			Variance Decomposition		
	D(LIS)	D(UPM)	D(USM)	D(LIS)	D(UPM)	D(USM)
1	0.067948	0.000000	0.000000	100.0000	0.000000	0.000000
2	-0.034563	0.013087	0.014708	93.74742	2.762798	3.489783
3	0.001536	-0.016208	-0.012259	87.89651	6.560920	5.542569
4	0.014932	-0.015989	0.006559	84.59594	9.663721	5.740339
5	-0.025919	0.024909	-0.005409	79.32084	15.48985	5.189306
6	0.011476	-0.014133	9.69E-05	77.82784	17.17845	4.993712
7	0.006953	0.005628	0.001588	77.64869	17.37563	4.975684
8	-0.011857	-0.001515	-0.002657	77.91647	17.11230	4.971231
9	0.012527	0.002862	0.005476	77.96970	16.83891	5.191386
10	-0.006441	-0.002571	-0.003049	77.93454	16.80599	5.259474
11	-0.006955	0.000320	0.000412	78.04677	16.71938	5.233849
12	0.014715	-0.001337	-0.002881	78.46215	16.34130	5.196548

culties in finding a sufficiently reliable variable to estimate Bulgaria's fiscal sector state on a monthly basis.

If conventional monetary aggregates (reserve money, quasi-money and broad money) are used, the results are different from these obtained by dividing money into primary and secondary (which is explained by different methodological approaches in constructing monetary aggregates). In the period of conducting a discretionary monetary policy unanticipated components of monetary aggregates are neutral in terms of the retail sales index. Shocks caused by monetary aggregates affect significantly the retail price index and their effect is of permanent and cyclical nature. In general these shocks explain to a great extent the variance of retail sales, increasing to about 60% twelve months after their emergence. In the period of currency board operation unanticipated components of quasi-money and broad money are neutral in respect of retail and industrial sales indices. In real terms these indices are impacted only by unanticipated changes in reserve money, and the effect of shocks caused by reserve money is permanent and displays a cyclical dynamics.

The Real Business Cycle Theory and the Reverse Causation Test

The real business cycle theory postulates a reverse causation: from real to monetary variables. Here a causation test within the VAR model *variance decomposition* is applied to estimate the degree of cyclical recurrence in monetary aggregates and vice versa caused by the cyclical component of real variables. After the impulse direction and variance decomposition have been determined, the size of the effect prompting changes of real variables in monetary ones and vice versa is to be estimated using the impulse response function.

For this purpose we use the *Wald test* (similar to Granger test but displaying also indirect causation in case of more than two variables[36]) testing the hypothesis of zero-coefficients before monetary variables. Rejecting this hypothesis we assume that cyclical components of monetary variables cause a cyclical recurrence in the real economy. Acceptation of the null hypothesis allows to assume that impulses are generated most probably by the real economy to monetary variables.

[36] *See the review article about various approaches applied for empirical test of causation by* ***Bruneau*** *(1996).*

Table 17

Effect of Unanticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (January 1995 – June 1997)

Period	Impulse Response				Variance Decomposition			
	D(LRS)	D(UM0)	D(UQM)	D(UM3)	D(LRS)	D(UM0)	D(UQM)	D(UM3)
1	0.035123	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	0.035408	0.006792	-0.018001	-0.010627	83.73623	1.553043	10.90865	3.802086
3	-0.001185	-0.008599	-0.012101	-0.003310	77.69589	3.748599	14.68765	3.867865
4	-0.002193	-0.026984	-0.005168	0.007433	62.05850	21.10935	12.37367	4.458485
5	0.005379	0.000272	-0.003326	-0.002277	62.07938	20.87611	12.50812	4.536386
6	-0.016031	-0.000252	0.002456	0.000582	64.23939	19.60658	11.88602	4.268014
7	0.002852	0.011321	0.023054	-0.015460	53.26450	18.65823	19.98168	8.095583
8	-0.007028	0.018949	0.011106	0.009317	48.47823	22.82131	19.97717	8.723286
9	-0.000540	-0.004790	-0.005345	0.017072	45.79708	21.92724	19.33147	12.94421
10	0.014333	-0.002340	-0.016777	0.000779	45.49303	20.39286	22.11495	11.99916
11	-0.005473	0.003467	-0.021346	-0.011890	41.93460	18.77850	26.40467	12.88223
12	-0.018156	-0.014948	0.009497	-0.002610	42.64954	20.04905	25.38357	11.91784

Table 18

Effect of Unanticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (July 1997 – March 1999)

	Impulse Response				Variance Decomposition			
Period	D(LRS)	D(UM0)	D(UQM)	D(UM3)	D(LRS)	D(UM0)	D(UQM)	D(UM3)
1	0.069019	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	0.025244	0.025837	0.015413	-0.002884	85.53429	10.57181	3.762181	0.131724
3	-0.021154	-0.019538	-0.006094	0.003569	81.30222	14.58636	3.818683	0.292740
4	-0.007969	-0.005776	-0.009703	0.004289	79.86018	14.62444	4.982429	0.532947
5	-0.036991	0.000675	-0.014403	-0.001555	81.05845	12.05904	6.416315	0.466198
6	0.009413	-0.006825	-0.007041	-0.000403	80.38982	12.32398	6.827637	0.458562
7	0.008102	0.030291	0.008345	-0.004953	72.57589	19.98486	6.789401	0.649851
8	0.022950	-0.030499	-0.001643	0.002809	67.97915	25.42337	5.961689	0.635798
9	0.002268	0.040504	0.019279	-0.002826	57.99328	33.61805	7.788470	0.600205
10	-0.055456	-0.037269	-0.021915	0.003345	59.07032	32.13579	8.292949	0.500938
11	0.019066	0.003018	0.000890	0.001845	59.80933	31.54855	8.133234	0.508887
12	-0.015880	0.022044	-0.001838	-0.005380	58.75772	32.77283	7.834427	0.635023

Table 19

Effect of Unanticipated Components of Reserve Money, Quasi-money and M3 on Industrial Sales Index (July 1997 – March 1999)

Period	Impulse Response				Variance Decomposition			
	D(LIS)	D(UM0)	D(UQM)	D(UM3)	D(LIS)	D(UM0)	D(UQM)	D(UM3)
1	0.062137	0.000000	0.000000	0.000000	100.0000	0.000000	0.000000	0.000000
2	-0.047138	-0.012610	0.030089	0.002972	85.00338	2.222092	12.65113	0.123405
3	0.020836	-0.000608	-0.013373	-0.003048	83.78046	2.048984	13.93761	0.232949
4	0.009533	-0.001031	0.007400	0.002374	83.31700	2.023029	14.36043	0.299544
5	-0.043815	0.021177	0.002585	-0.000772	82.74044	5.907784	11.11550	0.236283
6	0.044325	-0.025481	-0.019473	-0.000365	78.89108	9.459970	11.46485	0.184108
7	-0.036041	0.032960	0.008796	0.002208	74.78296	14.86952	10.16131	0.186204
8	0.026129	-0.029829	-0.002075	-0.001024	71.91628	18.64663	9.261786	0.175309
9	-0.002567	-0.001353	0.011482	0.000660	71.37537	18.50707	9.941170	0.176389
10	-0.042437	0.039353	-0.011306	-0.001770	68.11626	22.82111	8.900574	0.162053
11	0.073070	-0.068785	-0.002514	0.001514	63.19986	30.65197	6.031341	0.116825
12	-0.085300	0.081311	0.010511	1.59E-05	59.71302	35.80418	4.402280	0.080520

Table 20

Wald Causation Test

Equation	H0	F -Statistic	Probability
rsc m0c(-1to-4) qmc(-1to-4) rsc(-1to-4)	c(1)=0, c(2)=0, c(3)=0, c(4)=0, c(5)=0, c(6)=0, c(7)=0, c(8)=0		
January 1995 – June 1997		0.658844	0.718596
July 1997 – March 1999		0.528420	0.809242
isc m0c(-1to-4) qmc(-1to-4) isc(-1to-4)	c(1)=0, c(2)=0, c(3)=0, c(4)=0, c(5)=0, c(6)=0, c(7)=0, c(8)=0		
July 1997 – March 1999		0.838029	0.593065
rsc pmc(-1to-4) smc(-1to-4) rsc(-1to-4)	c(1)=0, c(2)=0, c(3)=0, c(4)=0, c(5)=0, c(6)=0, c(7)=0, c(8)=0		
January 1995 – June 1997		0.627992	0.742094
July 1997 – March 1999		0.219568	0.978006
isc pmc(-1to-4) smc(-1to-4) isc(-1to-4)	c(1)=0, c(2)=0, c(3)=0, c(4)=0, c(5)=0, c(6)=0, c(7)=0, c(8)=0		
July 1997 – March 1999		0.963443	0.515527

Table 20 shows causation tests between logarithms of cyclical components of monetary and real variables which have **c** extension (e. g. the cyclical component of reserve money **m0** is **m0c**). Symbols with the same extension of cyclical components are used in charts.

Statistical characteristics confirm the hypothesis that monetary impulses (generated both by primary and secondary money) do not have a permanent effect on real variables, and *money follows and 'services' real sector developments*. This applies to both monetary regimes. These results may be considered as yet another argument against a central bank implementing a discretionary monetary policy.

Tested major VAR models are summarized below. All variables are in logarithms and first differences (see stationary tests).

Model	Variables	Lags
VAR(1)	m0c, qmc, rsc	4
VAR(2)	m0c, qmc, isc	4
VAR(3)	pmc, smc, rsc	4
VAR(4)	pmc, smc, isc	4

The following six charts show the impulse response and variance decomposition between cyclical component logarithms of monetary and real variables within VAR models.

Chart 1

Relationship between Cyclical Components of Reserve Money, Quasi-money and Retail Sales Index (January 1995 – June 1997) VAR (m0c, qmc, rsc)

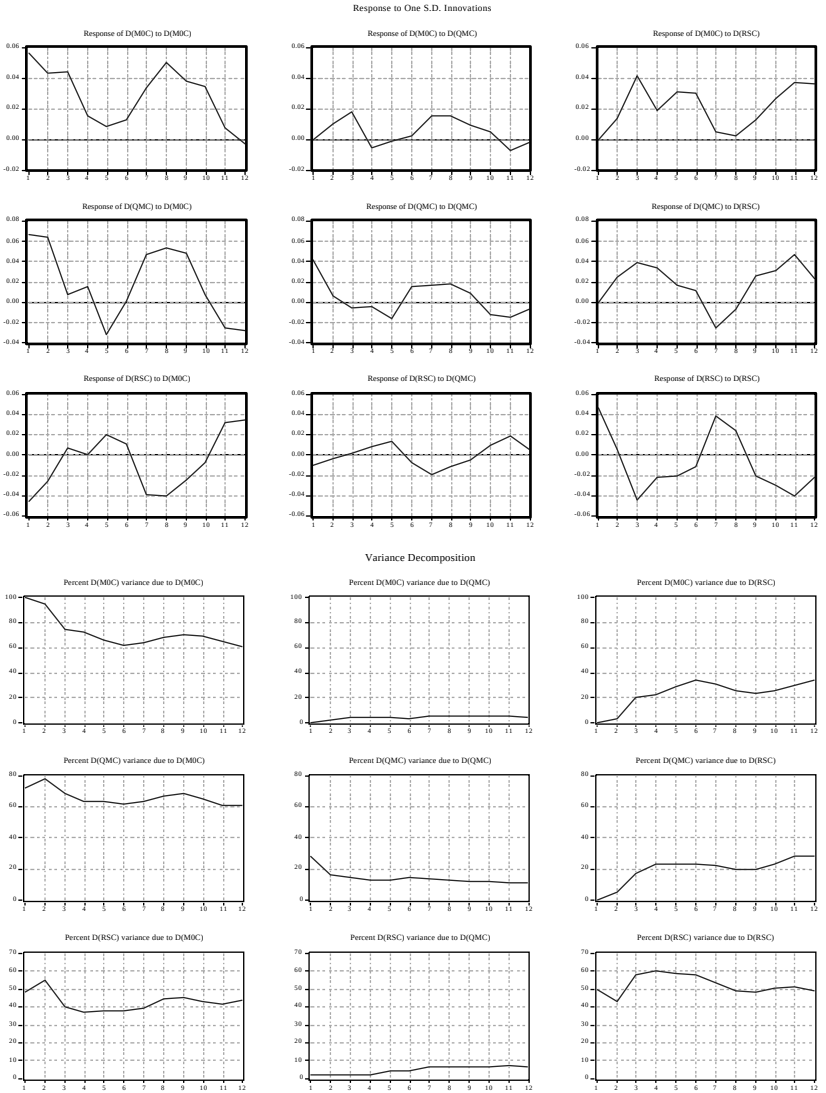


Chart 2

Relationship between Cyclical Components of Reserve Money, Quasi-money and Retail Sales Index (July 1997 – March 1999) VAR (m0c, qmc, rsc)

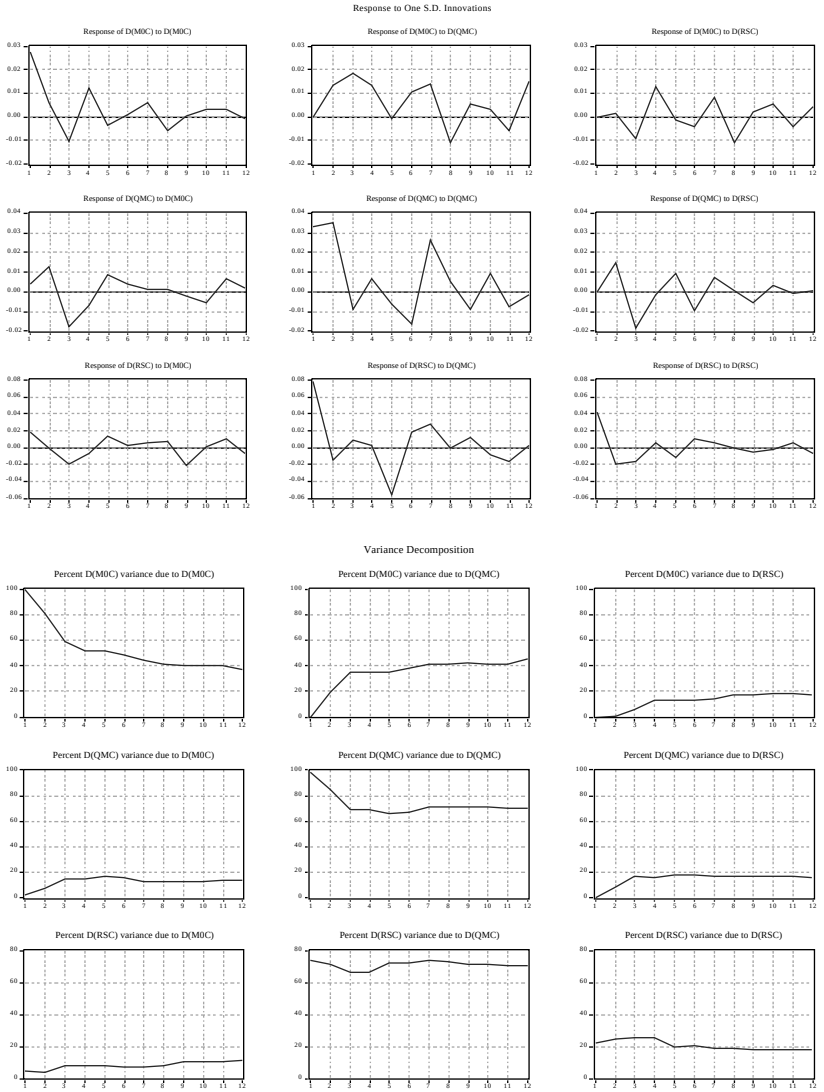


Chart 3

Relationship between Cyclical Components of Reserve Money, Quasi-money and Industrial Sales Index (July 1997 – March 1999) VAR (pmc, smc, isc)

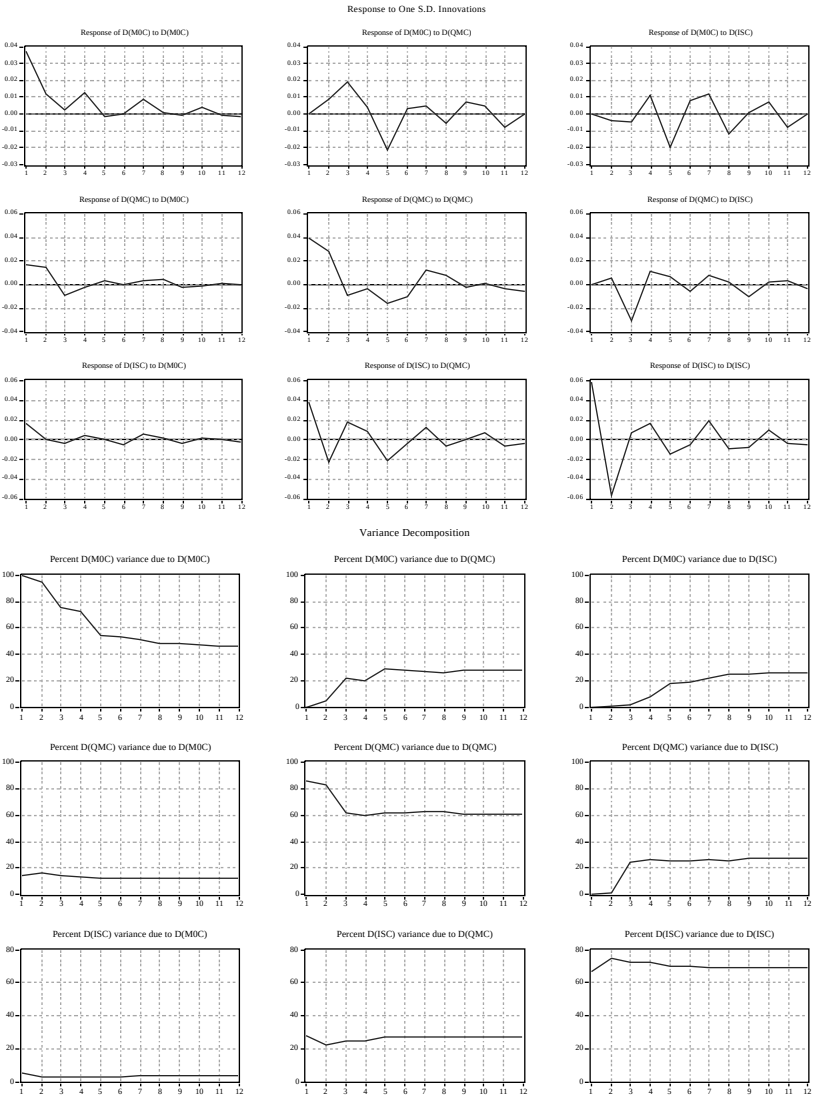


Chart 4

Relationship between Cyclical Components of Primary Money, Secondary Money and Retail Sales Index (January 1995 – June 1997) VAR (pmc, smc, rsc)

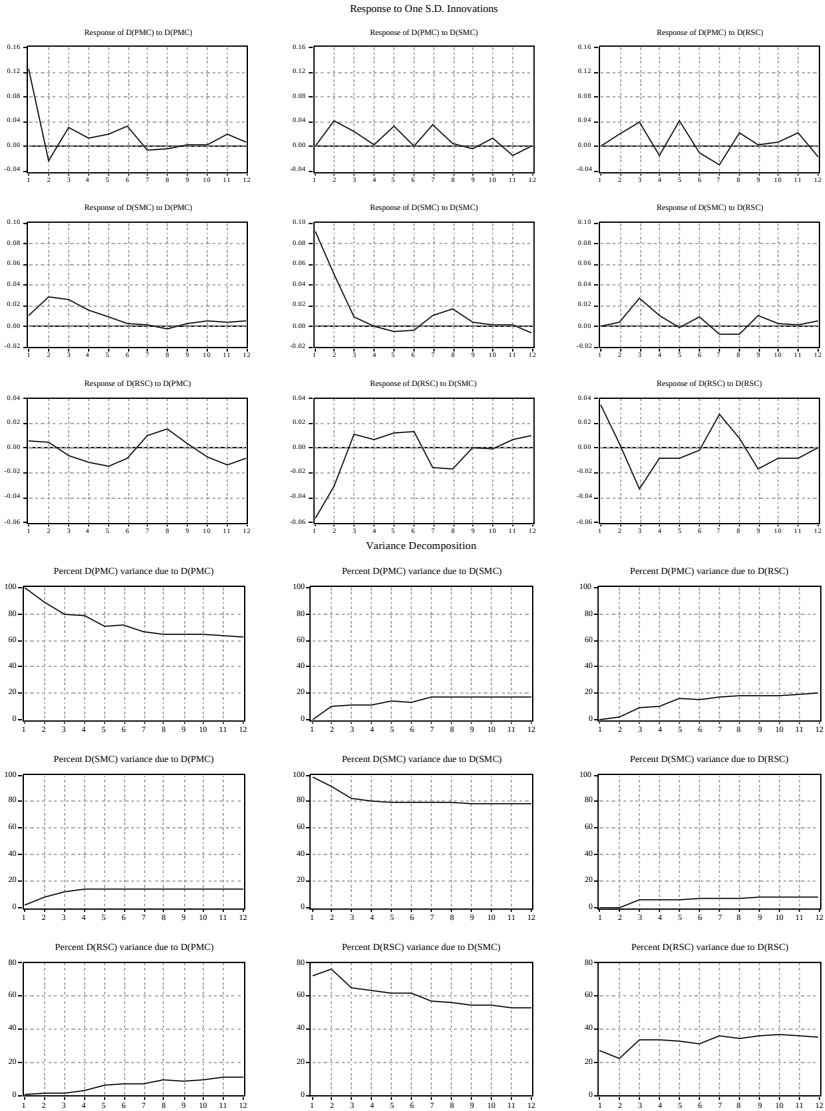


Chart 5

Relationship between Cyclical Components of Primary Money, Secondary Money and Retail Sales Index (July 1997 – March 1999) VAR (pmc, smc, rsc)

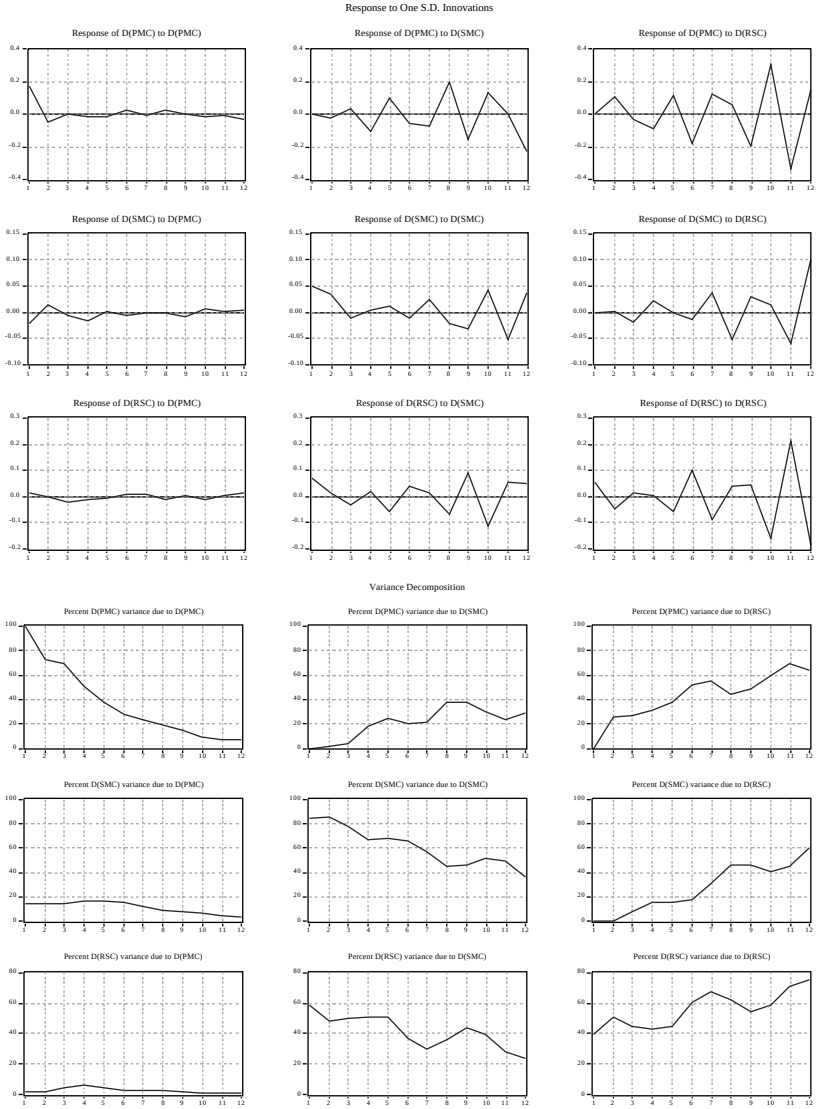
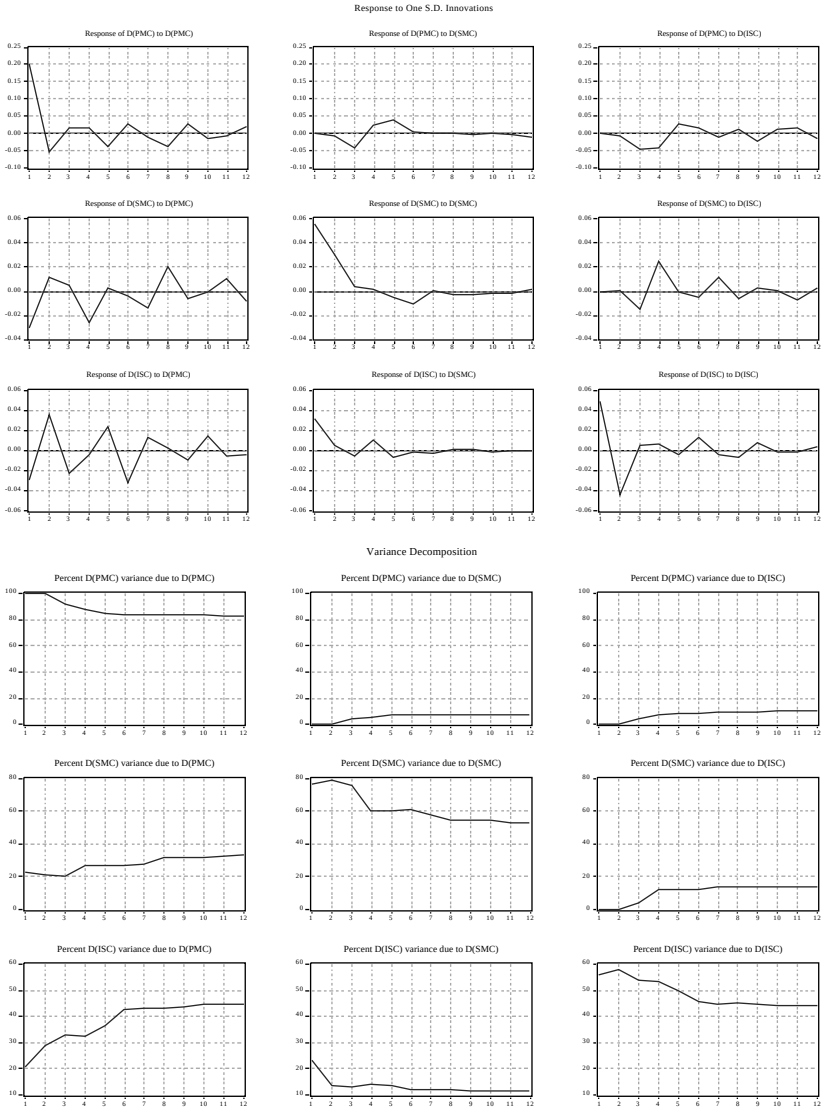


Chart 6

Relationship between Cyclical Components of Primary Money, Secondary Money and Industrial Sales Index (July 1997 – March 1999) VAR (pmc, smc, isc)



According to the real business cycle theory the positive relationship between money and real sector developments is explained by the fact that they are subject to one and the same real shocks. Money is neutral, does not impact the real sector and follows the dynamics of real variables (reverse causation). Dividing money into money determined by monetary authorities (reserve money and/or primary money) and money determined by the real sector behavior (quasi-money and/or secondary money) allows to test the neutrality of the former and the reverse causation of the latter through the VAR hypothesis.

The results of the VAR model prior to the introduction of a currency board suggest that reserve money variance is attributable to a greater extent to the retail sales variance (about 40%) rather than to the quasi-money variance (about 30%). The analysis of shocks shows similar response of reserve money and quasi-money in respect of a shock caused by retail sales. This contradicts to some extent the real business cycle theory.

After the introduction of a currency board the results diverge significantly from those obtained under the previous monetary regime. In fact, they refute to a great extent reverse causation, since only an insignificant percentage of the quasi-money variance is caused by the variance of retail and industrial sales indices (approximately 20%). On the other hand, the bulk of the variance of the two indices is determined by the quasi-money variance which seriously contradicts the results obtained from *Wald* causation tests. These results did not allow to confirm or reject the hypothesis of reverse causation of the real business cycle theory using conventional monetary aggregates in the analysis.

The test of the VAR model by using *primary* and *secondary* money almost mirrors the results obtained by using reserve and quasi-money. The only exception is the model studying the relationship between retail sales and primary and secondary money after the introduction of a currency board where the function of variance decomposition confirms the hypothesis of reverse causation.

IV. Conclusions and Policy Implications

The major objective of this article is to give elements of the answer whether the currency board halts real sector development. This objective is a part of a broader discussion on the effect of money and monetary policy on the dynamics of real variables under various monetary regimes. A comparative analysis of the money to real sector relationship under a discretionary central bank and a currency board is made.

The empirical analysis was limited to the use of four approaches: variation and correlation analysis, monetary analysis and correlation between money and real variables, decomposition of anticipated and unanticipated monetary shocks within the theory of rational expectations, and finally analysis of the relationship between cyclical components of studied variables within the real business cycle theory.

For the purposes of the analysis money is additionally classified into primary (exogenous for the real sector) and secondary (endogenous for the real sector).

Despite some differences the arguments of all four empirical approaches applied are in favor of the following conclusions:

- The currency board does not halt real economy development but follows it. Money has a service function and shocks caused by money supply are minimized. The currency board is impacted by the real economy and not vice versa.
- Fluctuations in monetary aggregates and real variables under a currency board are significantly weaker than under a discretionary central bank.
- The correlation between monetary and real variables was strong and had a negative sign prior to the introduction of a currency board, while it is insignificant and with a positive sign under a currency board arrangement. The negative correlation prior to the currency board introduction rejects the possibilities of stimulating the real sector through monetary expansion.
- Secondary money closely follows the real development under both monetary regimes.
- Primary money under both a discretionary central bank and a currency board has no permanent effect on the real sector. In most cases primary money dynamics, reflecting discretionary decisions, has a destabilizing effect on the real economy.
- In general under both monetary regimes money supply is beyond

the control of monetary authorities. The discretionary money supply management under a traditional central bank causes uncertainty, thus additionally worsening real sector problems. Automated rules under a currency board result in a smoother balancing of monetary and real sectors, since the money supply dynamics follows the real sector behavior. In this case the destabilizing effect of monetary shocks is minimized.[37]

- The volume of money under a currency board is significantly closer to that under a market mechanism, a result of the interaction of economic agents. In this respect it is closer to the 'optimum' volume. Our answer to the well known question of S. Hanke and Kurt Schuler (*Hanke, S., K. Schuler,* 1999) if it is possible to sit in an armchair and determine an optimum currency area is: no. We think that it is absolutely impossible to say what is the 'optimum volume of money' with a pen in your hand and a statement in front of you as it was done under a discretionary central bank.
- If any insignificant problems related to fast and gradual balancing of money and the real sector occur, they should be sought in the specific design of the currency board in Bulgaria and deviation from complete liberalization which is a fundamental requirement for the rule-bound operation of a currency board.
- Our practical recommendation to the currency board is: the operation of the currency board should be improved and confidence strengthened. An exit is out of the question. The direction is clear. The government should stay away from money.

[37] *In* ***Nenovsky, N.*** *(1998) the author argues and empirically tests the idea of the impossibility to exercise control over money supply under a discretionary central bank in Bulgaria prior to the introduction of a currency board. The mechanism of exogenous money supply for the central bank is described in detail. The central bank was unable to control neither reserve money sources, nor the money multiplier which is a behavioral variable.*

APPENDICES

Appendix 1

Analyzing the dependences between real and monetary variables a new classification of money supply components (different from that in monetary statistics) is introduced: money determined by monetary authorities and money determined by real economy development, a result of household and companies' behavior. The former is defined as ***primary money*** and the latter as ***secondary money***.

Primary money includes reserve money without overhang of commercial bank reserves in the period of conducting a discretionary monetary policy (1991 − July 1997) and minimum required reserves of commercial banks (excess reserves excluded) after the introduction of a currency board.

Secondary money emerges spontaneously reflecting the needs of households, companies and financial intermediaries. In this paper secondary money includes all types of deposits and the overhang of commercial bank reserves prior to the introduction of a currency board. After June 1997 secondary money includes deposits in the banking system, banknotes and coins in circulation (since they are unconditionally exchangeable into reserve currency) and overhang of commercial bank reserves.

(million BGL)

Before CB			After CB		
	Primary money	Secondary money		Primary money	Secondary money
I'95	80 318	378 713	VII'97	215 641	4 833 006
II'95	80 016	388 379	VIII'97	250 915	5 076 409
III'95	82 796	402 790	IX'97	273 469	5 064 680
IV'95	94 426	408 562	X'97	273 828	5 170 912
V'95	102 959	427 494	XI'97	281 526	5 376 746
VI'95	105 427	443 521	XII'97	319 364	6 043 359
VII'95	108 522	453 853	I'98	314 132	5 832 025
VIII'95	112 146	465 853	II'98	319 364	5 737 232
IX'95	115 069	477 071	III'98	327 647	5 873 530
X'95	118 238	482 054	IV'98	347 308	5 696 585
XI'95	116 462	487 899	V'98	288 265	5 593 562
XII'95	124 714	514 113	VI'98	353 900	5 774 517
I'96	113 196	510 099	VII'98	323 513	5 886 250
II'96	111 399	515 326	VIII'98	366 393	5 964 159
III'96	111 838	512 255	IX'98	379 798	5 743 576
IV'96	115 967	527 526	X'98	360 966	5 751 089
V'96	124 094	595 102	XI'98	394 188	6 009 236
VI'96	132 354	602 898	XII'98	309 961	6 398 907
VII'96	146 975	654 903	I'99	351 607	6 088 764
VIII'96	158 607	699 628	II'99	348 326	6 132 409
IX'96	169 022	703 895	III'99	303 241	6 076 242
X'96	167 326	721 659			
XI'96	194 928	862 972			
XII'96	263 269	1 102 149			
I'97	318 583	1 773 207			
II'97	469 864	3 049 243			
III'97	568 846	2 728 670			
IV'97	673 727	2 743 626			
V'97	746 518	3 007 268			
VI'97	952 420	3 401 425			

Appendix 2

DECOMPOSITION OF VARIABLES INTO CYCLICAL COMPONENT AND TREND THROUGH HODRICK – PRESCOTT FILTER

Chart 1

Reserve Money Decomposition

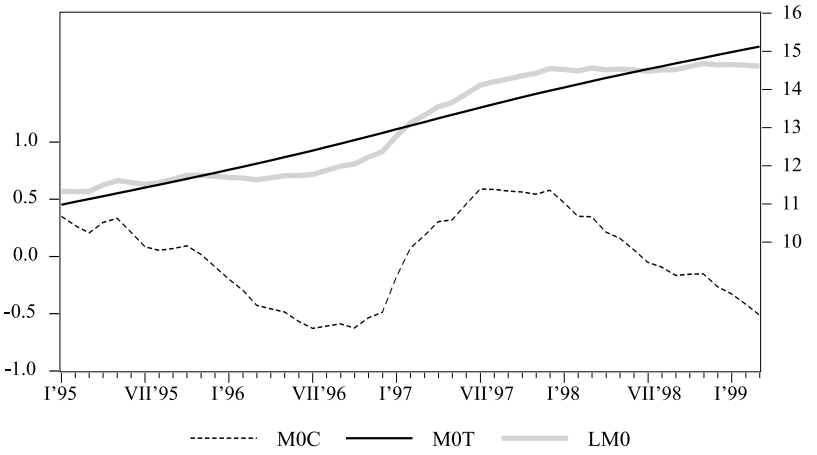


Chart 2

Quasi-money Decomposition

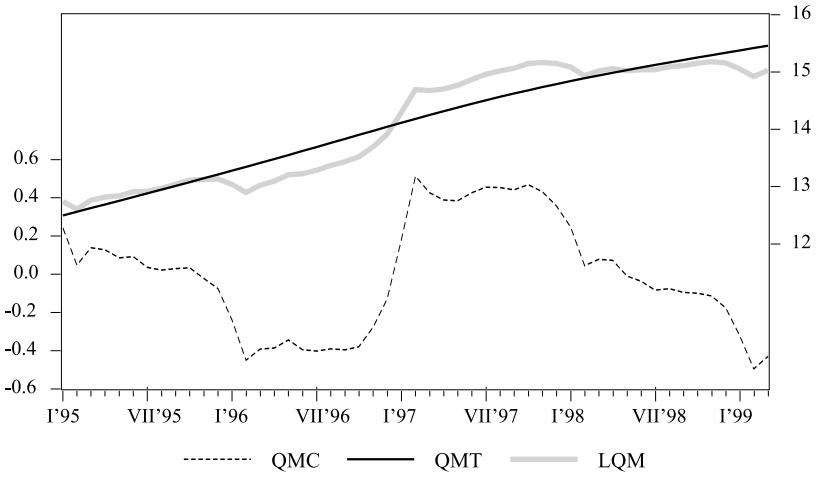


Chart 3

Broad Money (M3) Decomposition

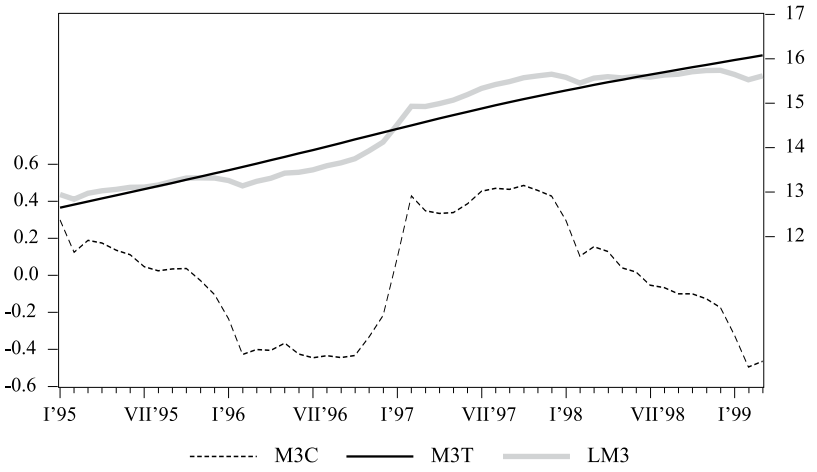


Chart 4

Primary Money Decomposition

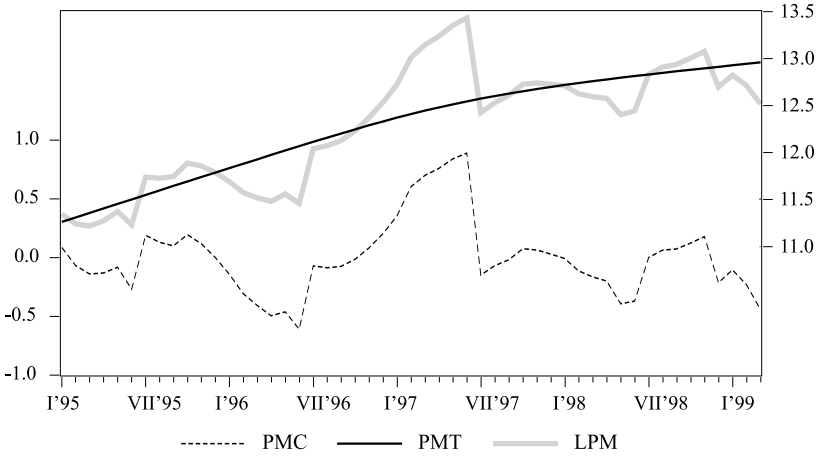


Chart 5

Secondary Money Decomposition

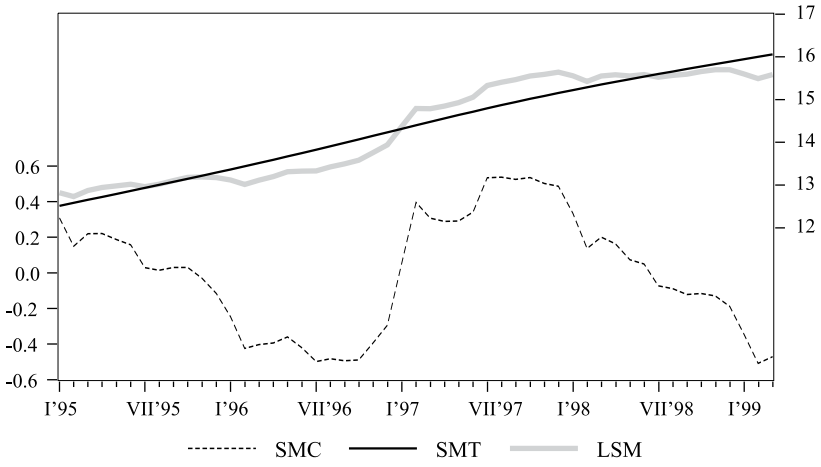


Chart 6

Industrial Sales Index Decomposition

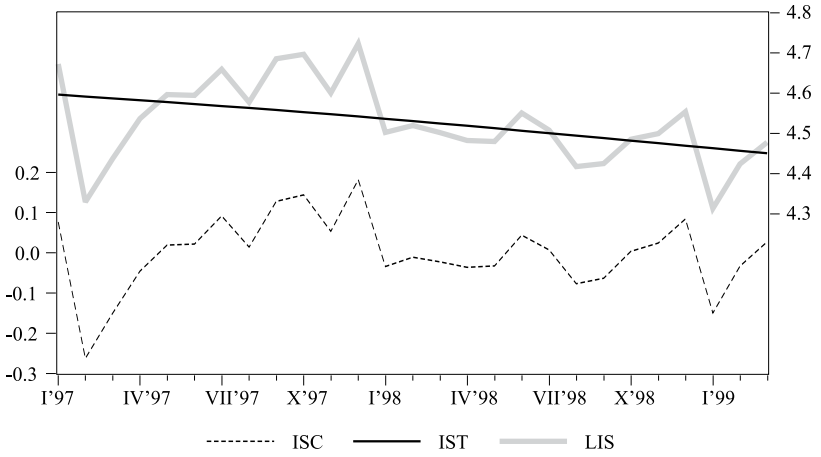
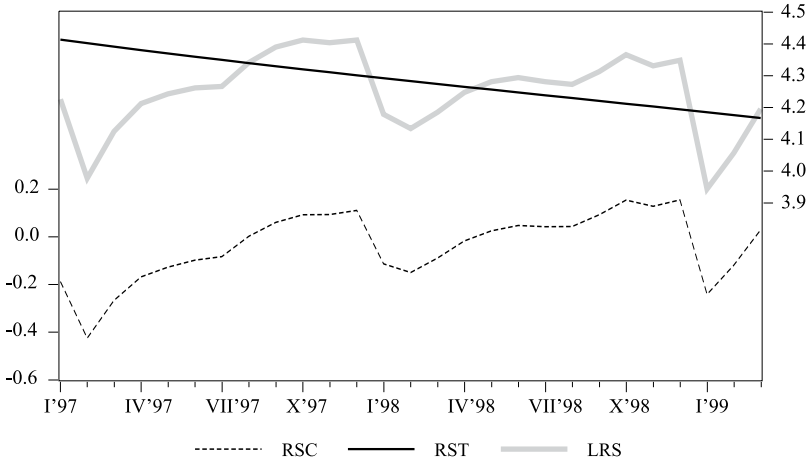


Chart 7

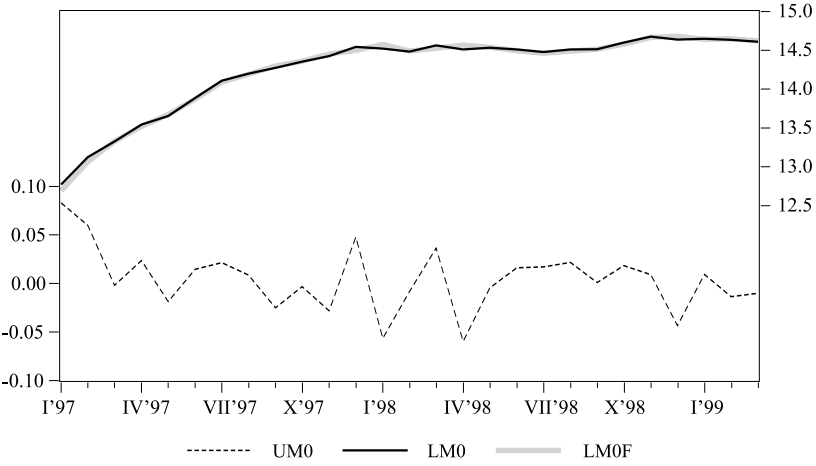
Retail Sales Index Decomposition



Appendix 3[38]

Chart 1

Estimated Anticipated and Unanticipated Components and Actual Value of Reserve Money



[38] *Files on ARIMA models are available with the authors and may be obtained at request (E-Views 3.1 format).*

Chart 2

Estimated Anticipated and Unanticipated Components and Actual Value of Quasi-money

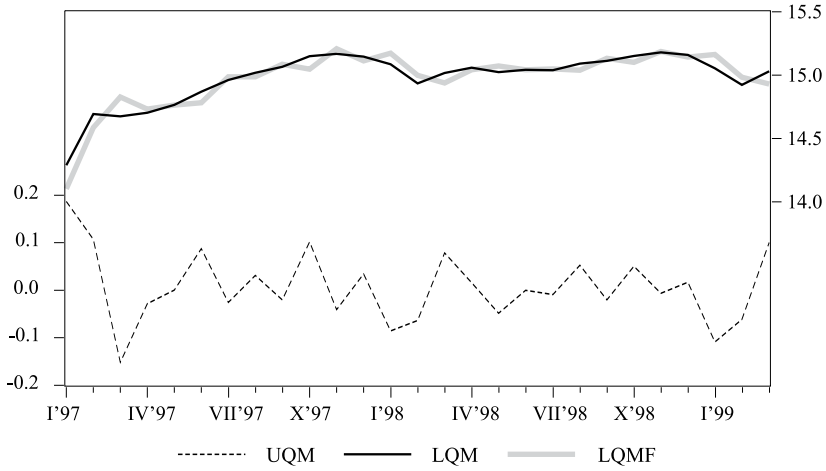


Chart 3

Estimated Anticipated and Unanticipated Components and Actual Value of Broad Money

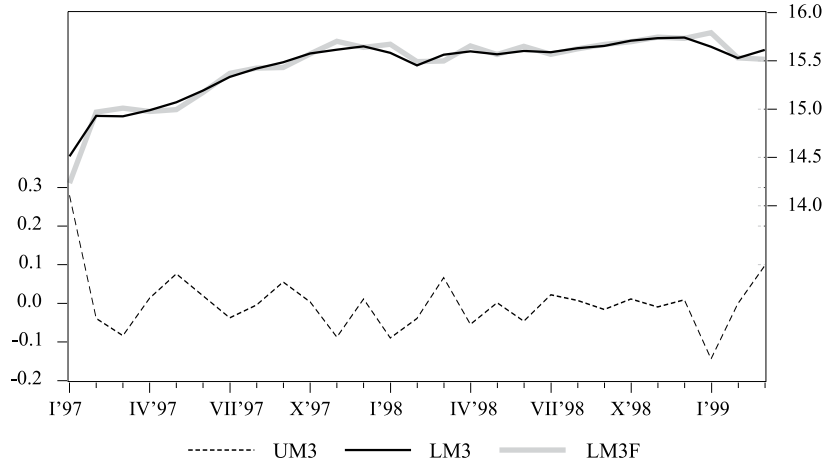


Chart 4

Estimated Anticipated and Unanticipated Components and Actual Value of Primary Money

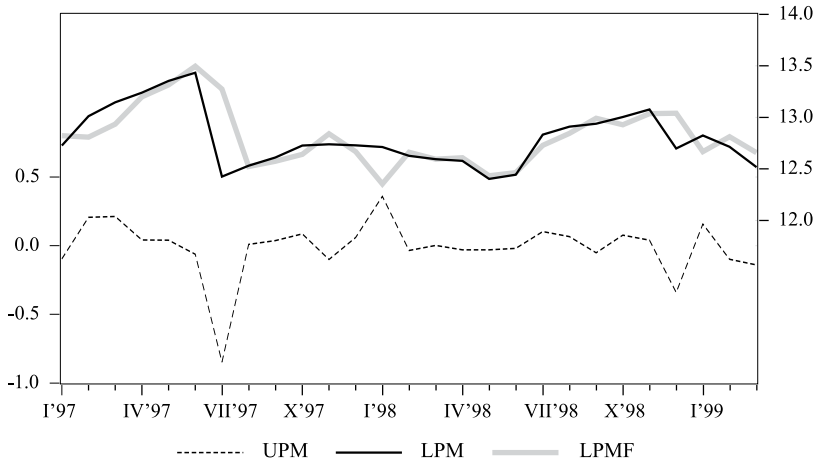
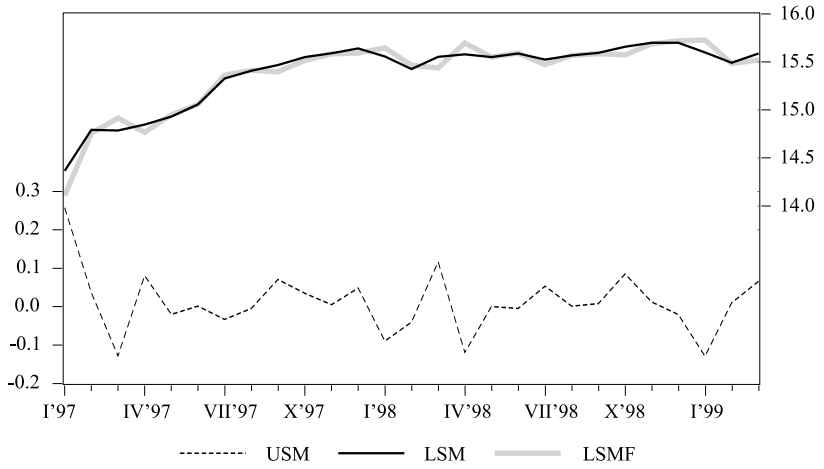


Chart 5

Estimated Anticipated and Unanticipated Components and Actual Value of Secondary Money



Appendix 4

Chart 1

Effect of Anticipated Components of Primary and Secondary Money on Retail Sales Index (January 1995 – June 1997)

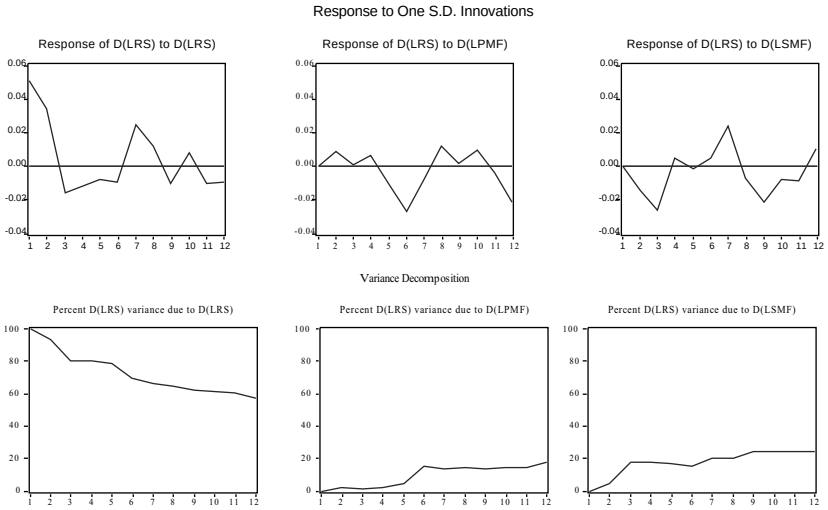
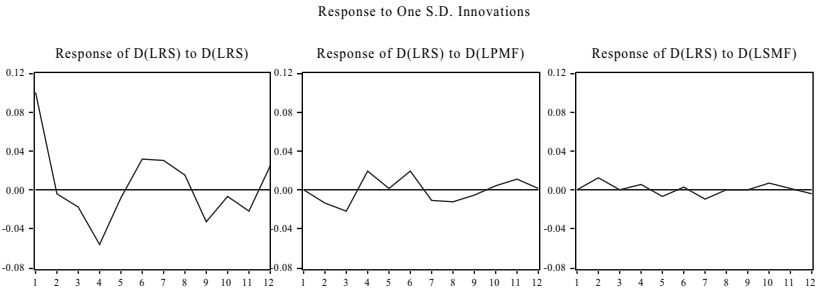


Chart 2

Effect of Anticipated Components of Primary and Secondary Money on Retail Sales Index (July 1997 – March 1999)



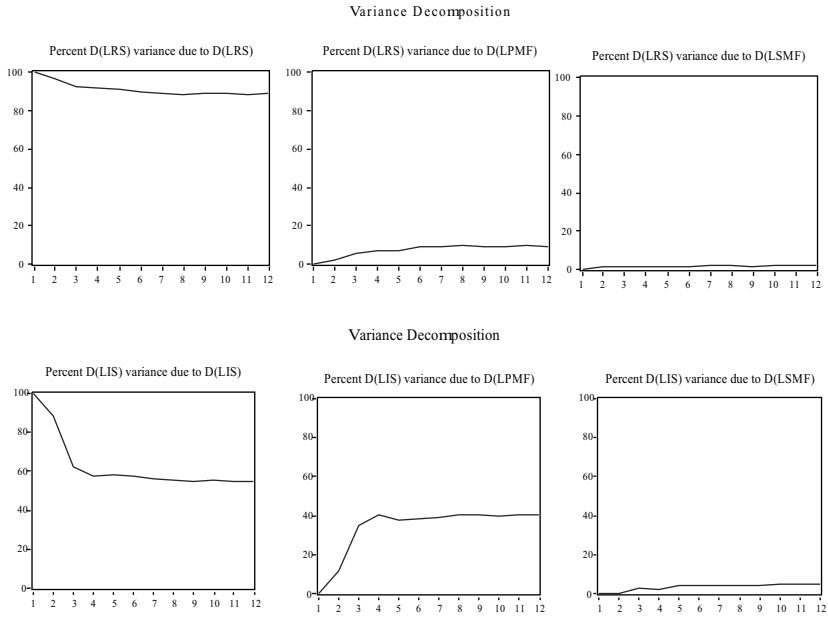


Chart 3

Effect of Anticipated Components of Primary and Secondary Money on Industrial Sales Index (July 1997 – March 1999)

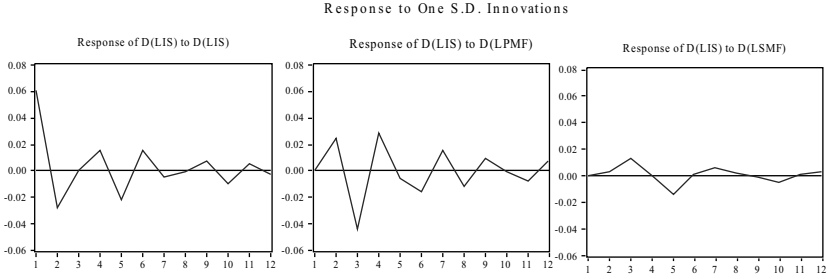
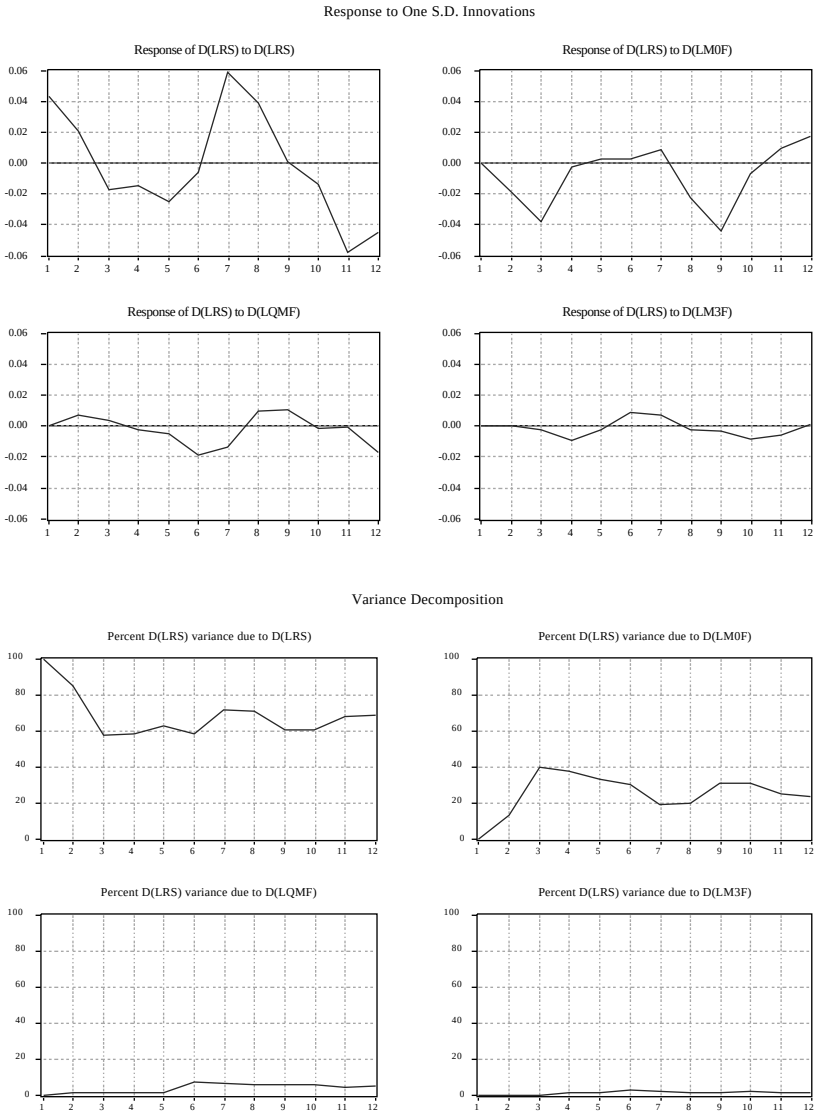


Chart 4

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (January 1995 – June 1997)



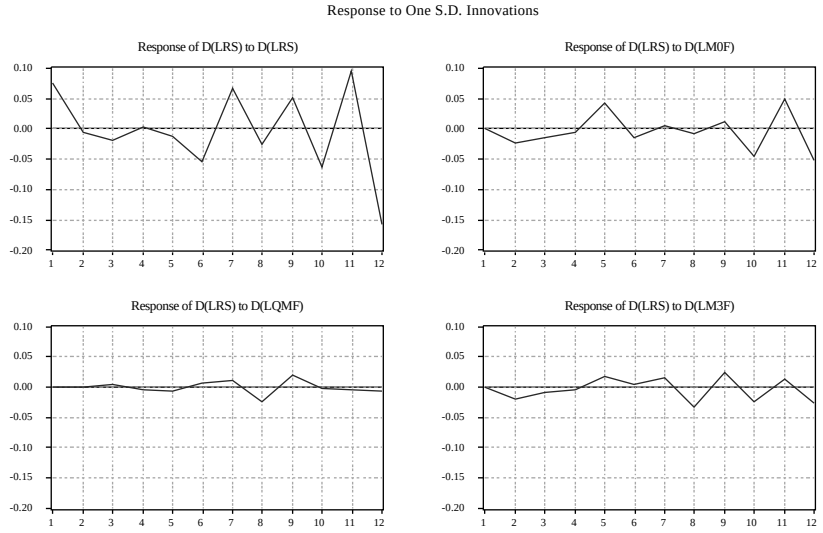


Chart 5

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (July 1997 – March 1999)

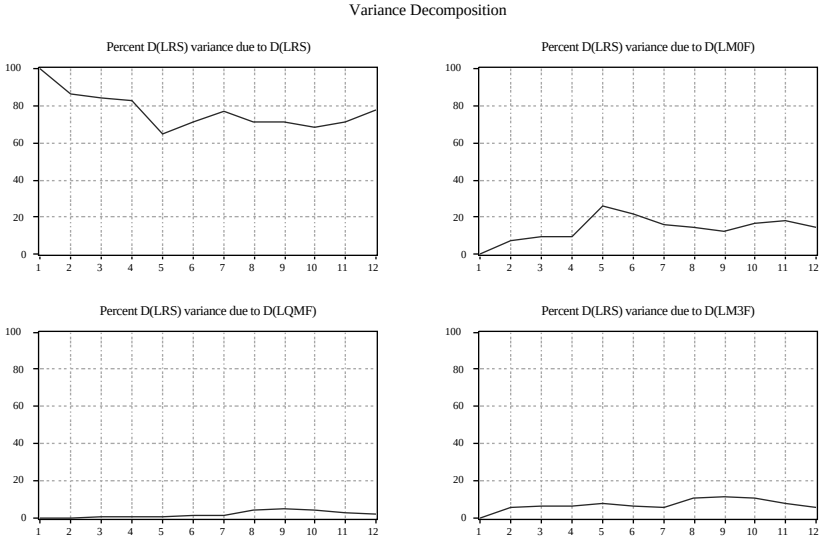


Chart 6

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Industrial Sales Index (July 1997 – March 1999)

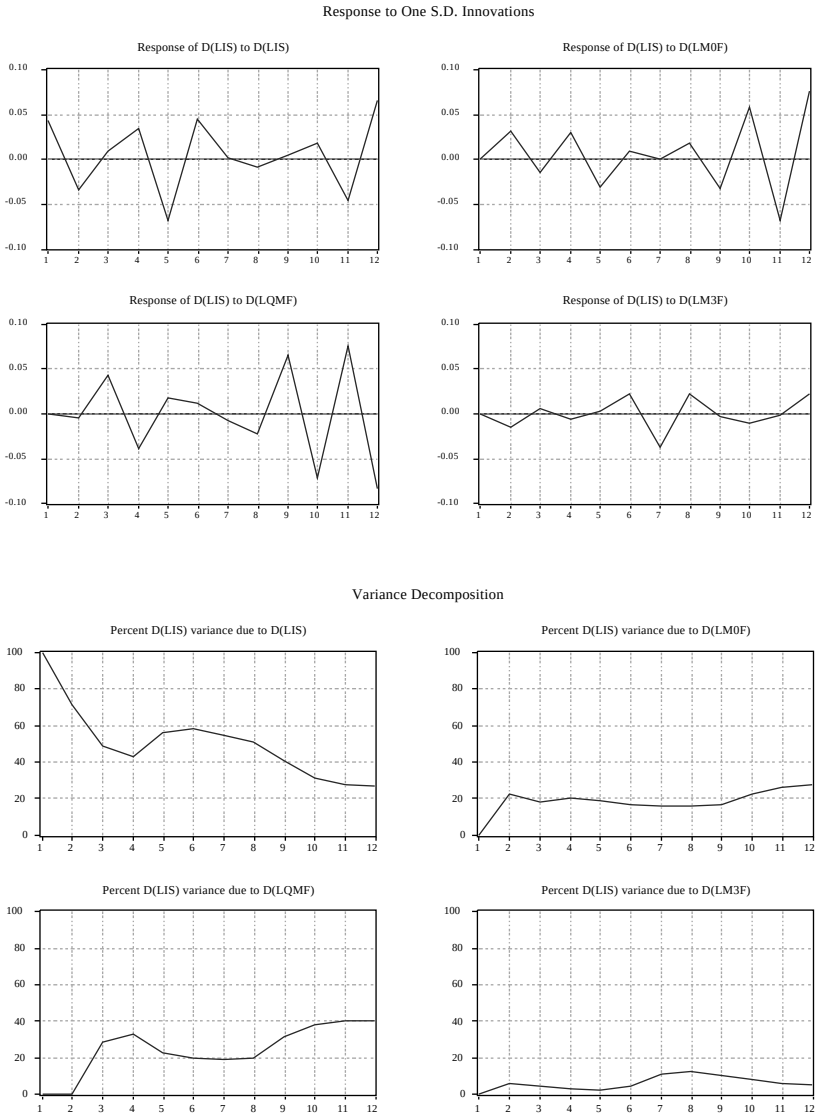


Chart 7

Effect of Unanticipated Components of Primary and Secondary Money on Retail Sales Index (January 1995 – June 1997)

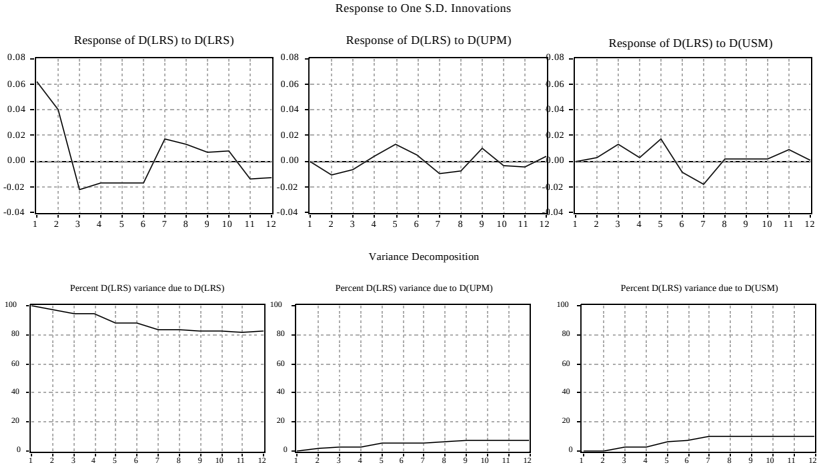


Chart 8

Effect of Unanticipated Components of Primary and Secondary Money on Retail Sales Index (July 1997 – March 1999)

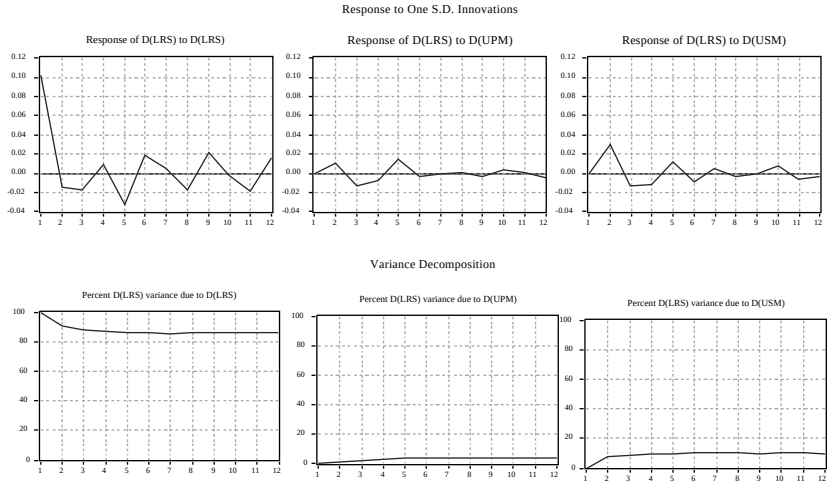


Chart 9

Effect of Unanticipated Components of Primary and Secondary Money on Industrial Sales Index (July 1997 – March 1999)

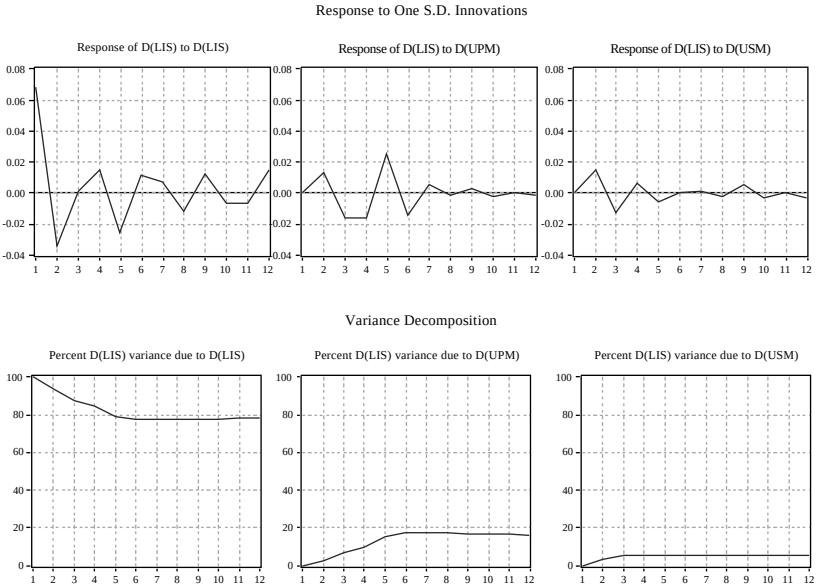


Chart 10

Effect of Unanticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (January 1995 – June 1997)

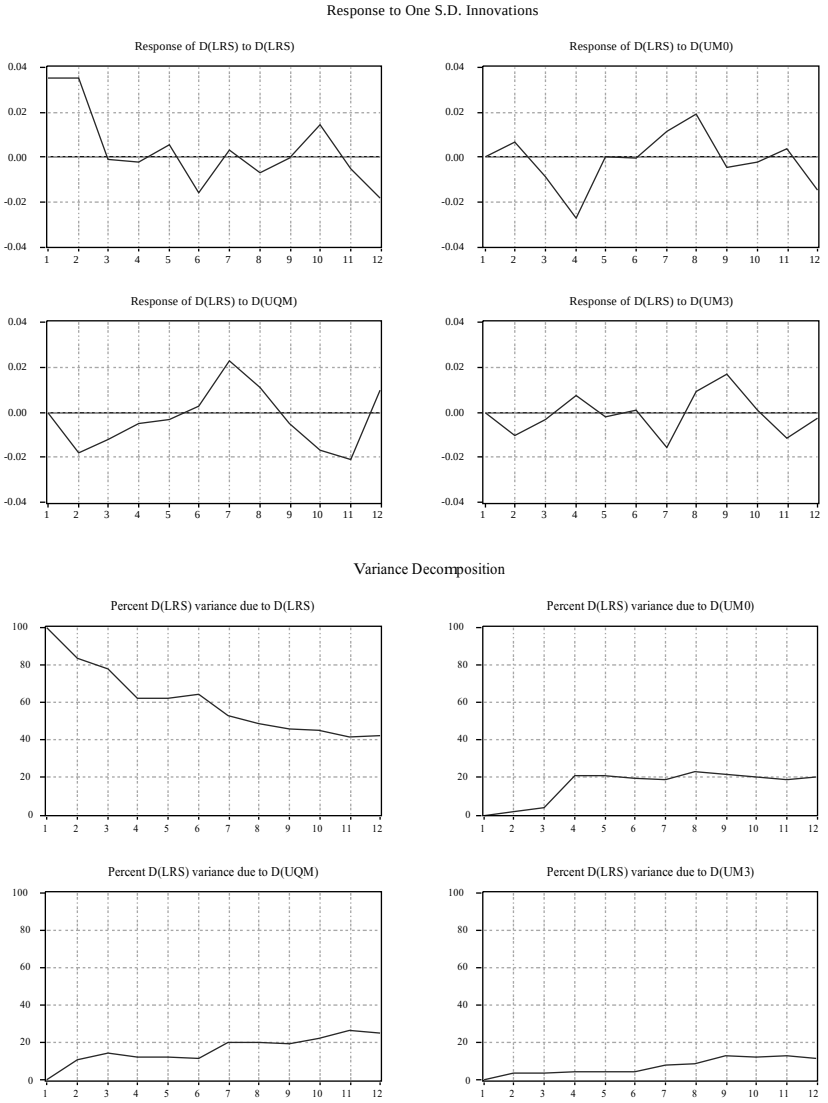


Chart 11

Effect of Unanticipated Components of Reserve Money, Quasi-money and M3 on Retail Sales Index (July 1997 – March 1999)

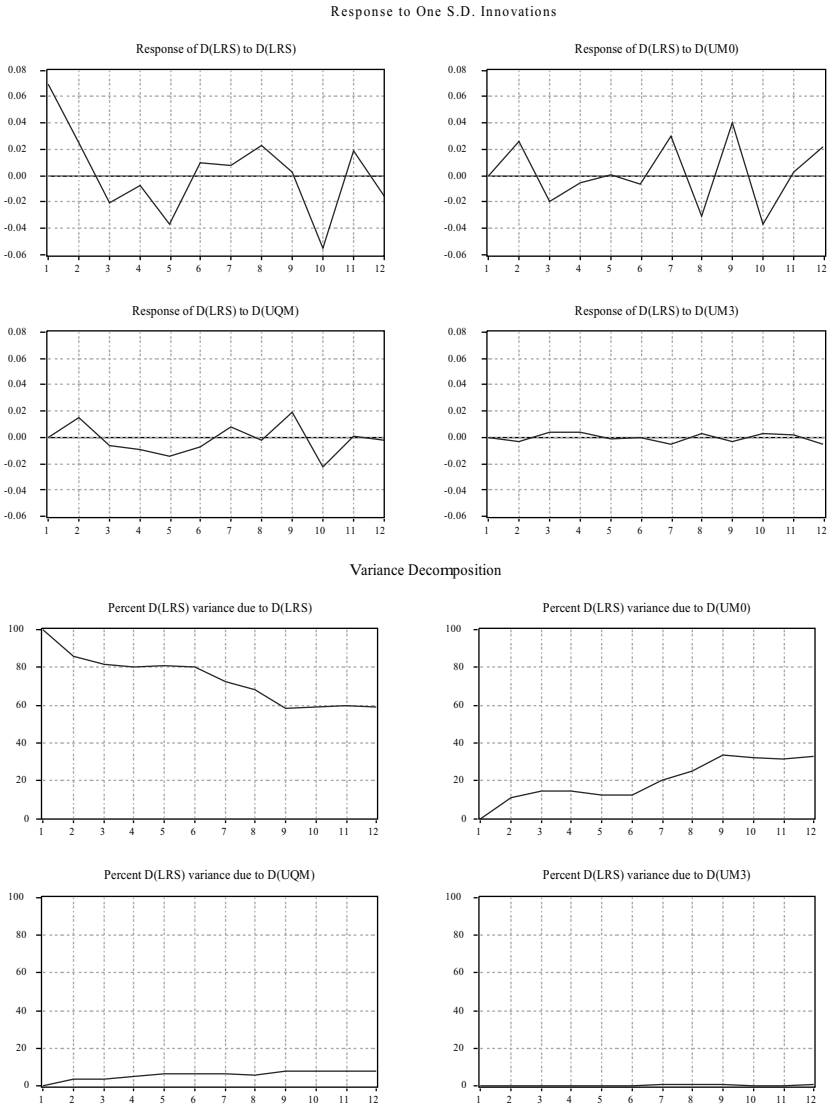
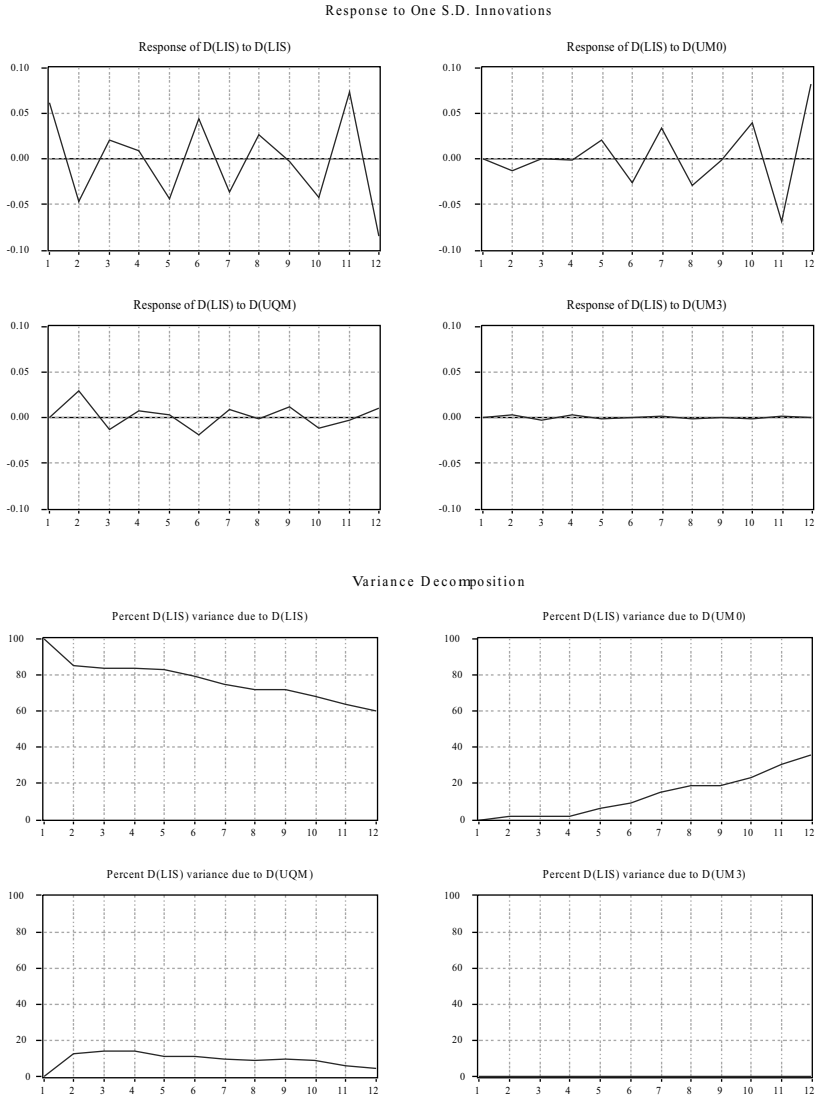


Chart 12

Effect of Anticipated Components of Reserve Money, Quasi-money and M3 on Industrial Sales Index (July 1997 – March 1999)



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The Currency Board in Bulgaria: The First Two Years

Jeffrey B. Miller

Abstract. Bulgaria experienced a severe financial crisis in 1996 and early 1997. Several banks were closed, inflation reached hyperinflationary levels and output declined sharply. During this period proposals were put forward to establish a currency board. It was hoped that a currency board would restore confidence and help stabilize the economy.

The currency board was established in July 1997. In many respects the currency board has been a great success. From hyperinflationary levels in February 1997, inflation fell to very low levels in 1998 and early 1999. The dramatic fall in nominal interest rates made it possible for the government to reduce large government deficits. The economy has also begun to grow, albeit more slowly than might be hoped during a recovery period.

A currency board establishes a fixed exchange rate and relies on automatic mechanisms to restore macroeconomic equilibrium. In theory, like the gold standard, the money supply will automatically adjust when balance of payments disequilibria arise. A currency board restores confidence by relying on these automatic mechanisms and severely limiting the discretion of policymakers.

What distinguishes currency boards from other fixed exchange rate regimes is the credibility of the exchange rate fix. Confidence in the currency is maintained by promising never to change the exchange rate and allowing the public to openly exchange as much local currency for reserve currency as they wish. The credibility of a currency board depends on both economic and political factors. To sustain confidence, the currency board must have sufficient foreign currency reserves to honor the pledge to exchange local currency for reserve currency. Politically, the government must be prepared to maintain the fixed exchange rate when adverse circumstances arise. To build confidence in the currency board and make it difficult to change the exchange rate, the exchange rate was written into the law establishing the Bulgarian currency board. Whether there is the political will to sustain the board will not really be known, however, until there is a real test. Thus far the Bulgarian currency board has not been confronted with a real challenge, but growing current account imbalances, which are likely to become worse because of the war in Kosovo, may create problems in the near future.

While the currency board in Bulgaria has been enormously successful in bringing down inflation, it has only been in place for only two years. In this paper we take a longer-term perspective and assess not only the board's immediate impact, but also its prospects for the future. Two issues are of special concern. The first is Bulgaria's large foreign debt. Bulgaria has been able to service this debt since the crisis ended in 1997, but there is now greater dependence on international financial institutions. The second concern is whether

the automatic adjustment mechanisms that maintain balance of payments equilibrium under a currency board arrangement will be effective. Without proper adjustments, it will not be possible to sustain the currency board in the long run.

Резюме. България усети силно финансовата криза през 1996 г. и в началото на 1997 г. Затворени бяха няколко банки, инфлацията достигна хиперинфлационни равнища, а производството рязко спадна. През този период беше предложено създаване на паричен съвет. Надеждите бяха, че паричният съвет ще възвърне доверието и ще подпомогне стабилизацията на икономиката.

Паричният съвет беше създаден през юли 1997 г. В много отношения той представлява успех. Инфлацията спадна от хиперинфлационните равнища през февруари 1997 г. до много ниски нива през 1998 г. и в началото на 1999 г. Драматичният спад на номиналните лихвени проценти направи възможно за правителството да намали големия бюджетен дефицит. Икономиката също започна да расте, макар и по-бавно, отколкото се считаше по време на периода на възстановяване.

С паричния съвет беше въведен фиксиран валутен курс и за възстановяването на макроикономическото равновесие се разчиташе на автоматични механизми. Теоретично, подобно на златния стандарт, предлагането на пари автоматично се приспособява, когато възникне неравновесие в платежния баланс. Паричният съвет възстановява доверието, като разчита на тези автоматични механизми и на строго ограниченото право на вземане на решения от страна на лицата, формиращи политиката.

Това, по което се отличава режимът на паричен съвет от всички други режими на фиксиран валутен курс, е доверието във фиксирането на валутния курс. Доверието в паричната единица се поддържа посредством обещание никога да не се променя валутният курс и като се позволи на обществеността свободно да обменя срещу резервната валута толкова места валута, колкото желае. Доверието в паричния съвет зависи както от икономически, така и от политически фактори. За да съхрани доверието, паричният съвет трябва да има достатъчни резерви от чуждестранна валута, че да спазва обещанието за обмяна на местната срещу резервната валута. Политически правителството трябва да оперира, така че да поддържа фиксирания валутен курс, когато възникнат неблагоприятни обстоятелства. За да се

изгради доверие в паричния съвет и да се направи трудна промяната на валутния курс, последният е вписан в закон за създаването на българския паричен съвет. Дали наистина има политическа воля да се запази в бъдеще паричният съвет не е известно, но за това съществува истински тест. До сега българският паричен съвет не е бил изправен пред истински предизвикателства, но в близко бъдеще поради войната в Косово увеличаващите се дисбаланси по текущата сметка биха могли да се влошат.

Макар че паричният съвет в България е извънредно успешен за понижаването на инфлацията, той съществува само от две години. В това изследване ще погледнем в по-дългосрочна перспектива и ще оценим не само непосредственото влияние на паричния съвет, но и бъдещите му перспективи. Два въпроса са особено важни. Първият е големият външен дълг на България. Откак кризата приключи през 1997 г. страната е в състояние да обслужва този дълг, но сега е по-зависима от международните финансови институции. Второто опасение е дали механизмите за автоматично приспособяване, които при паричен съвет поддържат равновесието по платежния баланс, ще бъдат ефикасни. Без адекватно приспособяване няма да бъде възможно в дългосрочна перспектива да се поддържа режимът на паричен съвет.

Contents

I. The Structure of the Currency Board in Bulgaria

"A currency board is at bottom an arrangement that legislates a particular monetary rule: a rule that changes in the monetary base will be equal to the country's overall balance of payments surplus or deficit." (Williamson, 1995, p. 1). A currency board differs from a central bank in that all its assets are held in liquid reserve-currency assets. The assets of a currency board do *not* include domestic assets.[1] Because of this limitation the currency board cannot hold government debt or act as a 'lender of last resort' which lends money to troubled commercial banks.

Two factors that contributed to the Bulgarian financial crisis of 1996 −1997 were large government deficits and bad loans on commercial bank balance sheets. An attraction of the currency board is that by cutting off credit to both the government and commercial banks, the currency board disciplines both institutions.

When Bulgaria adopted a currency board in July 1997, it chose the Deutschemark as the reserve currency. This was somewhat controversial because the dollar was widely used and oil imports, which are very important, are priced in dollars. The Deutschemark had the advantage, however, that it was soon to be merged with the Euro, and Bulgaria hopes to join the European Union. With the adoption of the Euro in January 1999, the Bulgarian lev is now fixed to the Euro.

[1] *In Argentina the reserve currency is the US dollar and the currency board does hold some dollar-denominated government debt.*

The currency board in Bulgaria has a structure similar to the currency board established earlier in Estonia where there is a separation between the Issue Department and the Banking Department. In Bulgaria there is also a third division, the Banking Supervision Department. The Banking Supervision Department is the regulator of commercial banks. The Banking Department has reserves that can be used in a crisis situation to help banks. The heart of the currency board is the Issue Department. The balance sheet of the Issue Department for 25 June 1999 is presented in Table 1. All foreign currency assets are entered on the balance sheet of the Issue Department. Since the exchange rate is fixed at BGL 1000/DEM, the total foreign assets of the currency board were approximately DEM 5.1 billion (USD 2.7 billion).

An important difference between this balance sheet and the typical currency board balance sheet is the presence of government deposits and Banking Department deposits on the liability side of the account. Theoretically, the only liability of a currency board would be the monetary base. As Table 1 shows, government deposits and deposits of the Banking Department together are actually greater than the monetary base (M0).

The Banking Department provides a safety valve in the event of crisis. The high inflation and sharp depreciation of the lev that occurred during the financial crisis greatly reduced the value of the money supply. With more foreign currency reserves than were needed to provide coverage for M0, reserves were set aside for the Banking Department. Additional loans from the IMF have also made it possible to increase the size of the Banking Department.

This structure has important advantages for a country that has an ongoing IMF program and large foreign debt service obligations. With a currency board changes in foreign exchange reserves will affect the size of the money supply. With this structure IMF tranches and payments of foreign debt obligations do not affect the monetary base. This arrangement reduces the volatility of the money supply that would otherwise be affected by large movements in the BNB's holding of foreign currency reserves.[2]

[2] *IMF tranches actually pass through the Banking Department and borrowings from the IMF are a liability of the Banking Department. There is a four-week window after the tranche is received where the government can make a decision to borrow this money*

This arrangement has some additional consequences, however. First, because of these accounting features, the Bulgarian currency board does not satisfy Williamson's definition cited above. Changes in the monetary base will not be equal to the country's overall balance of payments surplus or deficit when the government is engaged in international transactions. International activities of the government are 'spontaneously sterilized' whether they are IMF tranches, foreign debt payments or receipts from privatization deals with foreign investors.[3]

Second, government deficits will automatically be financed by printing money. An increase in government spending will increase the monetary base and have the same effect on the money supply as a decision by a central bank to buy government bonds when the government deficit spends. For the same reasons, normal government receipts and payments will affect the size of the monetary base and create additional money supply volatility. To reduce this volatility, Nenovsky and Hristov (1998) have argued that government deposits should be held at a commercial bank instead of the currency board.

There are several trade-offs to be considered here. Government deposits were originally placed at the currency board because the banking system was considered to be too weak (Enoch and Gulde, 1997). If deposits were placed at a commercial bank, IMF tranches and debt service payments would create more money supply volatility than the present arrangements. Another alternative would be for the government to keep deposits at both the currency board and commercial banks. The deposits at the currency board could be used for IMF tranches and debt service, and the deposits at commercial banks could be used for normal government operations. A possible disadvantage of this arrangement is that the government could influence the size of the monetary base by moving deposits from one account to another.

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from the BNB. The government can then make payments from this account to service the foreign debt. (A special exception was written into the law establishing the currency board allowing the government to borrow these funds from the BNB.) (Enoch and Gulde, 1997)

Careful consideration is also given to how money from the World Bank affects the money supply. Money which is passed to the government and eventually spent by the government will affect the money supply, but the World Bank is careful that the original transfer of funds to the government does not significantly affect the monetary base.

[3] Sterilization is usually associated with situations where central banks try to stop monetary contractions when balance of payments deficits arise. The situation here is different since there is no discretionary policy action being taken.

From the viewpoint of a purist, none of these arrangements is ideal. Since the government's deposits and its international transactions are large, government activities will influence the size of the monetary base. Under ideal conditions, money supply adjustments under a currency board system should reflect only imbalances in the balance of payments.

II. Advantages of a Currency Board

Williamson (1995, p. 13) lists four advantages proponents claim for currency boards:

> "[a]that they assure convertibility; [b]that they instill macroeconomic discipline; [c]that they provide a guaranteed payments adjustment mechanism; [d]that because of those three features they create confidence in the monetary system and therefore promote trade, investment and growth.

Convertibility

A key aspect of a currency board is its guarantee of currency convertibility at a fixed exchange rate. To assure convertibility there must be adequate reserves to cover any demands for foreign currency. Only then is there a credible claim that citizens can always exchange the local currency for reserve currency. A standard criteria for judging sufficient coverage is that the currency board needs sufficient holdings of the reserve currency to cover the monetary base (M0). For a currency board where commercial banks hold their reserves at the currency board, sufficient reserves to cover M0 will be adequate to guarantee the fixed exchange rate but insufficient to prevent a banking crisis. Commercial banks themselves will not have sufficient foreign currency to guarantee the convertibility. People will be forced to withdraw money from the banks and present their demands for foreign currency at the currency board. The currency board will be able to honor these demands, but the withdrawals will bring about a contraction of bank liabilities and the money supply as banks are forced to call in their loans and sell other assets.

In Bulgaria gross foreign currency reserves far exceed the minimum requirements for coverage of M0. As Table 1 illustrates, the Issue De-

partment has foreign currency reserves of BGL 5.1 trillion and M0 is only BGL 2.2 trillion. At the end of June foreign currency reserves at the BNB were more than twice as large as M1. Indeed the ratio of broad money to foreign currency reserves was only 1.21. These figures suggest that the Bulgarian currency board should be able to honor its commitments to the exchange rate fix.

While there should be no immediate problems, the longer-term picture is not so rosy. At the end of 1998 Bulgaria's foreign debt was more than USD 10 billion. (This was a 4% increase over the 1997 end-year figure.) During 1998 debt service was almost USD 1.1 billion. Annual service obligations for 1999 – 2001 are in the same range. To put these figures in context, the government's deposits in Table 1 represent a little more than one year's annual payments. The total assets of the Issue Department are less than the debt service obligations over the next three years.

The future strength of the currency board depends on the management of these foreign debt service obligations. It is interesting to note that while servicing more than USD 1 billion in foreign debt in 1998, government balances at the BNB were almost the same in June 1999 as they were in June 1998.

In 1998 the foreign debt was managed largely by borrowing additional funds from official creditors, mainly the international financial institutions (IFIs), i.e. the IMF, World Bank, European Union, etc. While almost USD 500 million of the USD 1.1 billion in service obligations were payments to IFIs, Bulgaria's total indebtedness to IFIs increased by more than USD 300 million. Bulgaria is becoming more dependent on the IFIs to finance its foreign debt obligations.

Promises from the IFIs for 1999 fall far well below debt service obligations. IMF and World Bank loans are expected to total about USD 500 million and there are perhaps another USD 100 million from other sources. Recently there have been negotiations for additional loans.

Other potential sources of foreign currency reserves include foreign direct investment, portfolio investment and floating a Eurobond. Attracting private portfolio money or floating a Eurobond has been made more difficult by the financial crises in emerging markets, especially the crisis in Russia. The war in Kosovo has further highlighted prob-

lems in the region.[4] Efforts to attract foreign direct investment have focussed on privatization efforts. In 1997 foreign direct investment was USD 636 million, but the pace has slowed in 1998 to USD 436 million. The much anticipated sale of the Bulgarian Telecommunications Company (BTC) still has not been concluded (OECD, 1999). While the sale of BTC should bring in a substantial sum, many state-owned enterprises have deteriorated during the past decade, and their sale is unlikely to bring sufficient foreign currency flows to have a substantial impact on the underlying foreign debt problems.

Current account surpluses are another potential source of foreign currency reserves. We discuss these issues in more detail in Section III. Suffice it to say here that while the current account was in surplus in 1997, Bulgaria's current account fell into deficit in 1998 and the damage to roads and bridges in Yugoslavia during the war in Kosovo is making trade more difficult.

The high inflation that preceded the establishment of the currency board in Bulgaria created a situation where there were more than enough foreign exchange reserves to provide immediate cover for M0, but without the support of IFIs, the foreign debt problem could still threaten the viability of the board. Because of these debt problems, dependence on the IFIs has grown over the past two years. It is still too early to determine whether the stability provided by the currency board will provide sufficient impetus to the private sector to reverse this trend, but it is unlikely that these changes will occur quickly.

Macroeconomic Discipline

Advocates of currency boards argue that they will instill macroeconomic discipline. Williamson views fiscal policy, in particular, as a political problem that may or may not be solved by the establishment of a currency board.

Very weak commercial bank balance sheets and large government deficits helped bring on the Bulgarian financial crisis in 1996 – 1997. Proponents of the currency board hoped that the establishment of the currency board would signal a change of regime and greater economic discipline.

[4] *While the war in Kosovo has made it more difficult to attract private capital flows, it has strengthened Bulgaria's position in its negotiations to obtain additional funds from the IFIs.*

During the period leading up to the crisis the BNB provided commercial banks with refinancing. The banks then loaned the money to enterprises. These loans were a form of implicit subsidy since there was little chance they would be repaid. "Until 1996, commercial credit was expanded to the nonfinancial sector in Bulgaria to a degree that was unprecedented relative to any other European transition economy." (OECD, 1999, p. 32).

Government attempts to recapitalize the banks failed. The government replaced bad loans to enterprises with government bonds. Banks then made additional loans, and their balance sheets did not improve. The government bonds increased the level of government debt and the interest obligations on this debt ballooned creating large government deficits. By 1996 interest payments were 17% of GDP.

The currency board has effectively brought an end to these problems. Since the Bulgarian currency board cannot hold domestic debt, it cannot refinance the banks nor can it hold government debt. The high inflation during the crisis reduced the value of the lev-denominated government debt from 70% of GDP in 1996 to less than 15% of GDP at the end of 1998. Interest rates also fell dramatically greatly reducing the servicing burden (OECD, 1999). The fiscal budget was in surplus in 1998. For 1999 the government projects a deficit of 2.8%, but the money is to be used to upgrade a badly deteriorating infrastructure.

The situation in the banking sector has also improved dramatically. The banks have reduced their exposure to the nonfinancial sector and the capitalization of the banks rose to 36.7% in 1998 (against the minimum requirement of 10%) (OECD, 1999). Initially the banks did little additional lending to the nonenterprise sector and expanded their cash holdings and their holdings of government bonds. As Table 2 illustrates, more recently banks have taken less conservative positions and have expanded the amount of lending to the nonfinancial sector and reduced their cash holdings.

After many years of struggling with inflation, inflation has also come down dramatically with the establishment of the currency board. At the end of the financial crisis in February 1997, monthly inflation was 240%. End-period CPI inflation for the year 1998 was 1.0% on an annual basis.

The experience with output growth has been positive but less spectacular. Output grew in 1998 by 3.5% after declining by 6.9% in 1997. This improvement is less impressive than it first appears. The financial crisis ended in the first quarter of 1997 and output was very low. GDP recovered some by the third quarter, but output has not grown since then (OECD, 1999).[5]

Evaluating the overall macroeconomic experience in Bulgaria during the first two years, the currency board has to be given high marks. The currency board was instituted at a time when people had little faith in macroeconomic policymakers and the economy was in a shambles. Inflation has come down to reasonable levels, the government's budget has been balanced, and the banks are taking greater care of their assets. These are certainly major accomplishments. While the economy has not really started to grow, the economy has been stabilized, and it is easier for economic decision makers to make new business plans with longer horizons.

Guaranteed Adjustment Mechanism

Under a currency board arrangement balance of payments (BOP) equilibrium is maintained through an automatic adjustment mechanism. As with the gold standard BOP deficits create outflows of foreign exchange reserves and a reduction of the money supply. The fall in the money supply forces interest rates upward and a contraction in the economy. This contraction will result in lower output and prices. The fall in output should be smaller if the fall in prices is greater. Higher interest rates create capital inflows. The fall in output depresses import demand and the fall in prices increases the competitiveness of exports. All three changes help restore BOP equilibrium. When there are BOP surpluses, the opposite forces act to restore equilibrium.

The long-term sustainability of the currency board depends on this mechanism. The automatic nature of the adjustment relies on a close relationship between foreign exchange reserves and the money supply. The Bulgarian currency board is designed to reduce the impact on the money supply when there are financial flows from the IMF and major debt service payments are made. This structure has the advantage of re-

[5] *The IMF's immediate post-Kosovo war projection for GDP growth in 1999 is 1.5%.*

ducing the volatility of M0 which would be caused by these flows, but it also means there is no longer a direct connection between BOP disequilibria and adjustments in the money supply. For example, if the BOP were in deficit, large government expenditures could be used to offset what otherwise would be a decline in M0. This would stop the contraction needed to restore BOP equilibrium.

Thus the design of the Bulgarian currency board has important advantages, but it also creates the danger that the additional flexibility between foreign exchange reserves and money supply will hinder the operation of the automatic adjustment mechanism which otherwise should ensure BOP equilibrium. In the long run this could affect confidence in the sustainability of the currency board.

Confidence in the Monetary System and Promotion of Trade, Investment and Growth

In Williamson's list of advantages for currency boards, the last point is that a currency board should create confidence and promote trade and growth. A recent empirical study by Ghosh, Gulde and Wolf (1998) finds that economies that adopt currency boards do have better inflation experiences, and this improved inflationary environment does promote better growth.

When the currency board was adopted in July 1997, there were immediate indicators of confidence in the exchange rate fix. As illustrated in Figure 1, interest rates fell dramatically as the establishment of the currency board was anticipated. Interest rates reached single-digit annualized levels once the board was in place.

These changes are to be expected since speculators will arbitrage between the Deutschemark and Bulgarian lev. The interest rate premium on lev securities is a measure of the additional risk in the Bulgarian market. The interest rate differential between the Deutschemark three-month LIBOR and the three-month Bulgarian government bond has been around 2% since the beginning of 1998.

This dramatic fall in nominal interest rates had two important effects. First, lower interest rates greatly reduced the government's domestic debt service obligations and helped the government gain control of its budget. Secondly, the fall in nominal interest rates occurred be-

fore inflation came down. At first real interest rates were negative, although they have recovered as inflation has also come down.

While the currency board has been able to stabilize the exchange rate, it has not brought a significant inflow of foreign capital. A number of privatization deals were completed in 1997. Foreign direct investment climbed, but the crisis in emerging markets and a slowdown in privatization reduced the level of foreign investment in 1998. *Per capita* foreign investment is much lower than most other Eastern European countries and even in 1997 it was still only USD 60 (OECD, 1999).

III. Disadvantages of a Currency Board

Williamson lists a number of disadvantages of a currency board. In this section we discuss only those problems which are most relevant to the Bulgarian case. These are: (a) the transition problem which arises when inflation leads to overvaluation of the real exchange rate; (b) the adjustment problem caused by BOP disequilibrium; (c) the crisis problem in the banking system because there is no lender of last resort; and (d) the political problem.[6]

Transition Problem

The transition problem is the problem of bringing inflation down quickly enough after the establishment of the currency board. Fixing the exchange rate should bring inflation down, but inflation can have a momentum that leads to an overvaluation of the real exchange rate. The gold standard mechanism will eventually correct the BOP imbalance that results, but the adjustment can be long and painful.

In Bulgaria there was some inflationary momentum, but it was short-lived. Following the very high inflation during the first half of the year, the CPI rose only 16% during the second half of 1997 and only

[6] *The other issues that Williamson discusses are: seigniorage, the start-up problem and the management problem. Currency boards allow countries to collect seigniorage where simply using another reserve country's currency does not. The start-up problem is the problem of collecting sufficient foreign currency reserves before establishing the currency board. The management problem is the inability of a country with a currency board to manage its monetary policy. This last problem is discussed below when the adjustment problem is analyzed.*

1% in the 1998. During the first four months of 1999, the price level actually fell a little.

To determine whether this inflation would cause an overvaluation of the lev depends on where the nominal exchange rate fix was initially set. Figure 2 plots the real exchange rate (lev/US dollar) deflated by the PPI for the period beginning in January 1990. As can be seen in the graph, the real exchange rate fluctuated dramatically during the period immediately preceding the establishment of the currency board. This made it more difficult to determine an appropriate nominal rate. The nominal exchange rate chosen secured a real rate in the middle of the range during the 1990s. Since the currency board system was implemented, the lev has actually depreciated against the dollar in real terms because of the appreciation of the dollar against the Deutschemark.

While the real exchange rate has not appreciated against the dollar, the balance on the current account has moved from surplus to deficit. So a transition problem has arisen. The current account surplus in 1997 was USD 426 million and the current account deficit in 1998 was USD 272 million. Preliminary figures for the first four months of 1999 show a continuing current account deficit of USD 320 million. The impact of the war in Kosovo is not reflected in these figures.

Most of this shift is occurring in the trade balance. As Table 3 illustrates, most of the change in the trade balance between 1997 and 1998 is due to a fall in exports. A comparison of first quarter statistics shows that the improvement in the economy since the first quarter of 1997 has led to an increase in imports, but the major overall factor leading to the deficit is the decrease in exports. Falling exports to the former Soviet Union (USD 338 million) account for more than half the decline. Exports to Turkey also fell by USD 100 million (22%). On the other hand, exports to the European Union, which now constitute one-half of all exports, were almost unchanged between 1997 and 1998. This suggests that the real appreciation of the lev against the Deutschemark did not have an immediate impact on exports to that region.

According to preliminary figures overall exports declined another 24% in 1999, first quarter 1998 to first quarter 1999 (see Table 3). Exports to the European Union fell 9%, and there were further declines in exports to the former Soviet Union. Exports to the former Soviet Union in 1999 were only one-third the level of the comparable period in 1997.

Thus, Bulgaria has a current account deficit problem as it transitions to a currency board, but continuing inflation did not play a central role. The BOP problems have different causes. Bulgaria has been hurt by the crisis in emerging markets, particularly the crisis in Russia and its affects on other countries in the region. However, between 1997 and 1998 the real problem was that Bulgaria was unable to expand its export trade in any other major region.

Adjustment Problem

Unlike other countries that have had a currency board for a longer period of time, the currency board in Bulgaria has not really been tested. This may soon change with the growing current account deficits. While there was no speculation against the lev when the Russian crisis occurred, continuing current account deficits could cause a contraction in the economy. Williamson refers to this as the adjustment problem.

The adjustment process unfolds when BOP deficits lead to a contraction in the monetary base, a fall in the money supply and a decline in aggregate demand. Either a fall in output or a decline in prices can improve the current account balance. The greater the decline in prices, the smaller the decline in output needed to bring about equilibrium.

Figure 3 plots the movement of the monetary base over the period of the currency board. It is clear from a comparison of Table 3 and the changes in Figure 3 that there are more factors affecting the monetary base than the changes in the current account. The dramatic increase in the monetary base in late 1997 when the currency board was first established reflects a portfolio readjustment following the hyperinflationary period that preceded it. Holding levs was a much safer bet than before. This created an inflow of foreign currency reserves.

Figure 3 also shows an increase in M0 during 1998 in spite of current account deficits. The first six months of 1999 show a sharp decline in M0 in January and then a slight decline after that. Because of the large swing in M0 in December (for both 1997 and 1998), it may be more useful to compare November 1998 and June 1999. Over this period M0 *declined* by BGL 54 billion (DEM 54 million) or 2.5%. Because there was a small increase in the money multiplier over this period the money supply actually *increased* by BGL 81 billion (DEM 81 million) or 1.3%. While current account figures are available only

through April 1999, the current account deficit from November to April was USD 385 million.

From these figures it does not appear that the current account deficit is creating a monetary contraction. On the other hand, the decline in exports is reducing aggregate demand. This should slow the growth of the economy. If the money supply contracted, this would reduce aggregate demand even more.

Under a currency board arrangement there is little that can be done to offset these contractionary pressures. In a more flexible environment expansionary fiscal or monetary policy might slow the contraction. If Bulgaria had a floating exchange rate, a depreciation of the real exchange rate might spur exports. None of these options exist under a currency board.

The impact of contractionary policies on prices can be very important. If prices are more flexible in a downward direction, the contraction in output should be less severe. Figure 4 shows the relationship between monthly CPI adjustments in Germany and Bulgaria. The increase in the CPI during the first six months of the currency board was higher in Bulgaria, but in 1998 the CPI increases were almost the same: 0.6% in Germany and 1.0% in Bulgaria. The volatility of price adjustments in Bulgaria was much greater. In several months Bulgarian prices fell, in part because food prices fell almost 5% in 1998. This suggests that Bulgarian prices might indeed fall more during a contraction than a country like Germany. This should ease the output effects of a contraction caused by the adjustment process that will take place under a currency board arrangement.

Current account deficits and BOP deficits are not equivalent. The current account deficit can be offset by increases in foreign investment. This is an alternative mechanism under which a currency board arrangement relies on growth in the economy to correct the current account imbalance. Under this scenario, foreign investment will lead to greater growth and an eventual reduction in the current account deficit. With this adjustment mechanism, which appears to be the pattern that is unfolding in Bulgaria, the viability of the currency board depends on the efficient use of foreign investment to increase productivity. It is too early to determine whether these productivity improvements are occurring in Bulgaria.

Crisis Problem

What Williamson refers to as the crisis problem arises because there is no 'lender of last resort' under a formal currency board. In Bulgaria there is more flexibility. When the currency board was established, a Banking Department was created to provide protection during a crisis. A substantial amount of money was put aside in the Banking Department and has increased since the board was created. In June 1999 the deposits of the Banking Department at the Issue Department were 140% of bank reserves (Table 1).

Offsetting this advantage is the small presence of foreign banks in Bulgaria. Most countries with currency boards have been countries where foreign banks were dominant, as with the British colonies. Hong Kong and Argentina are exceptions, but the presence of foreign banks in these countries is also greater than in Bulgaria. Argentina experienced a run on its banks in 1994 – 1995 during the Mexican debt crisis. The exchange rate was maintained, but reserve requirements were reduced by half – a very noncurrency board thing to do. The IMF provided large loans, and small banks were absorbed by large banks (Williamson, 1995). Since then Argentina has organized large lines of credit which can be called upon in the event of another crisis.

If banks have lines of credit in foreign currency upon which to draw, the contraction will be less severe. Foreign banks should be able to draw on their parent banking institutions for resources in the reserve currency, especially if their parent is in the reserve currency country. For Bulgaria today any bank from Euroland would serve this function. At present, foreign banks make up only a small portion of the commercial banking sector. This could change significantly if Bulbank, formerly the Foreign Trade Bank, is purchased by a foreign bank. Bulbank has approximately one-third of commercial banking assets in Bulgaria.

It is difficult to judge what will happen during a financial crisis, but one can interpret from portfolio behavior what economic agents perceive the risks to be. Under a currency board the risk of currency devaluation is reduced, but the risk of bank failure is greater. In Figure 5 the cash-to-deposit ratio is plotted for period beginning in December 1990.[7] As can be seen from the figure, the cash-to-deposit ratio rose

[7] *Deposits include both lev and foreign currency deposits.*

dramatically when the currency board was established. This rise reflects the greater confidence in the lev as people exchanged dollars for lev. But confidence in the banks is still weak.

The behavior of banks has also been conservative since the establishment of the currency board. Figure 6 shows the ratio of bank deposits to reserves. During the currency board period the required reserve ratio (also shown on the graph) was 11%. Until very recently banks have been holding reserves well above this level. As seen in Table 2, recently banks have become more aggressive and have reduced their cash holdings and extended more loans. In part this reflects changes in the procedures for determining compliance with the minimum reserve requirements, but it may also reflect pressures on bank profitability. It is difficult for banks to make profits if they are holding large cash balances and low interest paying government securities.

Political Problem

The last disadvantage that Williamson lists is the political problem. The question he raises is whether the currency board will really impose controls on the fiscal authority. He remains skeptical that this will necessarily be the case.

Thus far the currency board in Bulgaria has created an environment where the government has been able to control budget deficits. If there is a political problem, it is the appearance, perhaps, that the currency board is too strong. In political debate the government has used the currency board to deflect demands on the budget. This has created an environment where the greatest political threat to the currency board is not the fiscal actions of the present government, but the political attacks on the currency board.

IV. Conclusions

There are many challenges in the Balkans. After climbing one mountain, there is another mountain in your path. The Bulgarian economy has climbed a high mountain, but there are many challenges ahead. The currency board has brought needed discipline to the economy. The money supply is no longer growing too rapidly. Government budgets are now under control. Banks' lending is much more cau-

tious. The result is that inflation has come down dramatically, and the economy is beginning to grow.

Having met these challenges, there are others that still lie ahead. Bulgaria still has a very large foreign debt. The servicing of the debt is still a problem, and there is a heavy reliance on the IFIs to provide support for these payments. These problems have been made more difficult because the current account is now in deficit.

The current account deficit may well create serious challenges for the currency board. This deficit has arisen in large measure because of factors outside Bulgaria. Still declining exports are contractionary, and the currency board arrangement provides no mechanism for offsetting these forces. At the same time, Bulgaria is being spared an even more painful experience since the contraction is smaller than it would have been if the money supply had not continued to expand. Even if the money supply does not fall, a decline in output at this stage could create additional political problems

The longer-term solution to these problems, however, is growth. It is still too early to determine whether the increased stability brought on by the currency board and the inflow of new foreign capital will be sufficient to increase productivity. If productivity improves, Bulgarian goods will become more competitive and the current account will readjust. If productivity does not improve, then the long-term viability of the board will be in question.

The currency board in Bulgaria is beginning to mature as economic agents are gaining a better understanding of the constraints they now face. The government has more confidence now and has been contemplating a small deficit to improve infrastructure. Banks are beginning to lend more as they reduce their holdings of cash and government securities. The question now is whether the government and the banks can now proceed prudently when the constraints appear to be less severe.

The currency board has brought stability to the economy. The next stage will test whether these gains can be consolidated and longer-term growth can be achieved.

Table 1

WEEKLY BALANCE SHEET OF ISSUE DEPARTMENT AS OF 25 JUNE 1999

(million BGL)

ASSETS		LIABILITIES	
Cash and nostro accounts in foreign currency	1 174 463	Currency in circulation	1 623 821
Monetary gold	627 509	Bank deposits and current accounts	552 655
Foreign securities	3 291 183	Government deposits and accounts	2 196 484
Accrued interest receivable	57 241	Other depositors' accounts	367
		Accrued interest payable	414
		Banking Department deposit	776 655
ASSETS	5 150 396	LIABILITIES	5 150 396

Source: BNB.

Table 2

AGGREGATE BANK BALANCE SHEETS
(Percentages of major liability categories)

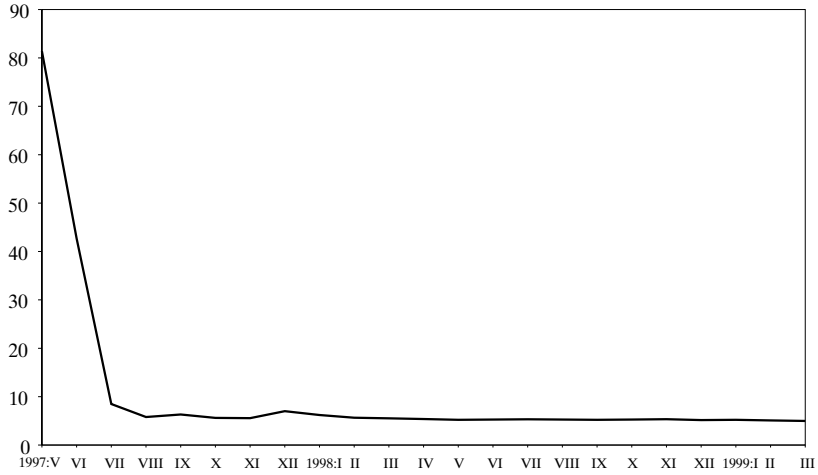
(%)

	1996	1997	1998		1999
	Dec.	Dec.	June	Dec.	Feb.
Cash	10	19	16	14	12
Government securities	24	24	25	20	21
Claims on banks and other financial institutions	24	29	28	32	30
Claims on nonfinancial institutions	39	22	23	27	29

Source: BNB

Figure 1

ANNUAL COMPOUND BASE INTEREST RATE

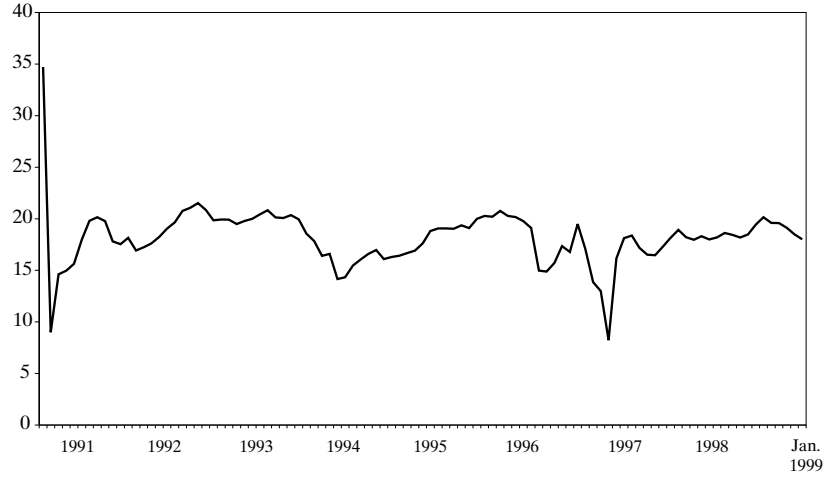


Source: BNB.

Figure 2

REAL EXCHANGE RATE (PPI)

(USD)



Source: BNB.

Table 3

BALANCE OF TRADE 1997 – 1998

(million USD)

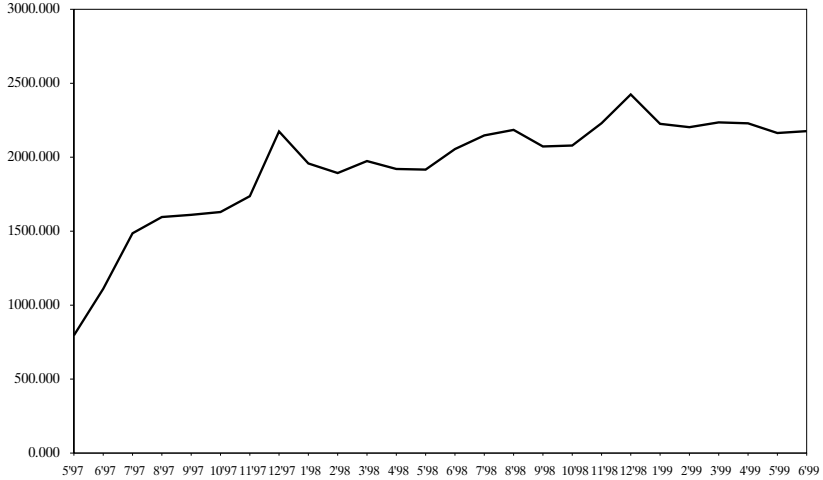
	Q1	Q2	Q3	Q4	Total
1997					
Trade balance	308.8	46.5	97.7	-72.6	380.4
Exports, fob	1190.9	1233.5	1272.0	1243.3	4939.7
Imports, fob	882.1	1187.0	1174.2	1315.9	4559.3
1998					
Trade balance	1.6	-68.9	-104.3	-157.9	-329.5
Exports, fob	1103.4	1113.0	1027.3	1050.2	4294.0
Imports, fob	1101.8	1181.9	1131.6	1208.2	4623.5
1999					
Trade balance	-165.7				
Exports, fob	865.8				
Imports, fob	1031.5				
Change between 1997 & 1998					
Trade balance	-307.2	-115.4	-201.0	-85.3	-709.9
Exports, fob	-87.5	-120.5	-244.7	-193.1	-645.7
Imports, fob	219.7	-5.1	-42.6	-107.7	64.2

Source: BNB.

Figure 3

MONETARY BASE

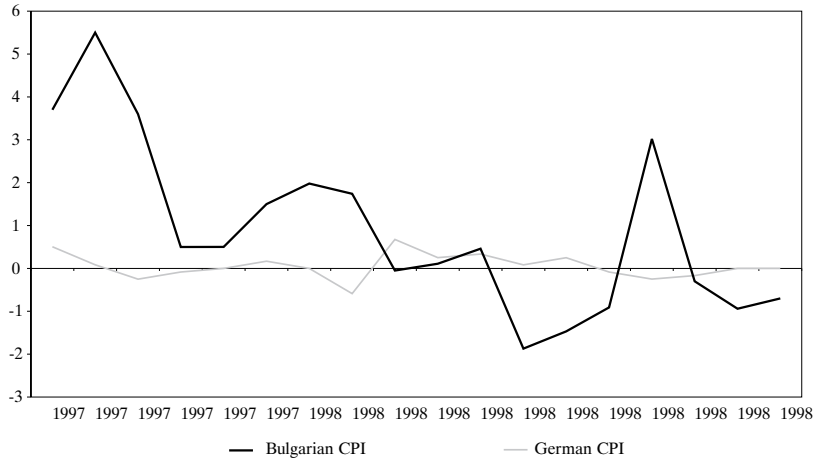
(billion BGL)



Source: BNB.

Figure 4

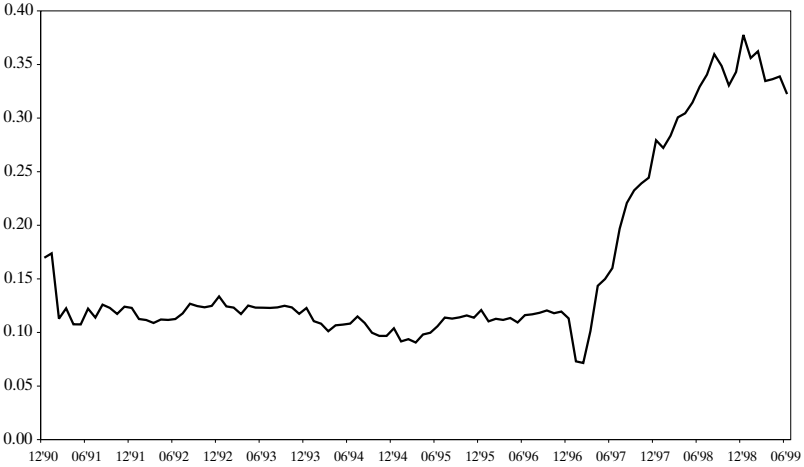
MONTHLY CPI CHANGES IN BULGARIA AND GERMANY



Sources: BNB, IMF: International Financial Statistics.

Figure 5

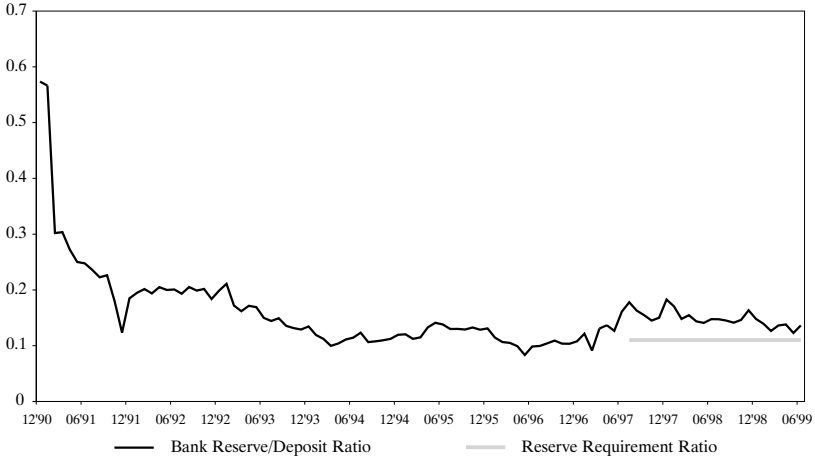
CASH/DEPOSIT RATIO



Source: BNB.

Figure 6

BANK RESERVE/DEPOSIT RATIO



Source: BNB.

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DP/13/2000

Currency Circulation after Currency Board Introduction in Bulgaria

(Transactions Demand, Hoarding, Shadow Economy)

Nikolay Nenovsky, Kalin Hristov

Abstract. Demand for currency is of great importance for maintaining the automatic mechanism of the currency board. Present analysis refers to the period after the introduction of the currency board in Bulgaria and includes major aspects of currency demand. The study consists of three components: analysis of transactions demand for currency, analysis and estimation of banknotes hoarding as a store of value and estimation of the shadow economy applying the currency circulation method.

Резюме. Поведението на парите в обращение е от важно значение за поддържането на автоматичния механизъм на паричния съвет. Настоящият анализ е приложен за периода след въвеждането на паричен съвет в България и се опитва да обхване основните страни на търсенето на банкноти и монети. Изследването се състои от три елемента: анализ на трансакционното търсене на пари в обращение, анализ и оценка на натрупването на банкноти с цел съхраняване на богатството и оценка на скритата икономика чрез метода „пари в обращение“.

Contents

I. The Necessity and Logic of the Study

Currency in circulation (banknotes and coins) is the most liquid monetary aggregate on which economic agents' behavior is focused because currency as a means of exchange approaches most closely the genesis of money.

It is often assumed that currency circulation dynamics is an indicator for monetization or demonetization of the economy. Undoubtedly, this is important but simplifies the importance of its behavior. Under the currency board regime (CB) the behavior of currency in circulation acquires special significance. This is due to the fact that the volume of banknotes and coins is not determined by the central bank and the primary impulse stems from demand for money by the public and companies. Money supply is endogenous which distinguishes it both from exogenous supply models and those with money supply resulting from the function of monetary authorities reaction under preliminary assumed loss function.

Currency in circulation together with commercial bank reserves are the basic components of reserve money dynamics in which disproportions and disequilibria in the economy finally polarize. Fast and automatic balancing of reserve money demand and supply (through interest rate and the volume of reserve money) is the basic mechanism ensuring the stability of the currency board.[1] It is important to study dynamics in the two key components of demand for reserve money for purposes of systemic risk forecast. No matter wherever the initial shock may come from and a possible attack against the fixed exchange rate may start (micro- or macroeconomic, banking or foreign exchange), this attack inevitably will cause a dramatic change in demand for reserve money and will focus on the liabilities of BNB Issue Department.[2]

The main task of the present study is to give a full overview of the reasons determining dynamics and volatility of currency in circulation. Our approach is microeconomic. The goal of the study determines its logic as follows: *first*, we analyze transactions demand for currency which is considered its major component. *Second*, we focus on cur-

[1] See the study on the seasonal character and volatility of monetary aggregates after the introduction of the currency board in Argentina (*Grubisic, E*., 1995 and *Lopetegui, G*., 1996).

[2] For detailed study of speculative attack models see: *Nenovsky, N., K. Hristov* (1997), *Nenovsky, N., K. Hristov, B. Petrov* (1999).

rency circulation dynamics caused by its use as a means of hoarding which is very interesting in the context of a set of studies in the EU. Last but not least we make an attempt to estimate the relationship between banknotes and coins dynamics and those of the shadow economy. The latter accent is also very interesting because, as far as we know, no attempt to estimate the shadow economy in Bulgaria using the currency circulation method has been made. The study of various motives for currency demand has special significance in the context of currency board operation and replacement of the lev by the euro during Bulgaria's future integration into the European Monetary Union. Analysis is reduced to the above three components of currency behavior, while actually these components are strongly interwoven.

The paper includes the following sections: the second section shows the major trends of currency circulation in Bulgaria after the introduction of the currency board. The third section deals with transactions demand for currency. Estimation of the banknotes and coins for hoarding is presented in the fourth section. The fifth section focuses on the relationship between the currency in circulation and the shadow economy. Finally, in the sixth section we draw some theoretical conclusions and policy implications.

II. Currency Circulation Dynamics after Currency Board Introduction in Bulgaria

In the period following the introduction of the currency board a steady upward trend of banknotes and coins per capita is observed. For the two and a half years under the new monetary regime banknotes and coins per capita have increased by 164% in nominal terms. Having in mind low inflation rates after the introduction of the currency board, the real growth is 124%.

Undoubtedly, the fixed exchange rate has a stabilizing effect on the dynamics of banknotes and coins per capita. This effect restored demand for banknotes and coins in national currency by reducing inflation and overcoming inflationary expectations. This effect is consistent with exchange rate based stabilization programs when restoration of real money balances occur after hyperinflation (*Rebelo, S., C. Vegh, 1996*). It finds expression in the fact that economic agents adjust their real money balances to the desired level. Real money balances effect

becomes a basic transmission mechanism and it may be interpreted through money inclusion in the utility function or budget constraints of economic agents.

As is well known, the term of foreign currency substitution and restoration of the national currency as a means of circulation is determined by the credibility of the fixed exchange rate regime. Progressively increasing rates of banknotes and coins after expiry of the initial stabilization effect of the currency board show that other factors affecting its dynamics exist. This is confirmed by the higher rates of banknote and coin increase per capita compared with those of money expenses.

Table 1

CURRENCY CIRCULATION DYNAMICS AFTER CURRENCY BOARD INTRODUCTION IN BULGARIA

	VI'97	IX'97	XII'97	III'98	VI'98	IX'98	XII'98	III'99	VI'99	IX'99	XII'99
C	67	113	150	166	172	172	199	202	180	199	236
ΔC/C	-	68.7	32.7	10.7	3.6	0.0	15.7	1.5	-10.9	10.6	18.6
ΔME/ME	-	48.5	25.1	4.3	4.0	1.8	13.2	-1.0	-4.8	1.6	11.3
AW	157	171	191	190	199	208	213	216	220	238	236
DC	5	6	8	9	10	11	13	16	21	24	32
C/M3	14	18	21	24	23	23	25	27	24	24	27
N50/C	24	47	50	50	52	54	57	59	61	52	50
N20/C										23	23
N10/C	15	9	18	20	21	23	22	22	22	15	14

C – banknotes and coins per capita (in levs);
ΔC/C – percentage growth of banknotes and coins per capita;
ΔME/ME – percentage growth of household money expenses per capita;
AW – average wage in public sector[3];
DC – number of debit cards per 1,000 persons;
N50/C – share of 50-lev banknotes in currency circulation;
N20/C – share of 20-lev banknotes in currency circulation;
N10/C – share of 10-lev banknotes in currency circulation.

[3] The average wage in the private sector is not presented here, since officially reported levels are much lower than those in the public sector which makes the data questionable.

The increased demand for banknotes can be explained by their use for hoarding, in the shadow economy and as a means of circulation and saving by economic agents abroad. The latter is characteristic of countries with stable national currency, as the USA, Germany, Switzerland and Japan.[4] This factor is of no importance for Bulgaria. Currency hoarding and shadow activities service affects most significantly demand for banknotes in Bulgaria. The progressively growing share of currency circulation in M3 is an indicator of increased demand for banknotes. This process is accompanied by a relatively dynamic development of the payment system (retail payments); number of debit cards and volume of payments with them increases steadily in the period after currency board introduction in Bulgaria (see Appendix 1).

The growing share of the two largest denominations in currency circulation proves that they are increasingly used for hoarding and servicing of the shadow economy and not for transactions in the official economy. At the end of 1999 the two largest denominations (BGN 20 and BGN 50) comprised 73% of the currency in circulation (see Appendix 1). Having in mind the structure of household expenses (expenses on food accounting for over 50%), the structure of relative prices and the level of officially registered incomes in the country, we can certainly argue that the two largest denominations are rarely used for transactions service in the official economy.

III. Transactions Demand for Currency

1. The Methodology and the Model

Banknotes and coins are used mainly as a means of exchange which determines the leading role of the transactions motif of demand for currency. The basic impulse for banknotes and coins demand comes from the public, the private business and the public sector. The demand passes through the commercial banks which are the major intermediary between the public, the business and the public sector, on the one hand, and the central bank, on the other. Finally, demand reaches the central

[4] See the studies of *Sprenkle, C.* (1993*), Judson, R., R. Porter* (1996), *Anderson, R. A., R. H. Rasche* (2000) on circulation of the US dollar outside the USA, the study of *Seitz, F.* (1995) on the use of the Deutschemark outside Germany and the study of *Rogoff, K*. (1998) which summarizes circulation of US dollars, Japanese yens and Deutschemarks outside the territory of the countries issuing these currencies.

bank which can supply the needs of currency in circulation against another type of assets. A summarized model of demand for currency (in real terms) may be presented as follows:

$$C^d/P = c\ (Y, \mathbf{R}, n), \quad (4)$$

and

$$\mathbf{R} = [i^{out}, i^{own}, \pi^e, Var\ (\pi)], \quad (5)$$

where

C – currency circulation in nominal terms;
P – general price level;
Y – variable approximating real sector development;
R – vector of assets prices in economic agents' portfolios;
i^{out} – yield of noncash financial assets;
i^{own} – currency yield;
π^e – projected inflation rate;
Var (π) – variance of inflation;
n – proxy of payment system development and financial intermediation.

2. Statistical Data and Results

Following the above theoretical model of demand for banknotes and coins by households and companies, we can build the following operational model.[5]

With the exception of the shadow economy, demand for banknotes and coins is most closely connected with households and companies which produce consumer goods. We follow a widely held approach in modeling transactions demand for banknotes and coins for use of household expenditure as proxy of demand transactions component. It is considered that household money expenses are more closely connected with demand for currency circulation than money income (*Boeschoten, W., 1992, Breedon, F., P. Fisher, 1993, Janssen, N., 1998*). To measure demand for banknotes and coins by companies producing consumer goods, we use receipts from retail sales as an additional transactions variable. We also use household money expenses and receipts from sales estimated on the basis of the National Statistical Institute (NSI) methodology (1998). Approximately 80 – 82% of money expenses are consumer expenses used in the formation of weights for calculation of the consumer price index. This gives us grounds to use the

[5] Recently, sector models have been increasingly used for study of currency circulation (usually households and business) which is a result of asymmetrically located liquidity in the real sector (*Butkiewicz, J., M. McConnel, 1995).*

consumer price index as a variable describing influence of the price level on demand for banknotes and coins.

In contrast to the general models of demand for money where it is estimated in real terms, demand for banknotes and coins is estimated in nominal terms. Under these conditions, in order to estimate the influence of price level on demand for currency, we add inflation rate measured through the consumer price index as an explanatory variable. We define vector **R** based on prices of assets which the economic agents may use in their portfolios, i. e. yield of current accounts in levs, yield of current accounts in US dollars, yield of time deposits in levs, yield of time deposits in US dollars, yield of government securities, and the BGN/USD exchange rate. We include the BGN/USD exchange rate as an opportunity cost of holding banknotes and coins in demand function having in mind the high level of unofficial dollarization in the country and economic agents' preference for saving money in foreign currency. As proxy of financial and payment system development impacting essentially demand for banknotes and coins by households and companies, we use number of ATMs, number of issued credit and debit cards, number of POS terminals and number and volume of transactions conducted via ATMs. Influence of financial innovations and payment and financial system development are estimated using the above variables (not the cumulative interest rate term used in some studies).[6]

We analyze the period after currency board introduction in the country until December 1999 using monthly data from BNB monetary statistics and NSI statistics on household budgets and retail sales. Data on variables used as proxy of the degree of financial and payment system development are based on BORICA (Banking Organization for Payments Initiated by Cards) statistics. All variables are seasonally adjusted using the standard CENSUS X11 procedure. All series with the exception of the interest rate and inflation rate are given in logarithm. The series of ATM number, POS terminals and debit cards are presented per capita. Estimated functions of transactions demand for banknotes and coins are displayed in Table 2 (**t**-statistics are shown in the brackets).

[6] For presenting models of demand for banknotes and coins where the cumulative interest rate is used as proxy of the degree of financial and payment system development, see *Breedon, F, P. Fisher (1993), Astley, M., A. Haldane (1995)* and *Janssen, N. (1998).*

Table 2

TRANSACTIONS DEMAND FOR CURRENCY MODELS (DEPENDENT VARIABLE C)

Variables	Model 1	Model 2	Model 3	Model 4
Constant	11.95 (5.00)	8.41 (4.54)	6.03 (2.49)	7.64 (2.75)
C(-1)	0.43 (5.57)	0.41 (4.93)	0.71 (20.03)	0.63 (10.37)
ME	0.29 (2.18)	0.38 (2.90)	-	-
RS	-		0.18 (2.12)	0.11 (1.21)
I	-	-0.009 (-2.96)	-	-0.007 (-1.82)
E	-0.32 (-1.97)	-	-0.26 (-1.47)	-
π	-0.008 (-2.06)	-0.009 (-2.12)	-0.0003 (-0.081)	-0.007 (-1.43)
ATM	0.48 (4.78)	0.43 (3.95)	0.26 (2.29)	0.39 (2.93)
ATMW	-0.22 (-3.42)	-0.22 (-3.07)	-0.11 (-1.41)	-0.19 (-2.22)
POS	-	-	-	-
CARDS	-	-	-	-
R^2	0.98	0.99	0.98	0.98
Adjusted R^2	0.98	0.98	0.98	0.98
S.E. of regression	0.02	0.03	0.03	0.03
DW Statistics	1.67	1.71	1.82	1.26

where

C – currency circulation;
ME – monetary expenses of households;
RS – retail sales;
I – interest rate on time deposits in levs;
E – monthly average BGN/USD exchange rate;
π – monthly inflation;
ATM – number of ATMs;
ATMW – volume of withdrawals from ATMs;
POS – number of POS terminals;
CARDS – number of debit cards.

Table 2 shows estimated results of major tested models for estimation of transactions demand for banknotes and coins. Household monetary expenses and retail sales have been used as variables approximating demand for banknotes and coins for purely transactions purposes. Models based on household expenses show better results than those based on retail sales. Elasticity of demand for banknotes and coins regarding household monetary expenses is **0.29** and **0.36** respectively dependent on whether the BGN/USD exchange rate or the interest rate on lev time deposits is used as an opportunity cost of holding currency (*Model 1* and *Model 2* respectively). In both models the obtained elasticities are statistically significant and have positive signs which correspond to the elasticities derived in the theory. Elasticity levels of demand for currency in circulation in both models are close to the elasticity level of **0.5** theoretically derived in the *Baumol* model (1952).

The models based on retail sales show relatively worse results. The elasticity of demand for banknotes and coins regarding retail sales is **0.18** and **0.11** respectively dependent on whether the BGN/USD exchange rate or the interest rate on lev time deposits is used as an opportunity cost of holding currency (*Model 3* and *Model 4* respectively). Both coefficients are with the expected positive signs and the elasticity of demand for banknotes to retail sales in Model 4 is statistically insignificant. In the models based on retail sales obtained elasticities of **0.18** and **0.11** respectively deviate significantly from the theoretically expected elasticity of **0.5**.

The results are an additional proof of the adopted view in studying demand for banknotes that household expenses are the best proxy of transactions demand for currency.

Interest rates on time deposits and the BGN/USD exchange rate are considered as an opportunity cost of holding banknotes in the tested models. The use of the BGN/USD exchange rate reflects the fact that the BGN/USD exchange rate is one of the major relative prices in the economy due to sustained significant dollarization despite the fixed exchange rate under the currency board.[7] In the model based on household monetary expenses the BGN/USD exchange rate is statistically significant and the elasticity is **-0.32**. In models based on retail sales the ex-

[7] In this context dollarization means unofficial dollarization in the form of the so-called assets substitution. For more details, see *Calvo, G., C. Vegh* (1992), *Giovanni, A., B. Turtelboom* (1992), *Guidotti, P, C. Rodriguez* (1992).

change rate is insignificant. In both cases the elasticity of demand for banknotes in respect of the exchange rate has the expected negative sign.

Using interest rates on time deposits as an opportunity cost of holding banknotes and coins, the elasticity of demand for banknotes in respect of the interest rate is very low (**-0.02** for both models). This elasticity obtains the theoretically expected sign but deviates significantly from the elasticity of **-0.5** derived in the *Baumol* model. These results – though significantly deviating from theoretically expected elasticities – are not surprising taking into account the low levels of time deposit rates. Given significantly higher interest rates on deposits in US dollars and lower inflation in the USA during the period under review, the BGN/USD exchange rate proves to be a better proxy of the opportunity cost of holding banknotes in levs.

As demand for banknotes is studied in nominal terms, monthly inflation rates have been included as an explanatory variable. In all tested models inflation impacts the demand for banknotes with a negative sign, and elasticities obtained are less than **1%**. These results do not correspond to the expected positive sign of inflation in the demand for money equation. A higher price level should prompt greater demand for banknotes and coins in nominal terms. The negative sign of inflation reflects its volatility after the currency board introduction. In most months of 1998 and several months of 1999, monthly inflation was negative (deflation), which coupled with a progressively increasing currency in circulation resulted in negative elasticity of demand for banknotes and coins in respect of inflation.

In modeling transactions demand for banknotes and coins the following four variables approximating the degree of Bulgaria's financial and payment system development are used: number of ATMs, volume of withdrawals from ATMs, number of issued debit cards and number of POS terminals. Estimates of the models indicate that the number of POS terminals and debit cards is statistically insignificant. Therefore, these variables have not been included in estimating final results of demand for banknotes and coins. The statistical insignificance of this variable is attributable to a certain extent to the small number of POS terminals across the country.

The case with debit cards is quite the opposite: following the introduction of the currency board the number of debit cards dramatically increased (see the right-hand chart in Appendix 2, p. 35). The impact

of a rapidly growing number of debit cards is shown by the volume of withdrawals from ATMs which are statistically significant, and the elasticity ranges between **-0.11** and **-0.22**.

The number of ATMs is also statistically significant in all estimated models in this paper, with the obtained elasticities varying between 0.26 and 0.48. The signs of the variables approximating the development of financial and payment systems should be very carefully interpreted, since the effect of these variables on the demand for currency is divergent. As is well known from theory and empirical research ATMs have an ambiguous effect on demand for banknotes *(Boeschoten, W., 1992; Viren, M., 1989)*. On the one hand, ATMs encourage the use of banknotes facilitating cash acquisition. In addition, the increase in the number of ATMs impacts directly the volume of banknotes in circulation due to a growing need of greater volumes of banknotes to be kept as reserves in ATMs (this effect occurs in denominations of 10 and 20 levs which are used for the ATMs in the Bulgarian banking system). Concurrently, easier provision of banknotes reduces transactions costs resulting in lower monetary reserves held by economic agents. The final result of the interaction between the above effects in the case of Bulgaria indicates that card holders make less transactions while their amount has progressively increased after the introduction of the currency board (see the left-hand chart in Appendix 2, p. 35). Under low inflation rates after 1997 the increased volume of withdrawals is indicative not only of a purely nominal effect but also of card holders preference for holding bigger real money balances.

The effect of ATMs on demand for banknotes influences only the part tied to household demand. Demand for currency in circulation by the real[8] and shadow economies, as well as for hoarding is impacted to a smaller extent by the number of ATMs. Consequently, it is impossible to determine whether the positive or negative effect of ATMs on demand for banknotes is dominating.

To assess the stability of estimated coefficients in the tested models, the standard recursive CUSUM and CUSUMSQ tests[9] are used. Stabil-

[8] Undoubtedly, the number of ATMs influence demand for banknotes by the real economy but the impact is not the same as in household demand. For example, in France law provides for compulsory payment of salaries on account which significantly enhance the impact on demand for banknotes both by the real economy and households.

[9] For description of the characteristics of stability tests of estimated coefficients, see *Johnston, J, J. Di Nardo* (1997).

ity tests of estimated coefficients in the tested models are shown in Appendix 3. The results clearly show that none of the tests is outside the 5% confidence interval which is indicative of the stability of estimated coefficients. In other words, the models indicate stability of transactions demand for currency, a basis for predictability of this variable.

IV. Demand for Currency Intended for Hoarding

1. The Importance

The second major motif of demand for currency in circulation is the economic agents' willingness to save (hoard) in cash. Two forms of hoarding can be distinguished: hoarding associated with the official economy and hoarding associated with the shadow economy. Under the first form economic agents decide on voluntary hoarding of a portion of their savings in banknotes since the income on alternative assets is smaller than transactions costs on portfolio transformation; in general this type of saving can be called '*fair, gratuitous*.' The second form of saving in banknotes relates to servicing the shadow (unofficial) economy. It is used in illegal transactions, tax evasion and various social security contributions and other compulsory payments to the government. The studies of *Boeschoten, W.* (1992), *Van Hove, L., J. Vuchelen* (1996) as well as of *Van Hove, L., J. Vuchelen* (1999) and *Van Hove* (1999) give a relatively clear picture of hoarding in the form of banknotes in developed countries. As far as we know, there is no such study on transition economies.

The analysis of banknote hoarding in Bulgaria would be useful in several aspects. *First*, the share of the two biggest denominations has increased in the total value of currency circulation. There are various reasons behind this growth but it may be assumed that this growth reflects the stabilization effect, a result of currency board introduction and the pegged exchange rate which significantly reduce the exchange rate risk and low income of other assets. In this situation it is much more profitable to hoard Bulgarian banknotes, profiting significantly from tax evasion. This appears to be a paradox: the stabilization boosts profits from tax evasion. *Second*, with the fixed exchange rate, and particularly the currency board under which the amount of currency in circulation is entirely demand driven, an estimation of banknote hoarding would be useful in the exchange of banknotes against reserve currency,

i. e. this will count for the exchange rate stability[10]. *Third*, such estimation (later adjusted with the direct estimation of shadow economy) may give a picture of the size of shadow economy. This appears to be of particular importance in estimating GDP produced in the country (officially registered and illegal) which is significantly undervalued under a sizable share of the shadow economy, hence worsening most macroeconomic indicators. In the context of Bulgaria's pending accession to the European Union this appears to be of essential importance for meeting nominal and real membership criteria as well as Bulgaria's capital quota in the European Central Bank.

2. The Methodology

The methods for estimation of banknote hoarding are well known and initially described by *Anderson, P.* (1977). Later, the estimation methods have been improved and applied many times (*Sumner, S.*, 1990; *Boeschoten*, *W.*, 1992; *Van Hove*, *L.*, *J. Vuchelen*, 1996; *Pedersen, E.*, *T. Waganer*, 1996; *Van Hove, L.*, *J. Vuchelen*, 1999; *Van Hove, L.*, 1999).

The volume of hoarded banknotes can be measured using three different methods: the lifetime method, the frequency-of-return method and the seasonal demand method.[11]

In the present study the lifetime method which is most popular is applied. The choice of this method was predetermined mostly by available data. The method applied follows the logic described below.

The average life of the banknotes of a particular denomination is re-

[10] It may be argued that under a currency board conversion of sizable volumes of national currency into reserve currency should not be treated as a speculative attack against the fixed exchange rate. This argument is based on the explicit central bank's commitment to exchange unconditionally national currency for reserve currency at a fixed exchange rate. Based on theory and empirical tests defining exchange rate crises as a combination of changes in the level of the fixed exchange rate, decreased international reserves and increased interest rates, we assume that the exchange of sizable volumes of national currency into reserve currency should be considered as a speculative attack against the fixed exchange rate (for detailed description of the models of speculative attacks against the fixed exchange rate, see *Krugman, P.*, 1979, 1996; *Obstfeld, M.*, 1986, 1994; *Kaminsky, G.*, *S. Lizondo* and *K. Reinhart*, 1998; *Frankel, Y.* and *A. Rose*, 1996; *Berg, A.* and *C. Pattillo*, 1998). Attacks against the Argentinian peso in 1995 and 1996 and Hong Kong dollar in 1998 are clear examples of attacks against a currency board (for detailed description, see *Caprio, G.*, *M. Dooley*, *D. Leipziger* and *C. Walsh*, 1996; *Cavallo*, 1997; *Cheng, L.*, *F. Lui*, 1999, 2000). Possibilities for successful attacks against a currency board, depending on the extent to which the government is able to maintain a fixed exchange rate, are beyond the scope of this study.

[11] For detailed review, see *Van Hove, L.* (1999).

garded as proxy of the intensity of use of that denomination. Based on such logic of measurement, the longer life of larger denomination banknotes is assumed as a signal of the existence of hoarding. The percentage of hoarded banknotes of a particular denomination is calculated as the difference between the average life of that banknote denomination and the average life of a smaller banknote denomination. The basic assumption here is that smaller denomination banknotes are used only for transactions purposes.

The average life of denominations is defined as the average period between the banknotes' issue and destruction.

$$AL_{it} = \frac{C_{it} + C_{it-1}}{N_{it} + D_{it}},$$

where,

AL_{it} – average life of the banknote;
C_{it} – number of circulating banknotes of a particular denomination (end of period);
N_{it} – number of newly issued banknotes of a particular denomination;
D_{it} – number of banknotes of a particular denomination withdrawn from circulation.

The above formula shows the actual life of the banknotes in stable macroeconomic environment. If the circulation of banknotes undergoes changes in the analyzed period, or a new banknote or series is introduced, the estimated average life is significantly affected by those short-term fluctuations.

Based on the assumption that smaller denominations are used only for transactions purposes and are not being hoarded, we take their average life as *the normal average life of the banknotes*. It should be taken into account that the average life of smaller denominations is not constant over time and varies for different denominations[12].

[12] *Boeschoten, W.* (1992) adds another consideration. According to him, inflation dynamics considerably impacts the life of banknotes as it causes changes in the average life of smaller denominations by reducing their real value. If this effect is disregarded, the estimate of hoarding will shift toward overvaluation of its level. The author measures this effect through regression, relating the estimated average life of a particular denomination to its real value:

$AL_t = \alpha + \beta \, Ln \, RD_t + \varepsilon_t$,

where Al_t is the estimated average life of the banknotes, and RD_t is the real value of the respective denomination.

The second step involves estimation of the very hoarding by denominations using the formula:

$$HP_{it} = \frac{AL_{it} - NAL_{it}}{AL_{it}},$$

where

HP_{it} – percentage of hoarded banknotes of a particular denomination;
AL_{it} – real average life of the banknotes of a particular denomination;
NAL_{it} – estimated normal average life of the banknotes of a particular denomination.

The second method applied by us for estimating the size of hoarded banknotes is that of the Swiss banker *Jean-Claude Hentsch*. In his survey on the optimum denomination composition carried out in the 1970s and the 1980s (published in the *Journal de la Societe de Statistique de Paris*, 1973, 1973a, 1983, 1985) he made the curious observation that under *échelonnement harmonique* (i.e. the ratio between two consecutive members of the series is a constant) the circulating volume of a particular denomination is proportionate to the square root of that denomination.

The author obtained the adjusted value for each denomination using the formula $\frac{V_i}{\sqrt{v_i}}$, where V_i is the circulating volume of a particular banknote i, and v is the denomination itself, comparing it with the optimal value for each denomination, which is identical for all denominations, and is calculated by the formula:

$$\frac{\sum_{i=1}^{I} V_i}{\sum_{i=1}^{I} \sqrt{v_i}}.$$

Using his own methodology, Hentsch estimated the adjusted (ideal) volume of each banknote and compared it with the actual (real) one, initially for Switzerland and France, and then for other developed countries. Where there is deviation from the optimum series such as the series 1 2 5 10 20 50 (because between 2 and 5 and 20 and 50 the ratio is 2.5, not 2 as with the other denominations) the so-called tooth shapes emerge between the adjusted and the actual volume of a particular de-

nomination[13]. While *Jean-Claude Hentsch* notices the fact that large denominations in France and Switzerland are used for hoarding, which explains the deviation from the square root rule, he does not apply his method for estimation of hoarding. The Belgian authors *Van Hove, L.* and *J. Vuchelen* made an original contribution by demonstrating that one of the major factors for the deviation from the square root principle is due namely to the hoarding of large denomination banknotes (*Van Hove, L. and J. Vuchelen*, 1996).

3. The Estimate for Bulgaria

3.1. Estimation through the Average Life of the Banknotes

To calculate banknote demand for hoarding purposes we use monthly data on the number of banknotes of each denomination in circulation, the number of newly issued banknotes and the number of destroyed banknotes of each denomination (data is provided by the BNB Cash Operations Directorate). This allows us to calculate the average life of each denomination using the above formula. We take the life of the 1-lev banknote (1,000 old levs) as the normal average life of the banknotes and assume that it is used only for transactions purposes, not for hoarding. After obtaining the average life of the banknotes we calculate hoarding for each of the denominations with the exception of the new banknote of 20 levs as it has been in circulation since mid-1999.

The estimates of banknote hoarding correspond to a great extent to those obtained using the *Hentsch* method. The obtained result shows that approximately **30%** of 10-lev circulating banknotes were used for hoarding in 1999. In absolute terms this means that out of the 321 million levs of the 10-lev denomination circulating during the year, **96.5** *million levs were used for hoarding*, not for transactions purposes. For the 50-lev banknote estimates show that **44%** of the circulating banknotes of this denomination were used for hoarding in 1999. In absolute terms this means that out of the 948 million levs of circulating banknotes of this denomination, *417 million levs* were used for hoarding. If our estimate of *513.5 million levs* in banknotes of 10 and 50 levs are used only for hoarding and do not service the shadow economy, these would comprise approximately 12% of savings in the Bulgarian

[13] *Hentsch* himself (1973, 1985) regards the above allocation as more cost-effective than the optimum one in the context of price indices.

banking system in 1999.

Such large volume of liquidity outside the banking system, being almost equal to the average annual amount of commercial banks' reserves (638 million levs), can trigger a strong impulse for speculative attack against the fixed exchange rate if expectations change and currency board credibility erode.[14]

Before we present the results obtained from applying the *Hentsch* method, we should note some of the limitations of the model based on the average life of the banknotes, preset by the dynamics of macroeconomic indicators in the transition period.

High inflation rates between 1991 and mid-1997 did not provide for the pursuit of consistent issuing policy, which entailed the launch of a sequence of new denominations. This policy affected strongly the average life of denominations. Due to this specific development, we focus our study on the period from mid-1997 to end-1999. This predetermined our choice of monthly data. We do not estimate hoarding for 1998 because we regard the increased demand for large denominations as being related to the recovery of real money balances in the wake of financial stabilization. Moreover, the estimate of the average life of the 50-lev banknote in 1998 is strongly biased due to the fact that it was introduced in May 1997.

The redenomination launched in the second half of 1999 affected the estimated volume of hoarded banknotes of 10 and 50 levs (toward undervaluation). The redenomination impacted significantly the process of destroying old banknotes and introducing new denominations, which affected the average life of the banknotes of each denomination (see the formula for estimation of the average life of banknotes). At the same time, the introduction of the new 20-lev banknote shifted hoarding away from the 10-lev banknote to that banknote (this is confirmed in the text below on the application of the *Hentsch* method). Due to the short life of the 20-lev banknote this effect cannot be measured through the method of the average life of banknotes, which leads to undervaluation of hoarding.

[14] The banknotes used for transactions purposes can also be used for a speculative attack , but as is well known from empirical studies flight from the national currency begins initially with the so-called *asset substitution*, i.e. savings are redenominated into foreign currency, to be followed by *currency substitution*, i.e. the use of foreign currency as a means of exchange. For a more detailed presentation, see *Calvo, G., C. Vegh* (1992), *Giovanni, A., B. Turtelboom* (1992), *Guidotti, P., C. Rodriguez* (1992).

3.2. Estimation by the Hentsch Method

The second key element of our analysis of hoarding involves the application of the Hentsch method. This approach is based on deviations from the square root rule, which we interpret, similarly to *Van Hove, L. and J. Vuchelen*, as the use of a particular denomination for transactions purposes (below the zero line) and for hoarding and saving (above the zero line)[15].

Chart 1

USE OF BANKNOTES OF 1, 2 AND 5 LEVS FOR TRANSACTIONS PURPOSES (BELOW THE ZERO LINE) AND FOR HOARDING (ABOVE THE ZERO LINE) – LOGARITHMIC SCALE

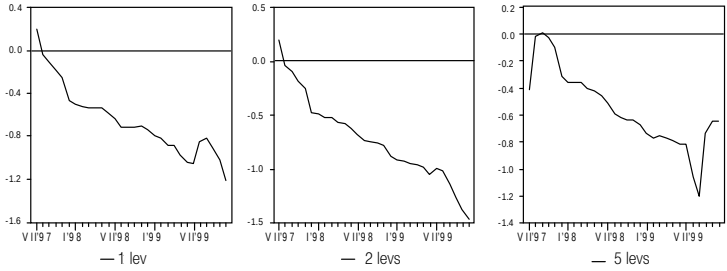
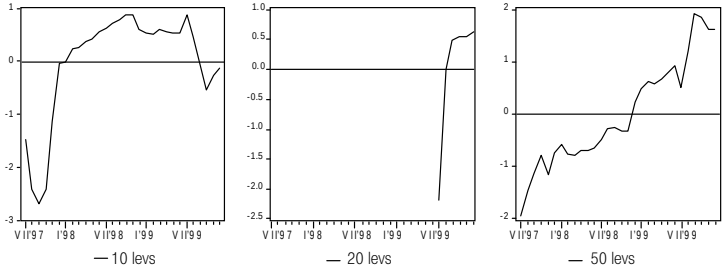


Chart 2

USE OF BANKNOTES OF 10, 20 AND 50 LEVS FOR TRANSACTIONS PURPOSES (BELOW THE ZERO LINE) AND FOR HOARDING (ABOVE THE ZERO LINE) – LOGARITHMIC SCALE



[15] Adjusted optimal values on Charts 1 and 2 are represented by the zero line. A logarithmic scale is used.

The estimates of hoarding using the *Hentsch* method confirm to a great extent the estimates obtained by applying the average life of the banknotes method, supplementing them. Clearly, the three small denominations are used for transactions purposes and their volume is below the optimum, i.e. in practice these service the bulk of transactions in the economy. Since early 1999 the 50-lev banknotes, and since June 1999 the 20-lev banknotes have been used for hoarding. Their volume is above the optimum under the *Hentsch* rule. The dynamics of the 10-lev denomination experienced two breaks: *first,* in early 1998 this banknote was used both to service transactions and for hoarding, and, *second*, after the 20-lev banknote was put into circulation the 10-lev banknote came to be used only for transactions purposes. In general, the assumption that the two large denominations were used mostly for cash saving (or for effecting transactions in the shadow economy) is confirmed. Charts 1 and 2 illustrate the application of the *Hentsch* method. They confirm the existence of hoarding for the 50-lev and 10-lev banknotes (the old 50,000 and 10,000), and for the 20-lev banknote after its circulation. Undoubtedly, deviations from the optimum volume of each banknote are caused by other important factors such as the velocity of circulation of denominations consistent with development of the payment system, as well as the structure of relative prices in the economy. Moreover, the purely psychological factors should also be taken into account since they influence preferences for using different denominations and their velocity of circulation[16].

V. Estimation of the Shadow Economy through Demand for Currency

1. The Importance

The importance of an even relative estimate of the shadow economy is understandable. Such an estimate gives a clearer picture of the economic development of a country, which reflects on all macroeconomic, financial and debt ratios. Such an estimate shows, within a certain frame, what portion of the generated revenue could surface and raise

[16] According to sociological studies the form, size and composition of the amount influence the use of denominations. For example, one and the same amount of 50 levs represented by one denomination is spent more slowly than the same amount represented by 50 pieces of 1-lev denomination (for details, see *Malahov, C.,* 1992).

the officially recorded revenue of the government. Even though the estimate in itself cannot improve the officially calculated GDP, it would be instrumental in making fiscal and monetary decisions. The share of the shadow economy, for example, may serve as useful information in the negotiations for Bulgaria's accession to the European Union and the European Monetary Union. The gross domestic product – through its presence in the multiple criteria for real and nominal convergence – is a key indicator for the integration into the European Union and the European Monetary Union. As is well known, the share of the shadow economy in the transition countries, including Bulgaria, is substantial. Estimates for Bulgaria range from 30 – 40% (*Staikov, I., P. Dimitrova,* 1999), 23% (NSI, 1999) to 35% (*Schmeider, F., D. Enste,* 1999, 2000).

2. The Methodology

Quantifying the shadow economy through the number of banknotes and coins is a sub-case of a general model of measuring the shadow economy (*Bhattacharaya, D.,* 1999) which looks like this:

$X = f(Y_{OF}, Y_{SH}, \mathbf{R})$,

where

X – a particular type of economic activity (demand for currency circulation, general household spending, electricity consumption, etc.);
Y_{OF} – officially recorded revenue or output;
Y_{SH} – shadow income or output;
R – vector of other variables determining X.

Attempts at estimating the shadow economy through the currency in circulation have a long history (*Cagan, P,* 1958, and *Gutmann, P.,* 1977)[17]. Vito Tanzi argues that while the shadow economy is serviced predominantly through banknotes and coins, its growth will lead to a growth in the currency demand. In the function of the demand for banknotes and coins he includes the average weighted tax rate (direct and indirect taxes) as proxy of the shadow economy (*Tanzi, V.,* 1983). The Tanzi method, widely applied in developed and developing countries, involves the following procedure:

[17] A detailed survey of the reasons, the size and methods for measuring the shadow economy is conducted by *Enste, D., F. Schmeider* (1999, 2000), and by *Thomas, J.* (1999), *Giles, D.* (1999), *Hill, R., M. Kabir* (2000).

First, comparison is made between the econometrically estimated currency dynamics when the tax burden and government regulation are at their lowest and highest levels. The difference between the two estimates of the demand for banknotes and coins is proxy of the shadow economy (determined by the higher tax burden).

The *second* step is based on the assumption of the constant velocity of currency circulation in the shadow economy and in the official economy. Based on the above assumption, the shadow economy is quantified and compared with the official gross domestic product (*Enste, D., F. Schmeider,* 1999, 2000).

3. The Estimate for Bulgaria

In order to accommodate the standard methodology described above to the specificity of Bulgaria and the analyzed period (after the introduction of the currency board), we modify the *Tanzi* procedure and reduce it to the following logical order:

1. A function of *the demand for banknotes and coins* (C^d) with and without tax burden (t) is constructed as proxy of the benefits of hiding income (i.e. the shadow economy). As proxy of the tax burden we take the ratio of *tax revenues to total consumer expenditures*. It is assumed that the demand for banknotes with a shadow economy is greater than that without a shadow economy (i.e. the sign for elasticity in front of t should be positive).

2. The currency volume servicing the shadow economy, C_{SH}, is the difference between the estimated demand for banknotes with and without tax burden respectively.

$$C_{SH} = C[E_{OF}, t, \mathbf{R}] - C[E_{OF}, \mathbf{R}].$$

Officially reported total consumer expenditures, E_{OF}, serve as proxy of the transactions demand for banknotes and coins. **R** is the vector of the other variables explaining the demand for banknotes. In our case the variables in **R** are: interest rates on lev time deposits, monthly inflation based on the consumer price index, number of ATMs and number of withdrawals from ATMs[18].

[18] As emphasized in section three, the number of bank cards and POS terminals is statistically insignificant and therefore we do not include it in the estimation of the demand for banknotes and coins.

3. We assume that the velocity of banknotes and coins in the shadow economy V [C_{SH}], measured through the total consumer expenditures, is equal to that in the official economy V [C_{OF}]:

$V [C_{SH}] = V [C_{OF}] = V.$

The hypothesis of the equal velocity of banknotes and coins in the shadow and in the official economy is the major weakness of the approach to measuring the shadow economy through the currency in circulation, likewise found in the Cagan model and then in the Tanzi model (*Thomas, J.,* 1999).

4. After obtaining the share of the currency servicing the shadow economy [ΔC_{SH}] as a percentage of the monitored (official) volumes of currency in circulation [C_{OF}]

$\Delta C_{SH} = (C_{SH}/C_{OF}) \times 100,$

we generate the hidden share of the economy measured through the general consumer expenditures ΔE_{SH} using the formula

$\Delta E_{SH} = \Delta C_{SH} \times V.$

5. Once we are aware that total household expenditures account for a relatively constant share (80%) of the gross domestic product, we generate its hidden portion ΔY_{SH}:

$\Delta Y_{SH} = \Delta E_{SH} / 0.8.$

The analysis for Bulgaria encompasses the period after the introduction of the currency board from July 1997 to December 1999, a total of 29 observations. All series were seasonally adjusted in advance due to the fact that currency in circulation and total consumer expenditures have a strong seasonal pattern. The seasonal adjustment covers a longer period than the one used in the estimated model (January 1997 – December 1999) because at least three full years are needed for the seasonal adjustment under the standard procedure CENSUS X11. All variables are in logarithm with the exception of the interest rate and inflation. Estimated functions of the currency demand are presented in Table 3 (**t**-statistics are given in brackets).

Chart 3

SHADOW ECONOMY AS A SHARE OF GDP (GENERATED THROUGH TOTAL HOUSEHOLD EXPENDITURES) MEASURED THROUGH CURRENCY CIRCULATION METHOD – CURRENT SHARE AND AVERAGE SHARE FOR THE PERIOD AFTER CURRENCY BOARD INTRODUCTION

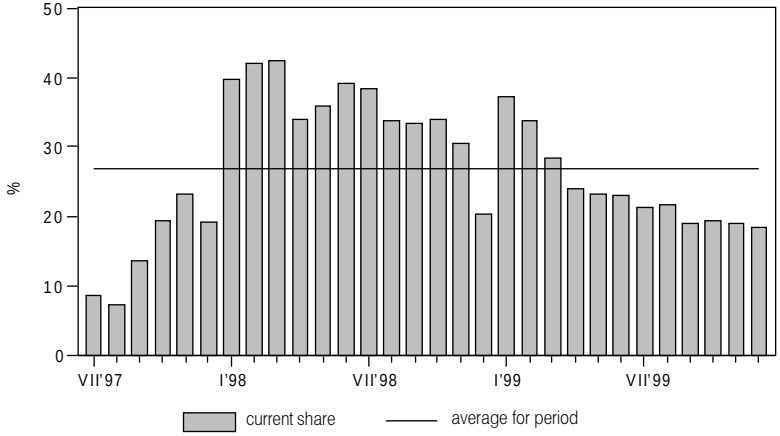


Chart 4

SHADOW ECONOMY AS A SHARE OF GDP (GENERATED THROUGH TOTAL HOUSEHOLD EXPENDITURES) MEASURED THROUGH CURRENCY CIRCULATION METHOD – CURRENT SHARE AND AVERAGE SHARE BY YEAR

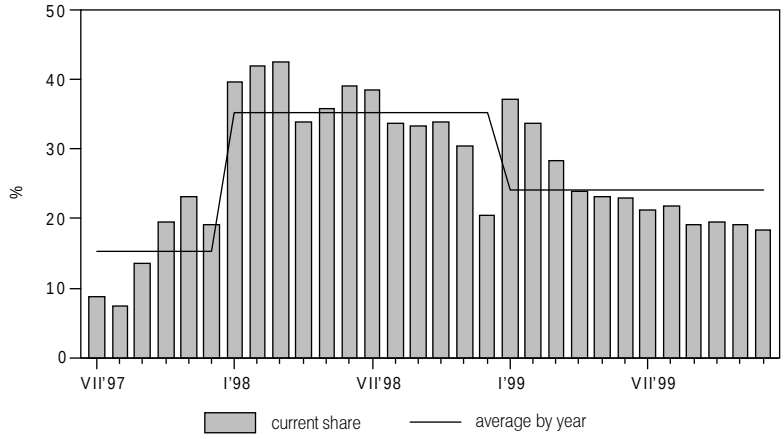


Table 3

DEMAND FOR CURRENCY WITHOUT AND WITH TAXES (DEPENDENT VARIABLE C)

Variables	Model without taxes	Model with taxes
Constant	7.26	6.69
	(4.31)	(4.37)
C(-1)	0.45	0.46
	(6.92)	(8.49)
TE	0.44	
	(4.03)	(5.47)
T/TE	-	0.45
		(2.28)
I	0.05	0.05
	(2.51)	(3.14)
π	-0.01	-0.008
	(-2.54)	(-2.56)
ATM	0.47	0.50
	(4.80)	(5.82)
ATMW	-0.27	-0.32
	(-4.17)	(-5.48)
R^2	0.98	0.99
Adjusted R^2	0.98	0.98
S.E. of regression	0.02	0.02
DW Statistics	2.04	1.92

The abbreviations of the variables have identical meaning with that described in section three. The difference is in the use of total, not monetary expenditures of households (**TE**) and in the introduction of the ratio of *government tax revenues to household general expenditures* (**T/TE**) as proxy of the incentives for tax evasion.

Elasticity and signs obtained in the two models meet expectations with the exception of the sign for inflation, which was analyzed in the section on the estimate of the transaction demand for banknotes and coins. Elasticity, which is of major interest, is that in front of the variable approximating the shadow economy (**T/E**). Its value is comparatively high (**0.45**) and has the expected positive sign.

Following the above procedure, we obtain the values of the shadow economy measured through the currency circulation dynamics.

Table 4

AVERAGE SHARE OF THE SHADOW ECONOMY AS A PERCENT OF GDP BY QUARTER AND ANNUAL AVERAGE AFTER CURRENCY BOARD INTRODUCTION

	I quarter	II quarter	III quarter	IV quarter	Annual average
1997			9.9	20.6	15.2*
1998	41.4	36.3	35.2	28.2	35.3
1999	33.1	23.4	20.7	19.0	24.1

* Only second half of 1997.

Before commenting on the obtained results, it is necessary to make some clarifications.

First, the method applied by us for measuring the shadow economy encompasses only that part which is serviced with levs, i.e. our method does not provide an estimate of the shadow economy that is serviced with foreign currency, mainly US dollars and Deutschemarks. Based on this logic, the obtained estimates are considerably lower than the actual ones. In other words, our estimates can be regarded as a *shadow economy minimum*.

Second, our methodology is based on the hypothesis of the constant velocity of banknotes and coins in the official and in the shadow economy. This assumption may be subject to critique, but in practice it is impossible to measure the velocity of money in the shadow economy. A traditional approach in shadow economy surveys is acceptance of the assumption of equal velocity of banknotes and coins in the official and in the shadow economy. We also follow this logic despite its vulnerability. In actual fact, velocity of money in the shadow economy is greater than that in the official economy (it depends on the type of transactions and the origin of funds, *Malahov*, 1992), which undervalues the size of the shadow economy (*Enste, D., F. Schmeider*, 1999).

For the entire period after the introduction of the currency board in Bulgaria the average value of the shadow economy is 26.78%. Average figures by quarter and year are given in Table 5: low values in 1997, followed by high values in 1998 (especially at the beginning of the year) and a downward trend since early 1999. Such large deviations in the estimates of the shadow economy can be explained by fluctuations in the currency demand and should be regarded as conditional. Low

values for 1997 (after the introduction of the currency board) can be explained by the fact that during the financial crisis and hyperinflation in late 1996 and early 1997 the lev lost completely its functions not only in the official but also in the shadow economy. In practice, the low estimate of the shadow economy for this year reflects a still recovering demand for banknotes and coins in levs.

Restored demand for local currency for transactions purposes contributed to a considerably higher (by 20%) estimate for the shadow economy in 1998, having a two-sided effect. *First*, restoration of the transaction role of the lev made it possible to estimate that part of the shadow economy, which was serviced with foreign currency and could not be measured[19]. *Second*, economic stabilization attained with the introduction of the currency board and restored economic activity in the official economy (for the first six months of 1998 an official GDP growth of 11 percentage points was reported on the same period of the previous year) are related to restoration of economic activity in the shadow economy.

Lower estimates of the shadow economy for 1999 should not be interpreted as a decrease in the share of the shadow economy at the expense of the official economy. This change reflects the behavior of the variables used by us as proxies of the shadow economy. *First*, there was a certain shift away from servicing the shadow economy with levs toward US dollars due to the dollar appreciation against the euro (the lev respectively). In practice, the preference for US dollars in servicing the shadow economy ensures it against currency risk prompted by the movement of the EUR/USD exchange rate (an effect similar to that in early 1997 but of a smaller magnitude). *Second*, employment of the ratio of *tax revenues to household general expenditures* rather than the accumulated amount of direct and indirect taxes as proxy of the incentives for tax evasion influences the estimate for the banknotes servicing the shadow economy. In practice, the lower ratio of *tax revenues to household general expenditures* for 1999 led to a lower estimate for the share of the shadow economy.

[19] The fast emergence of this effect was facilitated by the rapid fall of interest rates on lev deposits and their retention at lower levels than American and German interest rates, which resulted in a cheaper servicing the shadow economy with levs, given the opportunity costs.

VI. Conclusions

High currency circulation growth after the introduction of the currency board in Bulgaria poses the logical question of the factors that determine the process. On the one hand, this is a logical consequence of the financial stabilization and hence restored functions of the national currency as a means of exchange. On the other hand, data shows that there are factors other than the transactions ones, which influence the currency dynamics. Their behavior was reduced to three components: transactions demand, demand for currency as a means of saving and demand for banknotes related to servicing the shadow economy.

Constructed models of transactions currency demand shows that it is most closely related to monetary expenditures of households. Retail sales also have explanative force in the estimate of the transactions demand for banknotes and coins, although the obtained results do not indicate existence of such a strong relation as that with the monetary expenditures of households. The lev/dollar exchange rate remains the main alternative price in the demand for banknotes and coins function. High sensitivity of currency demand to exchange rate movements once again shows that the use of the fixed exchange rate as a nominal anchor has no alternative for a small and open economy as the Bulgarian. Development of the financial and payments system also affects significantly the demand for banknotes. Results show that despite the increased number of ATMs, POS terminals and debit cards, individuals prefer to make less monthly withdrawals while their volume increases. Estimated models of transactions currency demand indicate stable coefficients, which makes them a reliable tool in currency forecasting.

The analysis of banknote hoarding through the lifetime method and through the *Hentsch* method shows hoarding of 10, 20, and mostly 50-lev banknotes. The share of hoarded 50-lev denomination banknotes accounts for 44% of total circulation. This reflects adversely on Bulgaria's development as savings are being accumulated in a highly liquid form and do not generate income, causing liquidity overhang, which may threaten the currency board and the fixed exchange rate under certain circumstances. Small denominations are used mainly for transactions purposes and their circulation is much faster than the optimal. In a sense, their use in the currency turnover is more widespread than should be. It is reasonable to consider the issue of circulating a

banknote of higher denomination (for example 100-lev)[20]. This step would help shift the use of denominations of 10, 20 and 50 levs for hoarding of savings and for servicing larger payments in the shadow economy toward their inclusion in the transactions turnover. This would make it possible for the circulation of smaller denominations of 1, 2, and 5 levs to restore its optimum velocity (by lowering it).

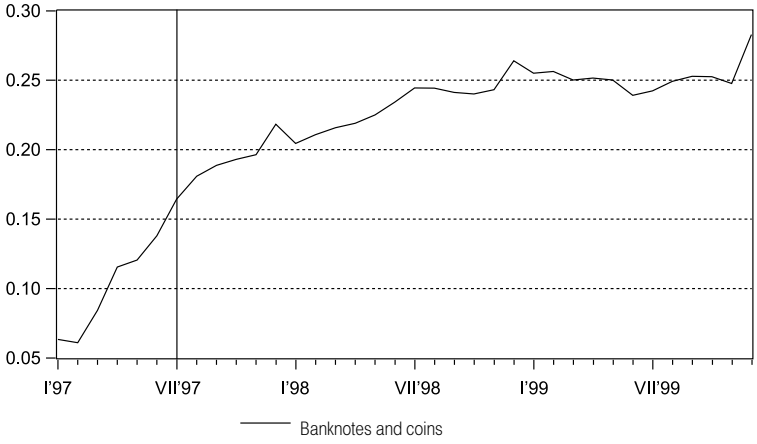
Last but not least, this study is an attempt to assess the share of the shadow economy in the official GDP. According to our estimates, the lowest values or the trough of the lev-serviced 'gray' economy is 27% on average for the period after the introduction of the currency board and by year: 15.2% for 1997 (second half-year), 35.3% for 1998, and 24.1% for 1999. If it is assumed that the national and foreign currencies have equal shares in servicing the shadow economy (like the ratio for the official economy), then its share will account for 50 – 60% of the official GDP.

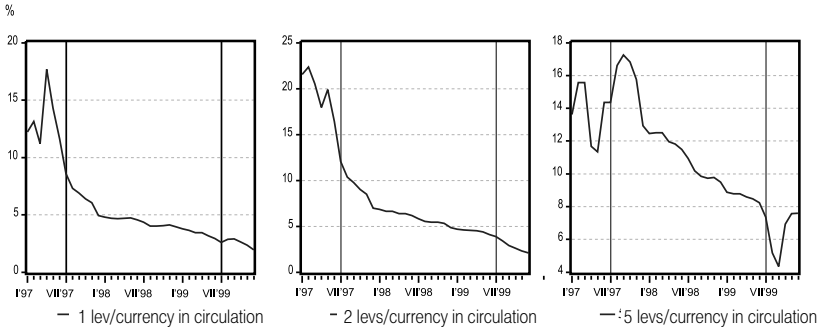
Although the obtained estimates are relative, they may be used as a starting point for future analyses in comparison with other approaches: through electricity consumption or with the mirrorlike statistical method used by the NSI.

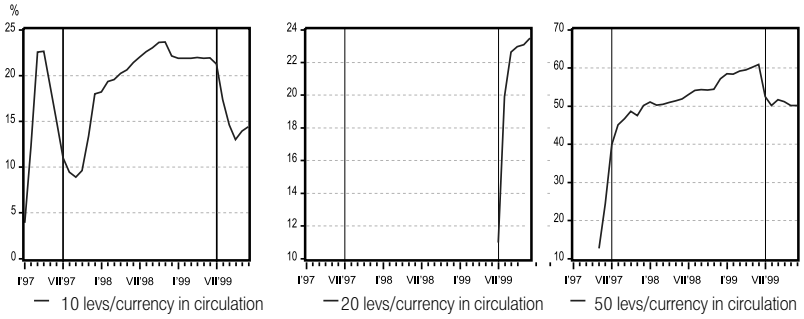
[20] Two arguments against the introduction of a 100-lev denomination banknote emerge here. The *first* is that big denomination banknotes are more attractive for counterfeit because of the higher profits. The *second* is related to the assumption that if higher denominations are used mostly to service transactions in the shadow economy the issue of a 100-lev banknote may facilitate transactions in that part of the economy. While the first argument is acceptable without reserve, the second would be true on the assumption that the only way of making transactions in the shadow economy is through the national currency. Given the presence of denominations of DEM 500 and DEM 1000 and later of EUR 500, the shadow economy in Bulgaria will use these denominations in transactions, whereby seignorage will be transferred to Bundesbank and the ECB (for a detailed answer to the question whether large denominations foster the shadow economy, see *Rogoff, K.* (1998) and his discussion with *Giavazzi* and *Schneider*).

APPENDICES

Appendix 1. Dynamics of Banknotes in Circulation







Appendix 2. Share of the Two Largest Denominations in Circulation

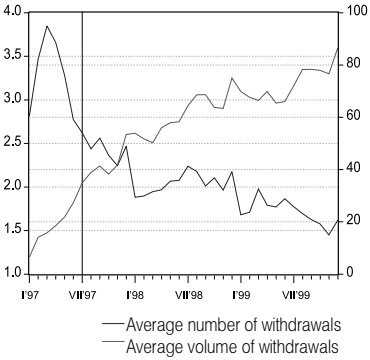
SHARE OF LARGE DENOMINATIONS IN EU MEMBER COUNTRIES

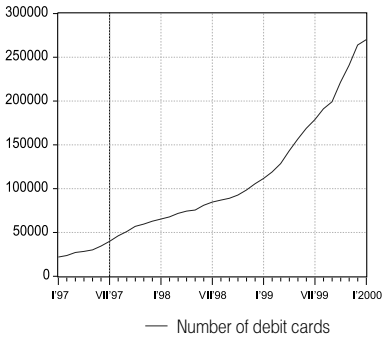
Country	Denomination	Share, %	
		1997	1998
EU countries			
Austria	ATS 5 000	32	34
	ATS 1 000	31	44
Belgium	BEF 10 000	46	48
	BEF 2 000	33	32
Great Britain	GBP 50	17	17
	GBP 20	50	52
Germany	DEM 1 000	34	34
	DEM 500	11	10
Greece	GRD 10 000	44	56
	GRD 5 000	49	38
Denmark	DKK 1 000	56	53
	DKK 5 00	19	22
Ireland	IEP 100	2	3
	IEP 50	13	16
Spain	ESP 10 000	54	56
	ESP 5 000	38	37
Italy	ITL 500 000	3	8
	ITL 100 000	72	68
Luxembourg	LUF 5 000	70	72
	LUF 1 000	26	24
Portugal	PTE 10 000	26	29
	PTE 5 000	58	56
Finland	FIM 1 000	36	36
	FIM 500	17	16
France	FRF 500	49	52
	FRF 200	31	30
The Netherlands	NLG 1 000	37	36
	NLG 250	13	13
Sweden	SEK 1 000	50	50
	SEK 500	34	35

Country	Denomination	Share, % 1997	1998
Other countries			
Canada	CAD 1 000	10	
	CAD 100	41	
USA	USD 100	67	
	USD 50	11	
Switzerland	CHF 1 000	46	
	CHF 500	5	
Japan	JPY 10 000	83	
	JPY 5 000	4	

SHARE OF LARGE DENOMINATIONS IN TRANSITION ECONOMIES IN THE PROCESS OF ACCESSION TO EU

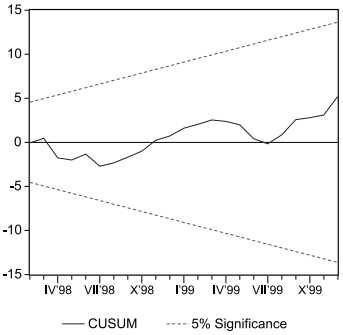
Country	Denomination	Share, % 1997	1998
Bulgaria	BGL 50	50	57
	BGL 10	18	22
Estonia	EKK 500	71	74
	EKK 100	22	20
Cyprus	CYP 20	35	
Latvia	LVL 100	11	
	LVL 50	16	
Lithuania	LTL 200	8	
	LTL 100	66	
Romania	ROL 50 000	55	
	ROL 10 000	33	
Slovakia	SKK 5 000	33	
	SKK 1000	52	
Slovenia	SIT 10 000	42	
	SIT 5 000	38	
Hungary	HUF 10 000	35	
	HUF 5 000	52	
The Czech Republic	CZK 5000	29	

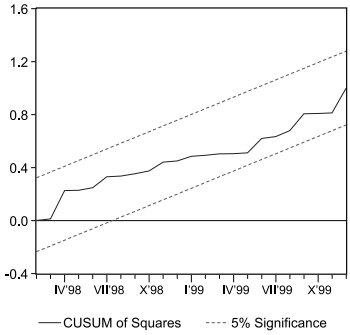




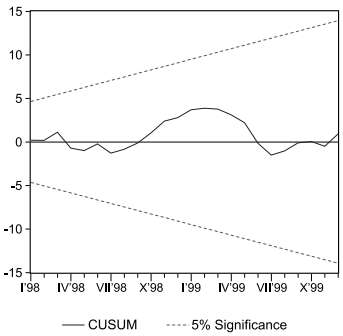
Appendix 3. Estimated Coefficients Stability Tests in the Models of Transactions Demand for Currency

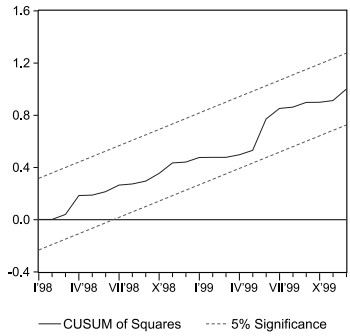
Model 1



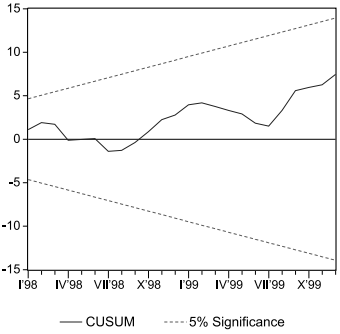


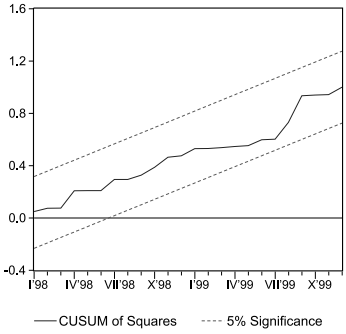
Model 2



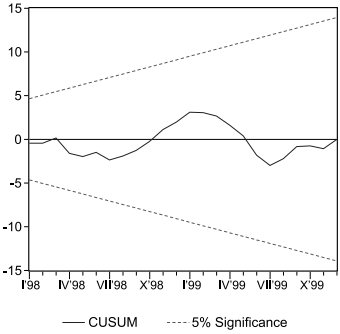


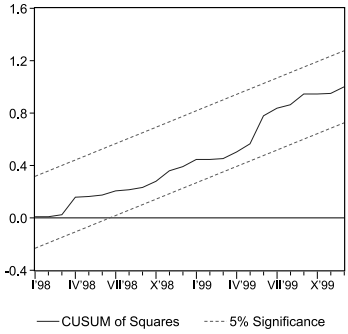
Model 3





Model 4





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DP/14/2000

Macroeconomic Models of the International Monetary Fund and the World Bank

(Analysis of Theoretical Approaches and Evaluation of Their Effective Implementation in Bulgaria)

Victor Yotzov

Abstract. In the process of transition to a market economy Bulgaria established sustainable relations with international financial institutions, the International Monetary Fund and the World Bank in particular. Relations with these institutions are based on implementation of specific programs for economic reforms. This paper presents an analysis and overview of the different approaches to adjustment program formulation. It reviews the macroeconomic models of the IMF and the World Bank, which serve as a basis for developing specific programs. Based on the statistical data for the period since the start of transition to date an attempt is made at assessing the results and effectiveness of all standby agreements implemented by Bulgaria over the last ten years.

Резюме. В процеса на преход към пазарна икономика България трйно се обвързва с международните финансови институции и преди всичко с Международния валутен фонд и Световната банка. Взаимоотношенията с тях се осъществяват чрез прилагането на специфични програми за икономически реформи. В предлагания материал са направени анализ и обобщение на различните подходи при изграждането на стабилизационните програми. Разгледани са макроикономическите модели на МВФ и СБ, върху чиято основа се изграждат конкретните програми. Въз основата на статистическите данни от началото на преходния период до сега е направен опит за оценка на резултатите и ефективността на всички стабилизационни споразумения, които България е изпълнявала през 90-те години на XX век.

Contents

The use of macroeconomic models in the process of designing, implementing and controlling programs supported by international financial institutions has a long history. Since their establishment in 1946 the International Monetary Fund (IMF) and the World Bank (WB) have been called upon to provide financial support to their members. Credits are made after a comprehensive analysis of the reasons causing the deficits (internal and/or external) and the necessary measures to eliminate them. Based on the results from the analysis a specific program is developed aimed at restoring macroeconomic equilibrium.

The IMF approach to economic stabilization (generally referred to as financial programming) is based on the models designed in the 1950s and 1960s by *J. J. Polak* and *E. Walter Robichek*.[1] The theoretical foundations of financial programming have remained generally unchanged for nearly 40 years. The RMSM model[2] (revised minimum

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[1] *Polak, J. J.* Monetary Analysis of Income Formation and Payments Problems. IMF Staff Papers. Vol. 6, November 1957; *Robichek, E. Walter.* Financial Programming Exercises of the IMF in Latin America. Seminar in Rio de Janeiro, September 1967.

[2] Currently the model is known as the RMSM-X (*revised minimum standard model – extended*). Here we will consider only its basic features so no difference will be made between the two models, although they differ significantly in some aspects.

standard model) is formulated by the World Bank in the late 1960s and early 1970s and is based on contributions by *Chenery*, *Strout*, *Weisskopf* and *Blomqvist*[3]. Its theoretical background can be found in *Harrod and Domar*'s two-gap growth model for an open economy.

Since the early 1970s, however, the conception and the structure of adjustment programs have gradually evolved and expanded. In part, this reflects institutional and structural changes in the countries seeking support from international financial institutions. On the other hand, significant events occurred in the world economy[4] that entailed changes in the approach to program design. Since the early 1990s a new group of countries has emerged, collectively called 'transition economies.' It turned out that application of the standard model for analysis and forecasting in transition economies produced weaker results (according to the words of *Polak* himself).[5]

The IMF and WB models, though having different approaches to economic problems, have a common macroeconomic basis. An economy is divided into four sectors, assuming that the private sector has all the factors of production. Revenue from sales of goods and services forms the income [Y] of the *private sector*, which is used for consumption [C_p], tax payment [T], and investment [ΔK]. The remaining private sector income comprises accumulation of financial assets (savings) which may take the form of money [ΔM] and foreign assets [ΔF_p] net of total banking system credits [ΔD_p]. Therefore budgetary constraints to the private sector are set by:

$$Y - T - C_p - \Delta K \equiv \Delta M + \Delta F_p - \Delta D_p \quad (1).$$

The public sector uses resources collected from taxes for its own consumption [C_g], the remaining portion being financial assets in the form of foreign assets [ΔF_g] net of banking system credits [ΔD_g]:

$$T - C_g \equiv \Delta F_g - \Delta D_g \quad (2).$$

[3] *Chenery, Hollis B., Alan M. Strout. Foreign Assstance and Economic Development*. American Economic Review # 56, Sept. 1966; *Weisskopf, Thomas E. The Impact of Foreign Capital Inflow on Domestic Savings in Underdeveloped Countries*. Journal of International Economics, Feb. 1972; *Blomqvist, A. G. Empirical Evidence on the Two-Gap Hypothesis*. Journal of Development Economics # 3, 1976.

[4] Among the most important events are the end of the gold-dollar standard; the sharp price rise in energy commodities and dramatic fluctuations in other goods' prices; fast interest rate growth in international credit markets; reduced trade volumes and a slowdown in growth globally.

[5] *Polak J. J. The IMF Monetary Model at Forty*. IMF Working Paper, WP/97/49.

The external sector receives income from imports[6] of goods and services [Z] and makes expenditure on exports of goods and services [X], the result being changes in net foreign assets of the private and public sectors and in official foreign currency reserves [ΔR]:

$$Z - X \equiv -(\Delta F_p + \Delta F_g + \Delta R) \quad (3).$$

The *banking system* is represented only by the central bank which is treated as a financial intermediary acquiring assets in the form of official foreign currency reserves and loans to the private and public sectors, and liabilities in the form of money for the private sector:

$$\Delta M \equiv \Delta R + \Delta D_p + \Delta D_g \quad (4).$$

Combining budgetary constraints to the four sectors of the economy (1) ÷ (4), one obtains the generally known identity describing GDP final use:

$$Y - C_p - C_g - \Delta K - X + Z \equiv 0 \quad (5).$$

Based on these generally accepted macroeconomic relationships the IMF and the World Bank have built two different approaches which, before being combined, need be summarized and distinguished.

1. The IMF Approach

Since IMF major goal is to support the balance of payments of countries with chronic current account deficits, there is clearly the need to relate policy variables to foreign reserves dynamics. In this light, the IMF model sets an explicit relationship between variables controlled by the authorities and the balance of payments. This approach involves exogenous setting of the nominal GDP:

$$Y = P\bar{y} \quad (6),$$

where

P is the price level, and $\bar{y}$ is real GDP[7].

In turn, a change in the nominal GDP [ΔY] is treated as resulting from price and autonomous changes. Real GDP [y_{-1}] and the price level [P_{-1}] in the previous period are known, the change in the price level [ΔP] is endogenous for the model, and growth [$\Delta \bar{y}$] is set exog-

[6] From external sector point of view imports represent income, while for the economy these are expenditures. The same approach applies to exports.

[7] Although real GDP is set as an exogenous variable in the model, this does not mean that in IMF programs it is treated likewise. Usually growth is derived from the simultaneous assessment of structural changes and the external environment.

enously[8]:

$$\Delta Y = \Delta P y_{-1} + P_{-1}\Delta \bar{y} \quad (6').$$

Velocity of currency circulation [v] is assumed as constant (or predictable but outside the model framework) which gives ground to relate money demand [M^d] to income:

$$\Delta M^d = v\Delta Y \quad (7).$$

It is also assumed that the money market is in equilibrium, which means that money demand matches money supply [M^s], i.e.

$$\Delta M^d = \Delta M^s = \Delta M \quad (8).$$

Based on the last three equations and identity (4) the change in official foreign currency reserves can be presented as a function of exogenous and policy variables:

$$\Delta R = v\Delta P y_{-1} + vP_{-1}\Delta \bar{y} - (\Delta \hat{D}_p + \Delta \hat{D}_g) \quad (9),$$

where the sign '^' above credits to private and public sectors defines them as instrumental variables controlled by the monetary authorities.

Equation (9) illustrates the monetary approach to the balance of payments, presenting the change in official foreign currency reserves as the difference between money supply and domestic credit. In formulating a specific financial program the equation is resolved for a desired value of the endogenous variable ΔR, and domestic credit growth is set as a ceiling. It is obvious that credit-ceiling setting depends to a large extent on money supply. Therefore the sustainability of the money demand function is critical to the entire model.[9]

The inclusion of two endogenous variables [ΔR and ΔP] in equation (9) means that by setting restrictions to domestic credit the solution may be found for any value of inflation, but this is not acceptable. Including an additional behavioral equation relating GDP [Y] to imports [Z] solves the problem:

$$Z = \alpha Y = \alpha(Y_{-1} + P_{-1}\Delta\bar{y}) + \alpha y_{-1}\Delta P \quad (10),$$

where α is the marginal propensity to import.

[8] The combined impact of autonomous and price factors [$\Delta P \Delta \tilde{y}$] is considered negligibly small.

[9] In order for changes in domestic credit to have a *predictable* effect on the balance of payments, money demand should be stable and be a function of a limited number of independent variables. However, this does not mean that the velocity of currency circulation should be constant.

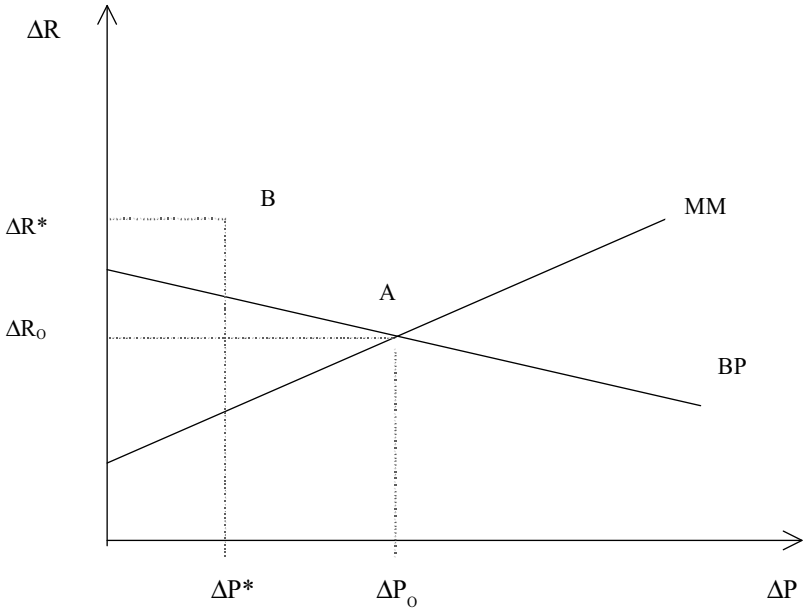
Therefore reserves can also be derived from the combination of equations (3), (6') and (10), and the relationship between reserves and changes in the price level (inflation) is determined by another equation:

$$\Delta R = (\overline{X} - \Delta\overline{F}) - \alpha(Y_{-1} + P_{-1}\Delta\overline{y}) - \alpha y_{-1}\Delta P \qquad (11).$$

If the relationship between the balance of payments and monetary and credit aggregates is presented graphically, assuming prices as an endogenous variable, it will look as follows:

Chart 1

MONETARY APPROACH TO THE BALANCE OF PAYMENTS (J. J. POLAK MODEL)



Equation (9) is described by *MM* line, and equation (11) is described by *BP* line. If we assume that equilibrium is achieved in point *A*, domestic credit contraction will move *MM* upward left and the equilibrium point will move along the *BP* line in the same direction. This means that forex reserves grow at lower values of inflation. The targets for reserves and inflation in this model cannot be taken independently of each other. Since changes in domestic credit can move the equilibrium point only along *BP* line, $\Delta\hat{D}$ alone can influence the combina-

tion of ΔR and ΔP. If the targets for reserves and inflation are selected so as not to lie on *BP* (for example in point *B*), they cannot be achieved only through changes in domestic credit. This embodies the *Tinbergen rule* that two objectives cannot be achieved by using only one instrument.

The use of the exchange rate as a *policy variable* provides solution to the dilemma:

$$\Delta P = (1-\theta)\Delta P_d + \theta\Delta\hat{e} \quad (12),$$

where

P_d is the index of internal prices,

θ is the share of imported goods in the general price index, and

$\hat{e}$ is the desired level of the exchange rate.

By including a new equation and a new endogenous variable (P_d) the authorities have one more policy variable at their disposal: the exchange rate. Besides, equation (10), describing the relationship between GDP and imports, can be modified so that import volumes can be affected by relative prices of imported goods in respect of the prices of domestically manufactured goods.

$$Z = Z_{-1} + (Z_{-1} - b)\Delta\hat{e} + b\Delta P_d + \alpha\Delta\bar{y} \quad (10'),$$

where

b is a parameter measuring the elasticity of import volumes to changes in relative prices of imported goods.

Parameters α and *b* being positive, equation (10') postulates that an increase in domestic prices and/or real GDP leads to increased imports, while national currency devaluation leads to reduced imports.

Including the exchange rate as a policy variable requires modification of equation (4) to accommodate the impact of exchange rate changes on the balance sheet of the central bank:

$$\Delta M \equiv \Delta R + \Delta\hat{e}R^f_{-1} + \Delta\hat{D}_p + \Delta\hat{D}_g \quad (4'),$$

where R^f_{-1} are monetary authorities' reserves in the previous period, expressed in currency units.

Finally, export volumes (similarly to import volumes) are assumed as being impacted by relative prices of tradable goods while net capital flows are assumed as exogenous:

$$X = X_{-1} + (X_{-1} + c)\Delta\hat{e} - c\Delta P_d \quad (13)$$

$$\Delta F = \Delta\overline{F}(1 + \Delta\hat{e}) \quad (14).$$

By the latter additions equation (9) and (11) can be reformulated to eliminate the problem with the missing instrument.

$$\Delta R = \nu_{y_{-1}}(1-\theta)\Delta P_d + (\nu_{y_{-1}}\theta - R^f_{-1})\Delta\hat{e} + \nu\Delta\bar{y} - (\Delta\hat{D}_p + \Delta\hat{D}_g) \quad (9')$$

$$\Delta R = (X_{-1} - Z_{-1} - \Delta\bar{F}) + [X_{-1} - Z_{-1} - \Delta\bar{F} + (b+c)]\Delta\hat{e} - \alpha\Delta\bar{y} - (b+c)\Delta P_d \quad (11').$$

This model is referred to as the expanded Polak model. It is analyzed in the same way as the basic model, the only difference being that the abscissa in Chart 1 represents the change in domestic prices (ΔP_d) alone. Essentially, controlling the change in the exchange rate ($\Delta\hat{e}$) makes it possible for *BP* line described by equation (11') to move so that higher values of forex reserves can be achieved for a given level of inflation. This allows for eliminating the requirement for setting restraints to domestic credit and inflation only in combination so that they would always lie on *BP* line. Points outside *BP* (for example point *B*) can be achieved through a change in the exchange rate so that *BP* passes through point B, and control over domestic credit growth can move *MM* to achieve the desired target.

The general structure of the model used by the IMF is given in the table below.

Table 1

STRUCTURE OF THE IMF MODEL

Targets	Endogenous variables	Exogenous variables	Policy variables	Parameters
ΔR	ΔY	Δy	ΔD	v – velocity of currency in circulation
ΔP_d	ΔM	P_f	Δe	a – marginal propensity to import
	ΔP	X		θ – share of imported goods in the price index
	Z	Z_{-1}		b – price elasticity of imports
	ΔF	ΔF_p		c – price elasticity of exports
	$T - C_g$	ΔF_g		

Constraints on domestic credit growth set by the policy variable (ΔD) usually take the form of ceilings. The IMF practice with standby programs has shown that instances of credit ceiling abuse are often due to excessive growth in credit to the public sector. It is therefore common practice to set constraints only to credit to the public sector, whereby credit to the private sector can be treated as an auxiliary policy variable (ΔD^*_p). This target is achieved by assuming public sec-

tor credit growth as a policy variable:

$$\Delta\hat{D}_g = \Delta D - \Delta D_p^* \quad (15).$$

Due to absent or underdeveloped stock markets in the countries implementing adjustment programs the relationship between GDP and credit to private sector is generally positive and sufficiently strong. This gives grounds for assuming similar growth rates in nominal GDP and credit to the private sector, making it possible to formulate a simple function of credit demand:

$$\Delta D_p^* = (D_p / Y)_{-1} \Delta Y \quad (16).$$

As regards budgetary restraints to the nonfinancial public sector equation (16) fixes explicitly the admissible deficit since the modification (2') of equation (2):

$$T - C_g \equiv \Delta\overline{F}_g - \Delta D_g \quad (2')$$

means that the public sector will have to adjust to the fixed deficit by increasing revenues and/or decreasing expenditures.

As the general structure of the model shows, it is focused on impacting demand rather than supply. Most IMF adjustment programs focus on reducing absorption, considerable attention being paid to constraining government expenditures. This approach is associated with externalities – restrictions on absorption affect income. Although the IMF is fully aware of the negative effects that a continuous contraction in demand may have, adjustment programs are still being applied by a number of countries. Macroeconomic stabilization, being of decisive importance, is pointed out as a reason for applying adjustment programs. It is assumed (although unproved) that favorable effects of internal and external equilibrium are significantly greater than potential income losses.

The other approach in designing adjustment programs involves influence on monetary aggregates. An understanding of the monetary nature of inflation underlies this approach. Provided aggregate spending exceeds the production capacity of the economy (under the existing price level) prices will increase to the equilibrium level. Usually this is effected by decreasing the real value of financial assets. Conversely, the price level may decline (if prices are flexible tending downward), and (which is more likely) unemployment may rise or/and the degree of production capacity utilization may fall, resulting in a reduced factor productivity.

It is an elementary truth that two divergent targets cannot be

achieved employing one and the same instrument. Achievement of internal and external balance entails measures reducing internal spending as well as measures aimed at restructuring general (internal and external) spending. Again, this is the real expression of the well-known Tinbergen rule[10] that the number of employed instruments may not be less than the targets pursued. If absorption exceeds output, decreased internal demand releases inflationary pressure but this will hardly contribute to simultaneous internal and external balancing. The implementation of the policy intended to both internal and external equilibrium will result in a sizable income loss and increased social tension. In this case measures aimed to strengthen demand for local goods and services without increasing absorption should be taken. This can be achieved by implementing expenditure switching policy, particularly by a change in the exchange rate.

Combined implementation of restrictive and expenditure switching policies poses the question of dichotomy between tradable and nontradable goods which is considered an important analytical instrument in studying depreciation or devaluation effects of the local currency[11]. Therefore, the philosophy of adjustment programs explains the reason for employing combined measures intended to reduce internal demand on the one hand, and measures encouraging exports and depressing imports, on the other hand. In turn, expenditure switching policy includes various measures (a change in the exchange rate, price liberalization, lifting trade and nontrade constraints on foreign trade), intended to eliminate price discrimination of local goods and services.

In cases when GDP is smaller than targeted due to inefficient resource allocation, the expenditure switching policy in respect of demand may also have a positive effect on the volume of output improving output structure in terms of supply. Problems in designing and applying growth-oriented programs are associated with the fact that expenditure switching policy entails a number of structural changes having uncertain effects and normally requiring a longer period of time.

[10] *Tinbergen, J. On the Theory of Economic Policy*, North Holland, 1952.

[11] The analysis aims at distinguishing tradable and nontradable goods rather than imported and exported goods as it is assumed that *terms of trade* are exogeniously set. See *Swan, Trevor. Economic Control of Dependent Economy*, Economic Record, vol. 36, 1960.

2. The World Bank Approach

The World Bank approach in applying expenditure switching policy implies the use of effects from income reallocation. In contrast to IMF programs focused primarily on achieving balance of payments equilibrium, the World Bank is mostly involved in development projects accenting on medium-run economic growth. National accounts are tied to the balance of payments. Concurrently, any emerging deficits and possibilities for deficit financing should be carefully monitored. The World Bank basic model focuses entirely on the real sector. Inflation is not determined by the model itself (inflation is not an endogenous variable), and it is exogenously set. To simplify the presentation of the model structure and comparison with the IMF model, it is assumed that prices are constant ($\Delta P = \Delta P_d = \Delta P_f = 0$). In the context of general macroeconomic model, the World Bank approach requires inclusion of four additional equations:

1. One of the major exogenous variables in the model is the ratio of investment growth to GDP (ICOR – *incremental capital output ratio*).

$$\text{ICOR}_t = \frac{I_{t-1}}{Y_t - Y_{t-1}},$$

where

I is investment (gross capital formation), and Y is the gross domestic product.

This relationship is fundamental, as a significant deviation in its setting predetermines the failure of the entire model. Simplicity is the major advantage of this approach, since no building of an individual investment function is required in which capital stock occur as a variable[12]. However, simplification increases the risk of errors since important relationships are ignored:

- Increasing capacity utilization has a strong effect on ICOR forecast. For example, other conditions being equal (i.e. if no increases in capital stock and investment occur) greater loading of existing capacities will result in greater output volume and GDP respectively, prompting a decrease in ICOR values. Obviously, expectations for a change in intensity of utilizing existing production capacity should be taken into account if ICOR is exogenously set.

[12] Since evaluation of capital stock is difficult, it is recommendable to use information on investments as it is much more reliable. If data on capital stock is comparatively reliable, the relationship between capital stock and investments is expressed through the identity $K_t = K_{t-1} + It - A_t$, where K is the capital stock, I investment and A amortization.

- The structure of investment also has a strong effect on ICOR. Since the dynamic relation between investment and GDP concerns only two consecutive periods, it should not be expected that investment in infrastructure projects, and that directed in output would equally relate to growth. The same refers to the sectoral structure of investment. Appropriate setting of ICOR necessarily entails distinguishing investment as its relationships to future growth significantly differ.

It is assumed that the ratio of investment growth to output growth, i. e. ICOR, is predetermined by past values or it may be forecast on the basis of changes in the technological level of output. The concept of ICOR allows for expressing output volumes as a function of the amount of investment:

$$\Delta y^* = \rho^{-1}\Delta K \quad (17),$$

where

ΔK is investment (capital growth) and ρ is ICOR.

This equation allows to determine growth based on available investment opportunities, or required investment to achieve the targeted growth rate.

2. Exports are set exogenously.

3. The relationship between GDP and imports is assumed as stable. The equation is similar to the IMF model equation (10) though excluding price changes:

$$Z = \alpha y^* \quad (10")$$

4. The last equation supplementing the basic model includes the function of private sector savings. Under a set savings parameter the function of private sector consumption may be derived:

$$C_p = (1-s)(y^* - \hat{T}),$$

where s is the ratio of private sector savings to disposable income.

Obviously, there are no significant differences between IMF and World Bank approaches regarding the external sector treatment. Major differences are as follows: the IMF uses the monetary approach explaining balance of payments imbalances, while the World Bank focuses on the real sector determining medium-term prospects for economic growth. The hypothesis of time constancy of investment growth/output growth ratio is based on a strongly restrictive assumption about the nature of the aggregate production function. Commonly, treatment of ICOR as a constant value is associated with the production function, with factors of production having constant weights, i. e. factor substitu-

tion is excluded. If factor substitution is assumed, ICOR will be a function of the relationship between factor labor productivity and capital productivity, provided that general factor productivity is constant.

Problems associated with exogenously set ICOR resemble the problems related to setting the velocity of currency circulation in the IMF model. Common in both cases is that *constancy* requirements are not absolute, provided that the direction and intensity of changes in constancy requirements can be grounded and predicted to a large extent. The theory of economic growth factors is much richer than ICOR. The effects of technical progress and human capital are as important as investment. Technically, the impact of these factors can be incorporated into ICOR. However, this requires precise evaluations and high degree of economic intuition.

Based on the World Bank approach the basic identity (5) of income can be rewritten as

$$\Delta K = (y^* - \hat{T} - C_p) + (\hat{T} - \hat{C}_g) + (Z - \overline{X}) \quad (19),$$

where internal investment is considered as a sum total of private and public sector savings plus the inflow (use) of external savings. Substituting the private sector consumption function (18) and the import demand function (10") in the latter equation, we obtain

$$\Delta K = s(y^* - \hat{T}) + (\hat{T} - \hat{C}_g) + (\alpha y^* - \overline{X}) \quad (20).$$

Transforming the latter equation in order to outline growth, an alternative equation on investment based on the basic equation on income can be derived:

$$\Delta K = (s + \alpha) y^* + (1 - s)\hat{T} - \hat{C}_g - X \quad (5').$$

This equation shows the positive relationship between income and investment (parameters α and s are positive) through the aggregate demand curve under exogenously set changes in the price level. Income growth [y*] is accompanied both by increased domestic savings (under preset parameter s) and greater use of external savings, insofar as the marginal propensity to import [α] is positively linked to income. In other words, savings growth (both internal and external) results in a proportional increase in investment.

In respect of supply, income is determined by equation (17) on the relationship between production and investment which can be transformed as

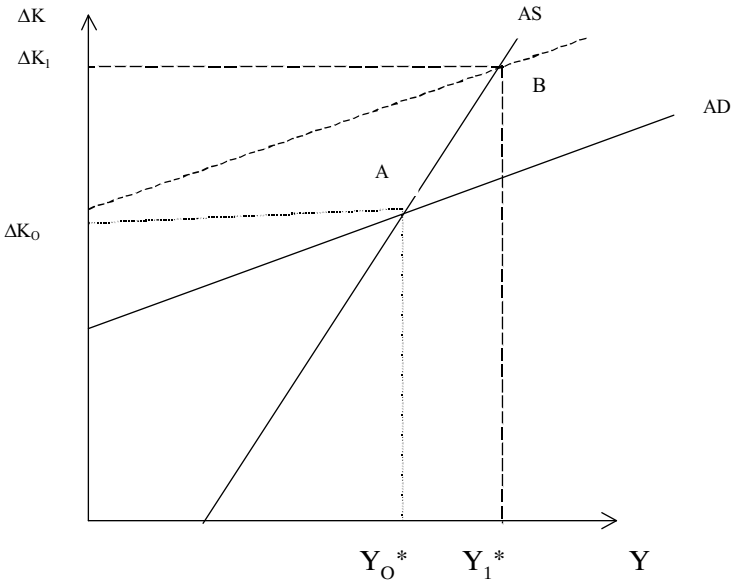
$$\Delta K = \rho y^* - \rho y_{-1} \quad (17').$$

Consequently, we obtain one more equation expressing the positive

relationship between income (production) and investment which can be graphically presented.

Chart 2

PRODUCTION AND INVESTMENT ACCORDING TO THE WORLD BANK MODEL



The slope of the line displaying aggregate supply (*AS*) is determined by ICOR [ρ] from equation (17'), while the slope of aggregate demand (*AD*) is determined by the sum total of $(s + \alpha)$ from equation (5'). As empirically obtained values of [ρ], based on a number of cross-country studies, vary between four and seven, and parameters s and α are positive but less than one, obviously the slope of the *AS* is larger than the slope of *AD*. The government can move *AD* implementing particular economic policy measures intended to change internal savings. In the reviewed model (equation 5') the government has at its disposal only tax revenues and public sector expenditure. If point *A* is in equilibrium corresponding to a particular investment volume (ΔK_o) under the targeted output volume (Y_0^*), other conditions being equal, a reduction in public sector expenditure will shift *AD* upward left, and the new point of equilibrium (*B*) will correspond to a higher output vol-

ume (Y_1^*) and increased investment (ΔK_I). If the interest rate is also included in the model, corresponding to a much greater degree to reality, the government will have one more instrument to influence aggregate demand. The eventual inclusion of the exchange rate as an instrumental variable not only will move the aggregate demand curve up or down but it will also change the curve slope, as any exchange rate movement affects the marginal propensity to import (α). An increase in taxes prompts a growth in public sector savings and a fall in private sector savings. The general effect on aggregate demand will tend to decline, since the private sector reacts to the lower disposable income by reducing consumption.

The policy variable of income growth (ΔY^*) can be coordinated with the policy variable of foreign exchange reserves growth (ΔR^*), provided that net capital flows are controlled or a trouble-free access to capital markets is assumed. In this case net capital flows may be treated as an instrumental variable.

$$\Delta\hat{F} = \overline{X} - \alpha y^* - \Delta R^* \qquad (21).$$

The formulated model may be presented in accordance with the standard classification of variables.

Table 2

STRUCTURE OF THE WORLD BANK BASIC MODEL

Targets	Endogenous variables	Exogenous variables	Policy variables	Parameters
Δy^*	Z	X	C_g	s – private sector savings to disposable income
ΔR^*	ΔK		T	α – marginal propensity to import
	C_p		ΔF	ρ (ICOR)

As it has been already mentioned, the World Bank approach draws its theoretical fundamentals from the two-gap growth model. Provided there are any constraints on foreign financing, the latter equation (21) will actually present limited growth opportunities determined by equations (5') and (17'). This group of models including constraints on net capital flows, are known in theory as two-gap models. In this respect RMSM-X model is basically used to estimate the implications on economic growth under alternative levels of foreign financing.

However, from a technical point of view, inclusion of constraints on

net capital flows makes the model overdetermined,[13] and the removal of this defect requires inclusion of an additional policy variable: the exchange rate. Similar to the IMF approach, import volumes depend not only on income and marginal propensity to import but also on exchange rate changes ($\hat{e}$) and elasticity of imports regarding changes in relative prices.[14] Exports are no longer a purely exogenous variable and are also dependent on exchange rate movements and elasticity of exports to changes in relative prices.

$$Z = \alpha y^* - b\hat{e} \tag{22}$$

and

$$X = c\hat{e} \tag{23}.$$

Therefore equation (21) describing net capital flows modifies into

$$\Delta F = -\alpha y^* + (b + c)\hat{e} - \Delta R^* \tag{24}.$$

As a result, the model is entirely determined since exchange rate changes can accommodate the income growth target and constraints on foreign financing. Prior to the inclusion of the exchange rate (under restrictions on capital flows), the model contained only two endogenous variables (Z and C_p) and three independent equations.

3. The IMF and World Bank Merged Model

Based on basic macroeconomic dependencies (equations $1 \div 5$) and divergent approaches applied by the IMF and the World Bank in specifying particular macroeconomic models, *Khan, Montiel* and *Hague*[15] propose a model combining the advantages of both approaches. The key relationship between the external sector and monetary and credit aggregates is sustained, while the disadvantage associated with the lack of growth component and the impact of changes in relative prices is removed.

[13] Restriction on foreign financing (i.e. a deficit in respect of the external sector) results in overdetermination since internal savings can be obtained in two different ways. Under a set growth rate ICOR synonymously determines required investments. Provided the access to external savings is limited, internal savings appear as a residual value under already determined investment volume. However, there is no guarantee that the obtained internal savings correspond to those obtained from equation (18).

[14] As prices in the simplified model are assumed as constant, the change in the nominal exchange rate can also be interpreted as a change in the real exchange rate.

[15] See *Khan, M. S., P. Montiel and N. Haque* (1990). *Adjustment with Growth: Relating the Analytical Approaches of the IMF and the World Bank.* Journal of Development Economics, #32, North-Holland, *Khan, M. S., P. Montiel and N. Haque*, eds. (1991) *Macroeconomic Models for Adjustment in Developing Countries.* IMF, Washington, D.C.

The merged model includes three major segments.[16]

Prices and Output

GDP growth is set through its link with investments (ICOR) based on equation (17):

$$\Delta y^{*} = \frac{\rho^{-1}\Delta K}{1+\Delta P} \qquad (17''),$$

where the nominal amount of investment is deflated by the increase in the general price level and GDP growth is a policy variable.

Using identity (1) describing budget constraints on the private sector, investment can be showed as:

$$\Delta K \equiv s(Y_{-1} + \Delta Y - \hat{T}) - \Delta M^{d} - \Delta F_{p} + \Delta \hat{D}_{p} \qquad (1'),$$

where private sector savings are showed as a function of disposable income.

Budget constraints on the public sector are set using the basic identity (2). The difference is that taxes [T] and government spending in the basic model are considered as instrumental variables [C_g].

$$(\hat{T} - \hat{C}_{g}) - \Delta F_{g} + \Delta D_{g} \equiv 0 \qquad (2').$$

Similarly to the approach (6') used by the IMF, changes in the nominal amount of GDP include real and inflationary components with the real growth being a policy variable and not exogenously set as in the IMF approach:

$$\Delta Y \equiv P_{-1}\Delta y^{*} + \Delta P y_{-1} \qquad (6'').$$

In the latter identity the change in the general price level is set similarly to equation (12), with the change in the internal price level considered as a policy variable:

$$\Delta P = (1-\theta)\Delta P^{*}{}_{d} + \theta \Delta \hat{e} \qquad (12').$$

Monetary Sector

The velocity of currency circulation [v] reflecting money demand is assumed as an exogenously set parameter used to relate monetary aggregates to the nominal GDP:

$$\Delta M^{d} = v\Delta Y \qquad (7).$$

Money supply is obtained from the banking sector balance sheet (equation 4) under a targeted change in forex reserves and limited

[16] The name of variables and numbering of equations are retained with a view to following the economic logic in merging both models.

growth in credit to the private and public sectors.

$$\Delta M^{s} \equiv \Delta R^{*} + \Delta \hat{D}_{p} + \Delta \hat{D}_{g} \quad (4').$$

Money market equilibrium is set as an equation between money demand and money supply.

$$\Delta M^{s} = \Delta M^{d} = \Delta M \quad (8).$$

External Sector

The purpose of changing forex reserves is described by the balance of payments as a balance between current and capital accounts:

$$\Delta R^{*} \equiv (X - Z) - (\Delta F_{p} + \Delta F_{g}) \quad (3').$$

Exports of goods and services are dependent on exchange rate changes the internal price level and a parameter reflecting export elasticity to changes in relative prices, while changes in net capital flows in the public and private sectors are exogenously set in units of foreign currency.

$$X = X_{-1} + (X_{-1} + c)\Delta \hat{e} - c\Delta P_{d} \quad (13)$$

$$\Delta F_{p} = \Delta \overline{F}_{p}(1 + \Delta \hat{e}) \quad (14')$$

$$\Delta F_{g} = \Delta \overline{F}_{g}(1 + \Delta \hat{e}) \quad (14'').$$

Imports depend on GDP growth (income) as well as on the exchange rate and relative prices:

$$Z = Z_{-1} + (Z_{-1} - b)\Delta \hat{e} + b\Delta P^{*}{}_{d} + \alpha \Delta y^{*} \quad (10'').$$

Table 3

STRUCTURE OF THE IMF AND WORLD BANK MERGED MODEL

Targets	Endogenous variables	Exogenous variables	Policy variables	Parameters
Δy^{*}	ΔY	X_{-1}	T (or C_{g})	ρ
$\Delta P_{d^{*}}$	ΔP	Z_{-1}	$\Delta \hat{D}_{p}$	θ
ΔR^{*}	ΔM^{s}	$\Delta \overline{F}_{p}$	$\Delta \hat{D}_{g}$	v
	ΔM^{d}	$\Delta \overline{F}_{g}$	$\Delta \hat{e}$	α
	X			b
	Z			c
	ΔF_{p}			s
	ΔF_{g}			
	ΔK			
	T (or C_{g})			

The merged model structure consists of 13 equations, including five identities. Given the seven parameters set (estimated), these equations synonymously determine the values of ten endogenous variables and three policy variables depending on eight exogenous and instrumental variables. This is the so-called *positive mode* to solving the system of equations used in building basic scenarios of the program which assumes stability in instrumental variables. The *programming mode* which is used in formulating the program's final version starts with setting policy variables (which actually transform into exogenous). In this case only two instrumental variables can be set at random, the remaining instrumental variables losing their independence, being determined by the model.

As it has been already emphasized, IMF and World Bank approaches have their own advantages and disadvantages. The attempts to build a merged macroeconomic model are intended to remove disadvantages while sustaining simplicity to a maximum degree. In the basic IMF model also known as 'financial programming,' variables concerning the real sector are determined outside the model, while in the World Bank model known as RMSM-X, inflation and changes in monetary aggregates do not have direct effect on growth. The merger of both approaches includes growth, inflation and forex reserves in the system of equations, formally transforming them into endogenous variables, with the government having at its disposal (in the form of instrumental variables) both fiscal and monetary variables. However, the merged model retains drawbacks and constraints typical of the model's two components. Some of these drawbacks, e.g. stability of the function of money demand and ICOR, have been already discussed above. Problems associated with the degree of conventionality and stability of other parameters should not be underestimated. In principle, stability of parameters in implementing any type of economic policy is a key factor for reliability and forecasting strength of any macromodel (*Lucas critique*). In addition to unavoidable problems associated with stability of parameters, at least three more principle issues deserve attention.

The *first* refers to financial aspects of the model. Monetary sector (even in its extended version, i.e. including both the central and commercial banks) is presented only through variables concerning the amount of money, credit and forex reserves. No other forms of financial assets are taken into account, and there is plenty of the financial sector of them in the economy. Therefore, the transmission mechanism of influence of the financial sector on the real sector is reduced to a

level drifting it far away from the real functioning of the economy. The lack of interest rates (an important element of the transmission mechanism) in the model is particularly sensitive among the set of instrumental variables.[17]

The *second issue* is associated with the assumption that prices continuously adjust thus maintaining money market equilibrium, that is at any moment money demand matches money supply. Unsoundness of this assumption is obvious as occurrence of lags in price adjustment is undoubtful.

The *third issue* stems from the fact that factors of production are not included in the function of growth. For instance, the lack of a wage level (change) is extremely sensible provided local currency devaluation is an important element of the implemented program. The objective, that is the desired change in the exchange rate, proves impossible to be realized using only fiscal and/or monetary instruments. This requires inclusion of additional equations establishing the relationship between inflation and monetary incomes (wages) to make indications of the employment level, an essential element of the potential GDP amount.

4. Criticism of Applied Approaches

It can be definitely concluded that IMF and World Bank models and adjustment programs based on these models are often under the lash. The criticism sharpens in periods of international financial crises. A clear example of this was the Bretton-Woods financial system disruption in the early 70s. The same happened as the debt crisis burst out in the early 80s and the socialist economic system disrupted at the end of the decade. As a result the 'clients' of the IMF and World Bank dramatically increased. After the financial crises in Mexico (1995) and Asia (1997 – 1998), IMF and World Bank adjustment programs were much strongly criticized.

Most of the criticism has a populist character as it reflects the inconsistency between the public feeling and expectations, and the real results from implemented adjustment programs. It is absolutely natural for the public to expect high growth rates, low inflation, increased employment, social security, reduced taxes, etc. In the short run, realiza-

[17] The lack of interest rates is even more surprising taking into account that one of the major and traditional elements in IMF adjustment programs is the provision of positive real interest rates used to influence the volume of internal savings.

tion of public expectations prove impossible but the above goals are always set in medium- and long-term programs. In a relatively short period adjustment programs can only overcome economic disequilibrium or at least reduce it. This can be achieved by:

- providing external financing;
- pursuing conservative policy in respect of internal demand;
- implementing structural reform.

These three elements constitute the core of any program, and the models and their specification for a particular country are rather a matter of technical skills.

Another critical trend concentrates on the theoretical ambiguity of the models. They cannot be *synonymously* associated with any modern trend in the economic theory. Undoubtedly, the Keynessian spirit is dominating but there are also elements of neoclassicism, monetarism and even the theory of rational expectations. Eclecticism of models causes some problems, insofar as the models are of structural type. This requires indisputable causality relationship between variables which is not always available. However, the drawbacks of the eclectic approach are offset by the goals set in programs. Macroeconomic models of the IMF and World Bank are not intended to approve or reject a particular economic theory. Therefore, no serious claims should be laid in respect of theoretical clearness.

Most often the models are criticized for insufficient specification of any individual case which results in identical recommendations both by type and 'dosage'. Unfortunately, it is impossible to check empirically the reliability of this hypothesis since no model specifications for other countries are available. Regarding the complete identity of recommendations, this could hardly be the case. Studies carried out by the IMF and independent organizations reveal[18] that 'dosage' depends both on the type and degree of disequilibrium in the economy. For instance, the Latin American crisis in the early 80's was characterized by huge fiscal deficits resulting in chronically high inflation, slowdown, fast devaluation of the national currency and balance of payments deficits. The measures which had been taken in these countries were quite different

[18] See for example, *Dornbusch, R.* Policies to Move from Stabilization to Growth, 1991, World Bank Research Report; *Edwards, S.* The IMF and the Developing Countries: A Critical Evaluation, 1989, Carnegie-Rochester Conference Series on Public Policy, #31, Elsevier, North-Holand; *Dell, S.* Stabilization: The Political Economy of Overkill, 1982, World Development, Oxford University Press; *Mussa, M. and M. Savastano.* The IMF Approach to Economic Stabilization. IMF Working Paper, WP/99/104, July 1999.

from those initiated against the financial crisis in some Asian countries. In Asian countries the problems reflected mostly poor bank supervision under conditions of a significant foreign investment inflow which prompted a rapid increase in short-term liabilities and devaluation pressure.

In respect of the third important element in IMF and World Bank programs (structural reforms) macromodels face serious difficulties in choosing the most appropriate way of including the models in the system of equations. First of all the issue of the formal description of the models should be solved. Some of required structural changes (liberalization or fixing of the exchange rate, providing positive interest rates, maximum admissible current account deficits and/or budget deficit, etc.) are comparatively easy to be carried out as this is a matter of exogenous or endogenous setting. A number of structural changes (e.g. trade liberalization, improvement of bank supervision and accountancy, establishment of market and nonmarket institutions, acceleration of privatization, etc.) are not subject to formal description. However, these changes have a significant impact on the economy also in the short run entailing their indirect inclusion in the models, which makes them highly vulnerable to criticism.

5. Evaluation of the Results from Implementation Adjustment Programs

The history of economic reform in Bulgaria is closely tied to the history of Bulgaria's relationships with the IMF and World Bank. Bulgaria has signed five standby agreements and one Extended Fund Facility with the IMF. The general feeling is that experience and results of implemented IMF programs (at least until 1997) are not encouraging. This is clearly evidenced by the fact that only two (the first and the last) of the five agreements were fully implemented. To this end, several important questions arise: the reason for the failure of most of the programs; if the reason for the failure of these programs was due to an inadequately chosen approach (model) or the model was good but inconsistently implemented, with governments systemically failing to fulfill undertaken commitments.

Special attention was paid to criticism that programs are stereotyped based on restrictive monetary and fiscal policies, inconsistent with the specificity of an individual country and disregarding growth problems and social problems associated with them. Regarding gener-

ally unsatisfactory results entailing the introduction of a currency board as an extreme measure to curb chronic inflation, it is quite easy to join the cohort of critics considering IMF models obsolete and inefficient.

In order to give adequate answers to the posed questions, it is necessary, though in brief, to review the major goals and results of all implemented programs.

However, the following specifications should be made prior to the review.

- *First*, it is quite clear that there is no perfect model. Any model is based on a number of assumptions associated with a particular economic theory. In this case the assumptions are based on the Keynnesian concepts of the government role and position in economic development. Perhaps, this is the bone of contention as adherents of traditional Keynnesian theory have been progressively losing ground in recent years.
- *Second*, IMF and World Bank programs are related to the Keynnesian theory inasmuch as they seek to ensure government support in implementing required economic reforms. In this respect practical implementation of the programs proves impossible relying on monetary and fiscal policy instruments. As a rule (without any exceptions) countries requesting support from international financial institutions are underdeveloped, developing or transition economies with no experience in market economy and having no market-oriented institutions. No reliable statistical information is available on most of the countries. Under these conditions, design of macromodels taking into account fluctuations in the business cycle as a result of technological shocks or including variables reporting changes in preferences of economic agents and their rational expectations is absolutely impossible.
- *Third*, IMF and World Bank models are based on generally acknowledged and indisputable economic interdependencies. The models are deliberately simplified and based on a limited number of parameters, and rely to a great extent on instrumental and exogenous variables which should be treated as trends rather than as particular values.
- *Fourth*, IMF and the World Bank are institutions with a specific public goal: supporting balance of payments of countries experiencing serious temporary or chronicle deficits and promoting economic growth by implementing specific projects. It is quite

natural to extend loans under terms and conditions ensuring loan repayment and avoiding recurrences. There is hardly a gloomier prospective for a country than to become a permanent 'client' of international financial institutions. Despite serious criticism there is no other financial organization to propose a better approach or more efficient programs. Recently there have been appeals to limit or even stop the IMF activity as the Fund's measures are always delayed and inadequately directed. It is often heard that it would be more healthy for countries experiencing financial difficulties to overcome these difficulties by borrowing funds from financial markets.

The efficiency of implemented standby programs may be evaluated by using various criteria and approaches:[19]

- The ***before – after*** approach used to evaluate country's major macroeconomic indicators prior to the launch of the program and those in the course of program implementation. However, the obvious simplicity of this approach is misleading as it assumes that all other parameters (i. e. macroeconomic variables beyond the scope of a particular program or set exogenously) stay unchanged. Since negative shocks can occur at any time (e.g. worsening terms of trade, increase in international financial market interest rates, unfavorable weather conditions), evaluations based on this approach may be (deliberately or not) intentional, in so far as all changes are associated with the implemented program. The problem with lags in program variables' reaction is also essential.
- The ***with – without*** approach based on comparing economic results of a particular country (or group of countries) implementing the program with results in another country (or group of countries) with similar problems which is not implementing such a program. This approach overcomes the disadvantage of the previous one where results from an implemented program are hard to be differentiated from autonomous and/or external factors. However, the problem with unequal starting conditions emerges, that is control country groups are not and may not be accidentally chosen, since countries seeking financial support

[19] This issue is thoroughly developed in: *Haque, N., and M. Khan. Do IMF-Supported Programs Work?* A Survey of the Cross-Country Empirical Evidence. IMF Working Paper, WP/98/169, Dec. 1998. Approaches for evaluating the efficiency of implemented programs described below are based on the cited paper.

are generally in worse economic state. This also creates conditions for biased evaluations as far as it proves difficult to filter out program results from those due to different **starting** conditions. In such comparisons differences in the effect and direction of exogenous factors should also be taken into account.

- The **generalized** evaluation approach includes comparison of countries or country groups implementing and not implementing programs after the starting conditions and divergent effect of external factors have been eliminated. This approach is complicated and its application limited as it is based on econometric techniques intended to limit the model to equations (similar to equation [11']) representing the reduced form of the model. The results from solution of policy variable equations are compared, provided the government reaction in the countries not implementing the program is known on the basis of the reduced form of the model.
- The **comparison of simulations** approach compares simulated macroeconomic indicators as a result of an implemented standby program with the simulations resulting from the implementation of another type of economic measures. This approach directly affects the quality of the applied model, since, unlike the previous comparison approaches, simulations are used instead of exact data considered as results from the implemented program. Difficulties in applying this approach are associated with the need for a well approbated econometric model suitable for simulation solutions, and the major problem relates to the well-known Lucas critique, postulating that parameters cannot stay stable under significant changes in the economic policy pursued.

Evaluation of results from particular IMF and World Bank-supported programs implemented in Bulgaria will be based on the first (before – after approach) and partly on the fourth (the comparison of simulations) approach. The latter requires a review of the validity of major assumptions and primarily of the correctness and stability of used parameters. Based on statistical data for the 1990 – 1998 period the following computations are made regarding:

- the stability of money demand function (velocity of currency circulation);
- the strength and stability of the relationship between import volumes and GDP;

- inflation dependence on changes in the exchange rate and the share of imported goods in the consumer basket;
- the validity of the hypothesis of a statistically important relationship between real effective exchange rate indices and export volumes;
- the accuracy of exogenous setting of GDP growth and net capital inflow;
- basic assumptions in compiling the state budget revenue side (buoyancy).

After reviewing the correctness of above computations, programs should be compared with obtained results. Estimations should be made of the extent to which discrepancies are due to incorrectly set exogenous values, the extent to which they are due to violating preset requirements (instrumental variables) controlled by the government, as well as of the extent to which these discrepancies reflect inherent and admissible errors typical of any model. Only after that it can be argued that the model is wrong.

Evaluating the results from the implemented standby program, it should be taken into account that programs do not coincide with calendar years which impedes the analysis of statistical data to a certain extent.

The **first** standby agreement with the IMF was one-year, covering the period between 15 March 1991 and 15 March 1992. The agreement provided for a purchase of SDR 279 million and SDR 60.6 million under the Compensatory and Contingency Financing Facility (CCFF) intended to compensate for the increased expenses on exports of energy inputs associated with the Persian crisis. As a result of nonfulfillment of the parameters under the agreement, the last tranche was not extended.

The **second** standby agreement was also one-year and provided for a purchase of SDR 155 million. The agreement became effective as of 17 April 1992. The last tranche under this agreement was not disbursed as well.

The **third** standby agreement (one-year) was signed on 11 April 1994, totaling SDR 69.7 million. In December 1994 the agreement was revised and extended by an additional SDR 69.7 million as a result of the agreement with the London Club creditors concluded in June 1994. The Systemic Transformation Facility (STF) of SDR 116.2 million concluded in April was also under the standby program implemented in this period. The last tranche of SDR 23.2 million was not disbursed.

The **fourth** agreement was signed on 19 July 1996 and provided for

a purchase of SDR 400 million for a period of 20 months (to 18 March 1998). The agreement was terminated after the disbursement of the first tranche of SDR 80 million.

The **fifth** standby agreement was signed on 11 April 1997 and provided for a purchase of SDR 371.9 million for a period of 14 months. The CCFF of SDR 107.6 million was also included in the fifth standby agreement.

The **last** standby agreement with the IMF was signed on 25 September 1998 for a three-year period. Financing under this agreement is expected to total SDR 627.6 million. As the new agreement is in progress, the results of its implementation have not been discussed.

Besides the agreements with the IMF between 1991 and 1998, the World Bank provided financing under special development projects.[20] Funds disbursed by year and project are as follows:[21]

Project	Effective as of	Completed on	Amount (million USD)
SAL I (Structural Adjustment Loan)	IX.1991	IX.1994	250
DDSR (Debt and Debt Servicing Loan)	IX.1994	XII.1994	125
ADP (Agricultural Development Loan)	VII.1995	VI.1998	50
PIEF (Private Investment and Export Finance)	I.1994	VI.1998	55
RL (Rehabilitation Loan)	X.1996	VII.1997	30
CIRL (Critical Imports Rehabilitation Loan)	VIII.1997	VI.1998	40
FESAL I (Financial and Enterprise Sector Adjustment Loan)	I.1998	IV.1998	100
TAL (Technical Assistance Loan)	I.1992	VI.1999	17
Telecommunications	XII.1993	VI.1999	30

[20] For a more detailed information about the World Bank projects in Bulgaria, see the website of the World Bank representation in Bulgaria: http://www.worldbank.bg.

[21] Besides these projects which have been finished, there are also programs underway, with funds under these programs still being utilized. Loans agreed under these programs total USD 582 million, including USD 321 million until the end of 1998.

Table 4

EXOGENEOUS AND POLICY VARRIABLES IN STANDBY PROGRAMS

Agree-ment	GDP growth (%)		Exports (billion USD)		Forex reserves (million USD)		BGN/USD exchange rate		Velocity of currency circulation		Inflation Dec. – Dec. (%)	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
First	-11	-11.7	6.6	3.7	625	353.4	17	21.8	2.12	1.76	234	473.6
Second	-4	-7.3	3.9	3.9	1350	944.8	23.7	24.5	1.39	1.59	44	79.4
Third	-1÷ -2	1.8	4.2	3.9	1089	1006.4	59.6	66.0	1.62	1.59	74	121.9
Fourth	0	-10.1	4.9	4.9	1327	488	150	487.4	1.83	1.33	105	310.8
Fifth	-7.4	-6.9	5	4.9	1947	2483	1700	1776.5	3.56	2.83	566	578.4

Table 5

PERFORMANCE CRITERIA

Agreement	Growth in banking system NDA (%)		Real growth in credit to government sector (%)		Real growth in credit to nongovernment sector (%)		Budget balance (% of GDP)		Growth in BNB NFA (million USD)	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
First	-103	-98	-65.0	-79.0	-48.4	-62.8	-3.5	-8.4	534	310.6
Second	-	-	3.0	6.5	-9.7	-25.8	-4.2	-5.2	-	-
Third	-27.4	-4.3	-24.0	-0.3	-24.1	-40.7	-6.3	-5.7	-600	-125.2
Fourth	54.1	139.4	-36.0	-22.6	-45.0	-45.4	-4.7	-10.2	-235	-620
Fifth	102.1	-24.8	-75.5	-73.2	-60.0	-32.2	-4.1	-2.9	620	1662

* Net domestic assets.
** Net foreign assets.

Table 6

MAJOR ECONOMIC VARIABLES

Agreement	BOP current account (% of GDP)		Real growth in wages (%)		Broad money growth (%)		Imports (billion USD)	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
First	-2	-1	-28.4	-56.2	24.1	24.7	8	3.8
Second	-1.4	-4.2	-1	18.9	33.9	50.1	4.3	4.2
Third	-4	-0.2	-18	-30.8	49.6	78.1	4.3	3.9
Fourth	3.1	0.8	-13.5	-17.6	40.6	124.5	4.5	4.7
Fifth	0.8	4.2	-23.5	-16.8	245.4	359.3	4.8	4.5

Table 7

EFFECTIVENESS OF IMPLEMENTING PROGRAMS

Agreement	Targets		Exogeneous variables			Policy variables		Endogeneous variables		
	Infaltion	Forex reserves	GDP growth	Exports	Velocity	CGS*	Exchange rate	Imports	M3	CNS**
First	×	×	√	×	×	×	×	×	√	×
Second	×	×	×	√	×	×	√	√	×	×
Third	×	√	×	×	√	×	×	×	×	×
Fourth	×	×	×	√	×	×	×	√	×	√
Fifth	√	√	√	√	×	√	√	√	×	×

** Credits to the government sector.
** Credits to the nongovernment sector.
× – no effect from the program implementation.
√ – effect from program implementation.

Statistical data displayed in Tables 4 ÷ 8 summarizes Bulgaria's experience in implementing standby programs. All agreements implemented in Bulgaria are reviewed in chronological order with the exception of the last three-year agreement concluded in September 1998 which has not been completed yet. Since post-1989 transition to a market economy, 1994 and 1995 were the only two years when Bulgaria did not sign agreements with international financial institutions, and in both cases the lack of financial support resulted in forex and financial crises. Forex and financial crises burst out in the spring of 1994 and the autumn of 1996 and the government had to seek emergency support, signing imprecise agreements unable to settle the problems. Moreover, stopped financial support even worsened the existing problems. To this end, it should be reminded that only the fifth agreement has been completed, that is the total amount of funds provided under the agreement has been disbursed to Bulgaria. The remaining agreements were untimely terminated, as it was found during the regular quarterly reviews that Bulgaria failed to fulfill its commitments under the agreement, formulated as performance criteria. The fourth agreement was not launched practically, since it was terminated four months after its signing, followed by a severe financial crisis. This evidenced again the crucial importance of external financing for Bulgaria's economy.

Table 4 displays exogenous and policy variables comparing the targets set in the programs and actual results. It is easy to note that targets and exogenously set values of major economic variables significantly

diverge with few exceptions. This fact is of great importance as in this case we are interested primarily in the principal ability of models to generate forecasts during transition normally characterized by unstable macroeconomic conditions rather than in the discrepancy between projected and actual values. To this end, results summarized in Table 7 are indicative of the fact that preset goals were achieved only under the fifth standby agreement, that is performance criteria were strictly followed and exogenously set variables adequately selected.

Information contained in Table 8 is of particular interest as it displays the effects of implemented programs both in the current and subsequent periods (after completion of the program). This evaluation approach proves very important because standby programs are generally intended to settle macroeconomic imbalances in the long run, not only for the period of their implementation. Data suggests that an adequately designed program has also a favorable effect in the next period, while the programs which failed (clearly pronounced in the fourth standby agreement) additionally worsen macroeconomic conditions.

The analysis of compliance with the performance criteria evidences the reasons behind the failure of all standby programs (except for the last program). Even in cases of adequately selected policy and exogenous variables, nonfulfillment of undertaken commitments condemned these programs to failure. In most cases failures are associated with the program's (model) approach stating that it is unsuitable for the specific Bulgarian conditions. However, data in Table 5 shows a different picture: due to various reasons (most often political, associated with pending elections and the 'need' for saving the electorate the social implications of reform) governments systemically escaped from their responsibilities. Unfortunately, a number of important economic prerequisites (structural reform, legislation, institutional changes, etc.) which have no direct quantitative indicators but are crucially important for the implementation of the program cannot be included in the published tables. As a rule governments avoided painful decisions, thus reducing Bulgaria's chances for a faster completion of the delayed transition.

Table 8

MAJOR MACROECONOMIC VARIABLES BEFORE, DURING AND AFTER IMPLEMENTATION OF ADJUSTMENT PROGRAMS

	First, 1991			Second, 1992			Third, 1994			Fourth, 1996			Fifth, 1997		
	Before	Programs	After	Before	Programs	After	Before	Programs	After	Before	Programs	After	Before	Programs	After
Growth (%)	-11.8	-11.0	-7.3	-11.7	-4	-1.5	-1.5	-1 ë -2	2.1	2.1	0	-6.9	-10.1	-6.9	3.5
Inflation (%)	64.5	234	79.4	473.6	44	63.8	63.8	74	32.9	32.9	105	578.4	310.8	566	1
Forex reserves (million USD)	125	625	945	353.4	1350	655.3	655.3	1089	1241	1241	1327	2483	488	1947	3056
Exports* (billion USD)	3.91	6.6	3.9	3.7	3.9	3.73	3.73	4.2	5.3	5.3	4.9	4.9	4.9	5	4.2
Imports* (billion USD)	4.85	8.0	4.2	3.8	4.3	4.61	4.61	4.3	5.2	5.2	4.5	4.5	4.7	4.8	4.6
Current account (% of GDP)	-7.7	-2	-4.2	-1	-1.4	-8.7	-8.7	-4	2.1	2.1	3.1	4.2	0.8	0.8	-1
Budget balance (% of GDP)	-8.5	-3.5	-5.2	-8.4	-4.2	-10.9	-10.9	-6.3	-6.4	-6.4	-4.7	-2.9	-10.2	-4.1	0.9
Exchange rate (BGL/USD)	2.8	17	24.5	21.8	23.7	24.5	24.5	59.6	70.7	70.7	150	1776.5	487.4	1700	1675.1
Real wage (real growth, %)	0.9	-28.4	18.9	-56.2	-1	1.1	1.1	-18	-5.5	-5.5	-13.5	-16.8	-17.6	-23.5	20.2
Broad money/GDP	1.22	0.47	0.62	0.57	0.72	0.78	0.78	0.61	0.66	0.66	0.55	0.35	0.75	0.28	30.5

* Exports and imports for 1990 are recalculated at the exchange rate of 4.875 per 1 transferrable rouble.

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Bank Reserve Dynamics under Currency Board Arrangement for Bulgaria

Boris Petrov

Abstract. It is well known that under a monetary system based on currency board arrangements, financial system equilibrium is maintained by the interest rate. This study meets the need to explain bank reserve dynamics during the period of bank reserve maintenance. The study presents an empirical model of bank reserve demand and explains bank reserve supply shocks and adjustment of banks to these shocks. Finally, the author makes practical recommendations intended to smooth interest rate variance resulting from shocks.

Резюме. Известно е, че при монетарна система, основана на паричен съвет, балансираност на финансовата система се постига чрез лихвения процент. Това изследване е провокирано от необходимостта да се обясни динамиката на банковите резерви в рамките на периода на тяхното поддържане. Представен е емпиричен модел на търсенето на банкови резерви и са обяснени шоковете върху предлагането им, както и приспособяването на банките към тях. Накрая са отправени и практически препоръки с оглед изглаждането на вариацията в лихвения процент, породена от действието на тези шокове.

Contents

The Balancing Role of Reserve Money Market under a Currency Board

As it is known stable and long-lasting operation of the currency board is predetermined by the automatically functioning rules, the basis of the currency board. These rules are based on a monetary approach to the balance of payments which links balance of payments dynamics with reserve money dynamics. Since the exchange rate is employed as a nominal anchor, financial sector equilibrium is provided through money market prices and volumes, i. e. interbank market interest rates and reserve money.

Under a currency board any disequilibrium or imbalances in monetary and real sectors reflect finally on reserve money market. Attainment of rapid and automatic equilibrium between reserve money demand and supply is the major rule for maintaining currency board stability. Reserve money supply is predetermined by balance of payments dynamics which, in turn, is impacted by various factors. Reserve money demand consists of two major components: demand for currency in circulation (banknotes and coins) by the public and companies and commercial bank demand for reserve money. The study of the behavior of reserve money components of demand is of essential importance in case of a systemic risk. Irrespective of the origin of the initial shock and subsequent attack on the currency board (bank and/or foreign exchange), this attack will sharply reverse reserve money demand dynamics and affect currency board liabilities.

The study of reserve money market includes analysis of economy's liquidity or especially that part of liquidity which is vulnerable to the greatest extent to any possible shocks under a currency board.

With the introduction of currency board arrangements in Bulgaria in mid-1997, implementation of the anti-inflationary policy was transferred to the European Central Bank (ECB). This helped settle the problems associated with the inconsistent discretionary policy previously pursued, and hence public confidence in government abilities to pursue an anti-inflationary policy was partly restored.

With the introduction of a currency board monetary aggregate behavior reflects automatic adjustment to money demand changes, balance of payments dynamics, and to a smaller extent to government behavior. The impact of government behavior has been thoroughly studied and described by Nenovsky and Hristov (1999).

Nenovsky (1998) profoundly analyzes and advances arguments for the failure of traditional approaches to monetary policy implementation in transition economies. Behavior of currency outside banks under a currency

board has been studied by Nenovsky and Hristov (2000). Therefore, the question of currency outside banks is beyond the scope of this paper. The study focuses on bank reserve behavior.

The goal of this paper is to propose a function of bank reserve demand and behavior model of average weighted interbank money market interest rate under a currency board. Further, construction of the model is associated with identification of various sources of shocks on bank reserves and changes in the behavior of various participants, and in interest rate dynamics correspondingly. The study will be made within the existing monetary system institutional structure.

This study is structured as follows. The first section includes a theoretical overview of the models of interbank market interest rate movements as well as models of bank reserve demand. The second section reviews institutional specificity of Bulgaria's minimum required reserve regulation system and payment system due to their importance in determining participants' behavior in the interbank deposit market. The third section of the paper includes a list of data used and major statistical test results which prove important for any further econometric processing. The fourth part of the study describes the model of bank reserve demand in levs and foreign currency.

This model can be used as a basis of future analysis of bank reserve dynamics and realization of an extremely short-term forecast (from one to several days). The model could be also instrumental in forecasting the impact of any institutional changes (e.g. a reduction of minimum required reserves) on interbank market rate dynamics.

Literature Review

Employment of a direct interest rate regulation of overnight deposits by a number of central banks in mid-90s as an operative target in monetary policy implementation made the study of interest rate movements extremely important.

The interbank deposit market is characterized by an interest rate with the shortest horizon. Consequently, the change in the interbank deposit market interest rate is considered indicative which automatically prompts changes in the interest rates of other financial market segments with longer maturity horizon. This way the influence on short-term interbank market rates spreads through economic agents' expectations on the whole yield curve. The hypothesis of rational expectations for the interest rate behavior in various yield curve points has been studied by Mankiw and Miron (1986), Fama (1984), Mishkin (1988), Hardouvelis (1988), Fama and Bliss (1987), Simon (1990),

Rudenbusch (1995), etc. Any of these studies confirm the hypothesis that the spread between various yield rates can be used in forecasting the behavior of short-term interest rates, which in turn reflects economic agents' expectations of central bank behavior (Bernanke and Blinder, 1992).

In this study special attention is paid to short-term interest rate dynamics. Under a currency board interbank market rate movements reflect money supply adjustment to the changes in money demand. The adjustment is not an automatic process due to institutional specificity of payment and monetary systems. Some peculiarities are considered in the second part of the paper and other have been already described by *Nenovsky* and *Hristov* (1999).

Review of models describing interest rate dynamics in the interbank money market

Economists' interest in interest rate movements is associated with information about future changes in macroeconomic variables. This can be realized by forecasting an implicit function of central bank reaction under different circumstances and the impact of these changes on macrovariables through various transmission channels (Bernanke and Blinder, 1992).

Campbell (1987) proposes a two-period model of interest rate movement in the federal funds market. The martingale[1] hypothesis of interest rate dynamics has been rejected in this study. In accordance with this model interest rate fluctuations were explained partly by the effect of announcing money supply data by the US Federal Reserve. Spindt and Hoffmeister (1988) propose a model showing the impact of continuous trade and regulatory constraints on reporting minimum required reserves on interest rate variance in each day of the reserve maintenance period.

Feinman (1993) assesses the reaction function of the Federal Open Market Committee (FOMC). The proposed model successfully predicts 75% of FOMC reactions. Moreover, the author proves through this model not only the FOMC successful manipulation of money supply but also the signals it sends about monetary policy performance.

Hamilton (1996) tests the hypothesis of martingale in interbank market interest rate movements. Earlier Shiller, Campbell, Schoenholtz (1983) and Dyl and Hoffmeister (1985) considered the same hypothesis as doubtful. According to Hamilton (1996), the federal funds rate market follows a martingale within the 14-day maintenance period. On the first day of a new maintenance period interest rate dynamics is described by higher-order autoregression. This rejects the martingale hypothesis within the whole maintenance period.

[1] Martingale is first order autoregression.

Hamilton (1997a) measures the liquidity effect (the change in interest rates as a result of changes in bank reserve supply) by modeling budget accounts' behavior. Based on these accounts he derives unexpected exogenous shocks which affect bank reserve supply. Finally, the author confirms the existence of two different channels for emergence of liquidity effect. The first channel is a result of a temporary fall in bank reserves and the second one reflects a permanent shock which continues even after expiry of the maintenance period.

Hamilton (1997b) studies the factors affecting bank reserve demand and supply. For this purpose data from US Federal Reserve daily balance sheets was used. The author proposes a VAR model imposing a number of constraints on individual variables. The latter is predetermined by various institutional peculiarities. Impulse analysis of individual variables helped determine the effect of shock duration on bank reserve demand and supply.

Nautz (1998) further develops the model of bank reserve management created by Orr and Mellon (1931) to include an additional component influencing reserve demand: uncertainty as a result of shocks caused by an unclear central bank's monetary policy.

Furfine (1998) constructs a micromodel which formalizes the relationship between the activity of each bank in the payment process and interbank interest rate dynamics. According to Furfine (1998), the function of bank reserve demand consists of two separate components: required reserve demand and settlement demand. Total bank reserve demand in the monetary system is a sum total of individual functions of commercial bank demand.

Clouse and Dow (1999) propose an equilibrium model. This model explains significant deviations of federal funds rates from the operative target. According to the authors, the reasons behind the significant deviations are fixed transactions expenses in finding nonmarket bank reserve sources. Chung and Hung (2000) explain interbank market rate movements by a single factor model.

The common feature of all mentioned models is the relationship between interbank market rate as a central bank's operative target and open market operations. In other words the size of the interest rate reflects the central bank's decision and the manner of its fulfillment through the interbank money market.

Under a currency board interest rate dynamics does not depend on central bank decisions. The interest rate reflects the interaction between demand and supply of bank reserves which are impacted by various factors. In this case the central bank could influence commercial bank behavior only indirectly by changing minimum required reserves. It should be noted that employment

of minimum required reserves is considered a disadvantage of the currency board rather than an advantage due to the adverse effect of the retained monetary policy instrument on currency board credibility, a fact highlighted by Hanke and Schuler (1994) and Nenovsky and Hristov (1999). Since no changes in minimum required reserves were made during the reviewed period, interest rate dynamics was entirely a result of changes in bank reserve demand and institutional specificity of the financial system.

The trend towards a reduction or even removal of minimum required reserves prompts a change in determinants of commercial bank reserve demand, and hence in the interest rates in interbank deposit market. Sellon and Weiner (1996) focus on the role of transactions demand which remains the core of the function of bank reserve demand in the absence of minimum required reserves. The authors focus on increased interest rate volatility as a direct effect of reducing minimum required reserves. Clinton (1996) makes practical recommendations in respect of monetary policy implementation in Canada under zero minimum reserves. Clouse and Elmendorf (1997) explain the increased interest rate volatility and show the change in this relationship as a result of changes in banks' behavior. Di Giorgio (1999) studies the interdependence between the reduction of minimum required reserves and the degree of financial mediation development. According to Di Giorgio, the degree of financial mediation development depends on financial agents' expenses for borrower monitoring.

Henckel, Ize and Kovanen (1999) propose a simplified model of bank reserve demand adjusted to uncertainty in payments which should be made by the respective bank. They find an interdependence between the interbank market interest rate, central bank supply of bank reserves and idiosyncratic shocks on money supply.

Study of bank reserve demand

Pool (1968) constructs a fundamental micromodel of bank reserve management deriving the optimal value of reserves a bank should maintain in order to maximize expected profit.

Ho and Saunders (1985) develop a micromodel of the interbank deposit market, including major institutional characteristics. The economists derive the determinants of demand for deposits by any individual participant and explain why big banks are net consumers of interbank deposits and small banks are net providers of resources.

Nautz (1998) studies bank reserve demand under the conditions of uncertainty of future monetary policy of Deutsche Bundesbank. Based on results obtained by using ARCH-M model, the Nautz concludes that the central

bank can influence money market, announcing its monetary policy explicitly or implicitly. This impacts the expected variance in bank reserve demand.

Jahnsen (1998) analyzes reserve money demand in Great Britain using quarterly data which covers a 20-year period. The author uses in his study a cointegration model with error adjustment.

Bartolini, Bertola and Prati (1999) analyze the effect of Federal Reserve behavior on bank reserve demand. In accordance with this econometric model interbank market rates volatility reflects market participants' confidence in Federal Reserve commitment to manipulating rigidly or softly the interest rate. The authors propose a specific theoretical model of the federal funds market microstructure.

Institutional Specificity of the Money Market in Bulgaria

Parameters of minimum required reserve system adopted in April 1998

The present minimum required reserve system replaced the former regulation system which had operated with certain modifications between 1990 and 1998. The change was intended to make commercial banks more flexible in executing minimum required reserves and to avoid maintenance of excess reserves.

Any required reserve system has specific parameters outlining its institutional character. For example, the period of reporting the deposit base required for minimum required reserve formation is called a base period. In Bulgaria this period covers one calendar month. Within this period banks must compute daily their deposit base. The deposit base includes all borrowed funds with the exception of funds borrowed from commercial banks. The deposit base is reported on a daily basis during the base period. Minimum required reserves account for 11% of the reported daily amount of the deposit base during the base period[2]. The average daily amount of minimum required reserves in the maintenance period is computed by reducing 60% of the average cash balances in levs from the total amount of minimum required reserves during the base period. The maintenance period begins on the fourth day of each month and finishes on the third day of the following month. During this period banks must cover minimum required reserves. Banks are allowed to use up to 50% of the minimum required reserves.

[2] 8% since July 2000.

The required reserves are estimated according to the following formula:

$$\frac{1}{K}\sum_{\kappa=1}^{K} R_k \geq \theta,$$

where

k has values from 1 … *K*, where *K* is the number of days during the maintenance period, i. e. 30 or 31 dependent on the corresponding month,

q is the average daily amount of minimum required reserves.

If banks fail to fulfil the minimum required reserves during the maintenance period, a penalty interest is to be paid to the BNB in the amount of 150% of the average interbank market rate for the days of default.

The opportunity to maintain both lev and foreign currency reserves with the BNB is another specific feature of the minimum required reserve system. This is predetermined by the significant share of foreign currency deposits in commercial bank liabilities and the need to offset foreign exchange risk by maintaining foreign exchange assets. It should be noted that forex reserves are in the form of noninterest-bearing deposits. Although forex reserves may not be used in transactions, they may be withdrawn and changes in balances are allowed through the whole maintenance period.

The analysis of the foreign exchange structure of these deposits indicates that banks use foreign exchange denominations to save opportunity costs. These are currencies on which low interest rate is applied (e. g. the Swiss franc).

Institutional specificity of the BISERA settlement system

BISERA is a system for gross settlement operating in a particular time period. The value date of payments is *t+1*. Payments are processed after the end of the business day and final balances resulting from settlement are recorded on commercial bank accounts in the beginning of the next business day.

Since banks do not have information about other participants' payments initiated to them, they are unable to manage effectively their liquidity, and when more sizable payments are to be effected, commercial banks have to provide excess reserves (if smaller) or use the admissible 50% of paid reserves to effect payments through BISERA.

Supply of bank reserves under a currency board

The supply of bank reserves under a currency board may have several exogenous sources. First, these are commercial bank net foreign assets denominated in reserve currency. These funds appear to be a source of liquid-

ity for commercial banks' sales of reserve currency to the BNB. The term of delivery is minimum *t+3* as in reserve currency transactions an external (foreign) payment system is used. Consequently, the banking system direct source of liquidity within a 24-hour time horizon is limited. As a result the banking system is unable to react to any idiosyncratic[3] shocks. Minimum required reserves in foreign currency maintained with the BNB appear to be one of the accessible liquidity channels. Where necessary commercial banks sell a portion of these reserves to the BNB, thus providing spot liquidity (as forex transactions with the BNB are effected only with a spot value date). This limits banks' immediate sources of liquidity. Under these conditions money market proves to be the only source of lev liquidity within 24- and 48-hour time horizons.

The Ministry of Finance issuing policy is the second systemic source of liquidity. Given the matching of maturity and new issue dates and maintenance of an issuance schedule, the Ministry of Finance issuing policy cannot be a source of unexpected shocks on the money market. Therefore, it can be assumed that market participants' behavior adjusts more or less to this shock in advance.

On the other hand, the Ministry of Finance appears to be a net exogenous source or absorber of liquidity from the banking system through cash flows from and to the budget accounts with the BNB. As these flows are serviced through BISERA, which operates with a value date *t+1*, commercial banks meet flows to the BNB by maintaining higher balances on their reserve accounts by the end of a particular business day.

Theoretical Model of the Demand for Bank Reserves

Money demand in transition economies has been thoroughly studied. In contrast to developed countries where money demand is relatively stable and its behavior predictable, in transition economies it is characterized by a number of specific features. For example, Nenovsky (1998) points out the high degree of foreign currency substitution and lack of confidence in monetary authorities as major factors behind the disturbed stability of the function of money demand. Similar arguments in favor of instability in the function of broad money demand have been also pointed out by Blishev (1997). Calvo and Vegh's (1992) arguments are based on the study of Arrau, De Gregorio, Reinhart and Wickham (1991). In this study money demand instability is

[3] A shock affecting a particular participant and not the whole system. In this case this is an individual commercial bank.

considered as a result of 'financial innovation' approximating the process of dollarization.

However, bank reserves are a relatively narrow segment of money in the economy. Therefore, bank reserves are characterized by a certain behavioral stability provided by the transaction and institutional specificity of payment and reserve systems. Employment or absence of minimum required reserves is part of the institutional specificity of bank reserve demand. Major factors ensuring stability of bank reserve demand are described below.

Motives for bank reserve demand

Commercial banks use their reserves with the central bank due to two major reasons. First, commercial banks need adequate balances on their current accounts at any time in order to be able to effect payments on their own account or on the client's account due to the banks' specific role of payment mediators in the economy, or the so-called liquidity buffer role of bank reserves. Transactions demand for bank reserves is predetermined by the need of maintaining a liquidity cushion.

In addition to payments maintenance of commercial bank reserves is required by the central bank. Although the reasons for maintaining required reserves are beyond the scope of this study, it should be noted that employment of minimum required reserves helps stabilize demand for reserves within a particular period, thus contributing to highly efficient monetary policy. Under a currency board the monetary policy is based on a simple rule, in contrast to discretionary policy which can influence the amount of a particular monetary aggregate. Therefore, under a currency board employment of minimum required reserves cannot and should not be justified by the need to regulate the demand for bank reserves. Existence of minimum required reserves distorts the information generated by the money market about motives for bank reserve demand. For example, in case of an attack against the fixed exchange rate in absence of minimum required reserves, enhanced demand for bank reserves will prompt a faster increase in interest rates than in a situation when banks are required to maintain minimum reserves. A liquidity crisis with a certain lag may also occur if a system of averaging minimum required reserves is employed.

On the other hand, minimum required reserves ensure less interest rate volatility in the interbank market which may occur as a result of significant deviations in banks' payment activity within the maintenance period. This thesis is well grounded and studied by Clouse and Elmendorf (1997).

Since the interbank market rate reflects the opportunity cost of maintained reserves on a particular day of the maintenance period, the banks'

ability to average their positions allows, in the event of liquidity squeeze, to avoid borrowing from the interbank market. This step should be initiated provided banks fail to fulfil their reserve positions. In the absence of an averaging system and insufficient liquidity, enhanced demand for bank reserves will prompt an increase in interbank market rates.

Another argument in favor of maintaining minimum required reserves ensure high commercial bank liquidity. High liquidity can be provided by introducing liquidity requirements. In Argentina, for instance, minimum required reserves were gradually replaced in 1995 by a requirement to maintain a portfolio of high-liquid and low-risk forex assets, with the amount of these assets dependent on the deposit base of an individual commercial bank. Furthermore, the accepted liquid assets entirely comply with currency board rules. For more details regarding the institutional arrangement of liquidity requirements in Argentina, see Escude (1999) and *Main features …* (2000).

Consequently, employment of minimum required reserves as an argument for maintaining bank liquidity is not well grounded. Moreover, Argentina's experience during the Asian crisis and later in the Russian and Brazilian forex crises evidenced that this technique works well.

Determinants of transactions demand for bank reserves

Transactions demand for bank reserves results from economic agents' preference for making noncash payments. With a view to better security of claims, financial mediators prefer the central bank as a clearing center between commercial banks. This is also in line with the recommendation of the Payments and Settlement System Committee at the Bank for International Settlements (BIS Report, 2000).

In technical aspect, the mediation function of commercial banks in payments is effected in a manner allowing any agent who has initiated payment through its bank to generate demand for reserve money (central money on the condition that the final recipient's account is outside the payer bank). Therefore, the increase in commercial bank demand for bank reserves is quite natural in the periods of concentrated payments, and *vice versa*: transactions demand decreases with reduced payment activity. Transactions demand is measured by the volume of effected noncash payments.

Bank reserve demand is in direct proportion to the monetary equivalent of transactions:

$$R^d = f(Q), \tag{1}$$

where

Q is the monetary equivalent of effected noncash payments of bank-to-bank type in the entire banking system.

Noncash payments are an accidental quantity dependent on bank customers' behavior. All outgoing customer payments which are not channeled to the BNB appear to cause an idiosyncratic shock on money demand by an individual bank. The sum total of such shocks for all commercial banks is equal to zero. Consequently, if such shocks affect only the individual function of demand for bank reserves, the effect will not reflect on total commercial bank demand for reserves.

Precautionary Demand Predetermined by the Specificity of the Payment System

Transactions demand for bank reserves is predetermined by the institutional specificity of the payment system. The efficiency of any payment system is measured through the ratio of used reserves and the volume of effected payments. To improve the efficiency of the payment system, it is necessary to use less liquidity in effecting a greater number of payments. Under less effective payment systems the above ratio is higher. Maintenance of significant minimum required reserves reflects the inefficiency of the present payment system.

While the number of payments is a natural factor determining demand for bank reserves, inclusion of the number of payments as a second factor needs an explanation. Initially, it seems that demand for bank reserves might not be determined by the number of payments, but under a system of noncash payment operating in gross settlement regime in a particular period *(t+1)*, the number of payments factor generates uncertainty regarding the time period required for processing. Therefore, for the purpose of security, banks maintain greater reserves. Consequently, precautionary demand for bank reserves should be proportional to the number of payments registered by BISERA for the entire system. The number of these payments is denoted with N_t.

$$R^d = f(N_{t-i1}), \tag{2}$$

where

$i1$ (1. . .m) is the number of lags.

Transactions demand for bank reserves in Bulgaria includes an additional component due to the specificity of the Bulgarian payment system (BISERA). This is a settlement system in a particular moment operating with a value date *t+1*. The system is designed to service both small payments of client-to-client type and payments between commercial banks. Within BISERA banks are unable to obtain information about incoming payments. They can forecast incoming cash flows on the basis of previous information.

This specificity of the system induces precautionary demand. It occurs as a result of banks' enhanced demand for reserves necessary to guarantee the realization of all payments against uncertainty of incoming payments. Since all payments through BISERA are effected on behalf and on the account of the client, precautionary demand covers only this segment of payments. Payments on foreign currency transactions as well as interbank market payments of bank-to-bank type are entirely controlled by commercial banks and do not prompt precautionary demand. These payments are considered a component of transactions demand for bank reserves.

Reserve Demand for Covering Minimum Required Reserves

The third component of demand for bank reserves reflects the need of covering minimum required reserves. This component is associated with the institutional specificity of the system of maintaining minimum required reserves.

Besides uncertainty of incoming cash flows, precautionary demand is also predetermined by the requirement for a particular balance of minimum required reserves at the end of each maintenance period to be covered by any individual commercial bank. Bank reserve demand for covering minimum required reserves is a function of compliance with required reserves from the previous day and the opportunity cost for maintaining these reserves. Correspondingly, the variables include the amount of total commercial bank reserves R_t, maintained in the review period t, and opportunity costs it for maintaining these reserves. The formula of bank reserve demand for covering minimum required reserves is as follows:

$$R^d = f(R_{t-i2}, i_{t-i3}), \tag{3}$$

where

$i2$ and $i3$ are the lags of the effect on respective variables.

The values of these variables are determined empirically.

In addition, the closer the end of the maintenance period, the more difficult the compensation for noncompliance with the requirements. This makes demand and correspondingly supply of minimum required reserves inelastic in the last day of the maintenance period. Therefore, interest rate volatility on this day is expected to be higher. This fact has been noted and explained by Hamilton (1996). Consequently, besides compliance, respectively noncompliance with the requirements for minimum reserves, the proximity of a particular day to the end of the maintenance period should also be taken into ac-

count in modeling expected variance. Logically, if at the moment of reporting banks maintain excess reserves, reserve demand in the next few days will decrease, and *vice versa*, if banks need to cover deficits, the demand will increase. This reveals the essence of the behavior under the martingale hypothesis.

Speculative Demand for Bank Reserves

Speculative demand for bank reserves reflects banks' ability to generate income from arbitrage transactions. This depends on the opportunity of placing abroad funds borrowed in the interbank market and *vice versa*. Consequently, demand for bank reserves is a function of the opportunity profitability of these funds.

The covered interest rate differential is traditionally used as a measurement of arbitrage transactions in national or foreign currency. Given the assumed full credibility of BGN/EUR fixed exchange rate in the future, the interest rate parity between these currencies will be permanently covered. Consequently, the amount of the interest rate differential plays a key role. Profitability of assets denominated in foreign currency is used by Giovannini and Turtelboom (1992) and Cuddington (1983) in modeling money demand. The DEM/USD exchange rate and/or the covered interest rate differential between lev interbank market rates and LIBOR on USD-denominated deposits can be used as a major variable in determining the speculative demand for bank reserves. The formula of speculative demand for bank reserves is as follows:

$$R^d = f(I_{t-j3}, \mathbf{DIF}_{t-j2}),$$

where

$\mathbf{DIF}_{t-j2}$ is the uncovered interest rate differential between weekly LIBOR on EUR-denominated deposits and the interbank average daily interest rate;

I_{t-j3} the average weighted interbank market rate in levs;

$j2$ and $j3$ the lags of corresponding variables.

Peculiarities of the Bulgarian Money Market

Since the institutional characteristics of the currency board in Bulgaria have been already extensively studied (Nenovsky and Hristov, 1999) I will not consider in detail this issue. I would like to note, however, that unlike the monetary regime with a classical currency board, under the quasi-currency board in Bulgaria the function of the lender of last resort continues to exist institutionally within the central bank, though under strictly formulated pre-

conditions. In practice, this function can be used only in a situation of a systemic liquidity crisis.

Commercial banks therefore do not rely on the central bank in managing their liquidity, as is the normal situation in industrialized countries with classical central banks where access to the lender of last resort is seen rather as a privilege than a right.

The choice of liquidity managers is reduced to attracting funds from the interbank markets or to liquidation of assets. Big banks with established record are net borrowers from the money market (M. Stigum, 1990, and Ho and Saunders, 1985). Small and medium-sized banks are net investors in the money market. In managing their liquidity they use mostly their own assets while big banks rely on creating and refinancing of liabilities.

The situation in the Bulgarian interbank money market is different. Small banks have no access to attracting funds through deposits due to their low confidence level (a fact easy to explain given the number of failed banks of similar size in 1996 and the lack of publicly accessible information on their financial state[4]). The only way to accumulate funds is through repo agreements in government securities and at a higher interest rate than that on interbank deposits. It is difficult to check this assertion as observations on the interest rate differential between unsecured deposits and repo agreements indicate that the average difference between them is a mere -0.13% for the period May 1998 – May 2000, but final fluctuations are -1.93 and 1.91. This assertion is based on the fact that distribution of interest rate differential is slightly shifted to the left (see Chart 1 in the appendices) indicating a greater possibility for higher repo agreement rate. Therefore we may argue that the Bulgarian interbank market is segmented. Despite the existence of a positive interest rate differential between interest rates on repo agreements and interbank deposits, they are cointegrated. This shows that there is a stable long-term relationship between them and they move in one direction. This signals that though being segmented in the short run, banks use this differential in the long run to effect arbitrage operations, thus providing the cointegration relationship.

Sources of Providing Bank Reserves

Commercial banks have several sources of providing liquidity. In terms of assets, forex reserves are most commonly used. Big commercial banks

[4] The initiative of the BNB to publish commercial banks' balance sheets and income statements is laudable and deserves appreciation, but is not sufficient. The whole information collected by the BNB on a bank should be made public. Thus creditors of any bank will have equal access to information. This will also facilitate money market operations.

use unsecured deposits in the interbank market as a source of liquidity while small banks employ repo agreements. Maturing government securities are a source of liquidity due to the negative net issue reflecting a reduced budget deficit and domestic debt after currency board introduction. Similarly, but in the opposite direction, auctions for new government securities can be a channel of absorbing liquidity.

Inflows and outflows to and from the BNB are a major source of liquidity. They reflect daily revenue and expenditure on the cash service of budget-supported organizations. This is the so-called unconscious channel of monetary policy pursuit, extensively described by Nenovsky and Hristov (1999). It affects directly liquidity in the banking system. Although this effect is accidental, it is of systemic significance.

Therefore this channel should not be assumed as being capable of affecting money supply in any form whatsoever. On the contrary, our thesis is that creating rules for budget spending should restrict the impact of this channel of affecting liquidity. By way of early public announcing of the shocks on money supply caused by the impact of the cash execution of the budget transparency will be achieved which will allow commercial banks to anticipate the overall impact on money market liquidity. Better knowledge will help all participants to anticipate the impact of the shock.

Modeling Interest Rate Dynamics in the Interbank Deposit Market

The Data

Undoubtedly the best way of modeling interest rate dynamics in the interbank market is to use daily data.

One of the problems with daily data is that BNB has available information from daily balance sheets since early 2000 and this is a very short period for a statistical study. Therefore no information from BNB balance sheet has been used. Since banks base their behavior on statistics maintained for the purposes of minimum required reserves, in this study we use such data. It includes information on the amount of required reserves (R), reserves maintained in levs (TRL) and foreign currency (TRV), the average-weighted interest rate in the interbank money market (I), and the interest rates on repo agreements (RR) and on operations in unsecured deposits (DR).

As statistics on minimum required reserves requires reporting of their maintenance on holidays when the money market does not operate, the values of the effective interest rate for the preceding business day are used to report the values of the interest rate for such periods.

Data on LIBOR for the euro (*EL*) and the US dollar have a seven-day term and are derived from the Reuters database.

Bankservice supplied data on the number (*N*) and total amount of payments (*Q*) via BISERA.

The period of the sample is from May 1998 to early June 2000 and includes 761 observations.

Test for Integration and Lags

The integration test is the first step in processing time series, which enables us to choose an appropriate econometric model. We apply both tests, the Dickey – Fuller test and the Philips – Perron test, in order to achieve high assurance of the results obtained.

In line with theory the data series on bank reserves is stationary as the existing system of averaging minimum reserves warrants this. All the other series shown in Table 1 are also stationary. Nonstationarity occurs only in the exchange rate of the lev to the US dollar. Both tests (DF and PP) with first differences indicate first order integration of the exchange rate. Because of the nonstationarity of the US dollar exchange rate we will not use it in modeling the demand for bank reserves.

Stationarity of the data series used warrants valid results in applying the OLS and ARCH econometric models.

Table 1

TEST OF INTEGRATION OF TIME SERIES USED[5]

Variables	Dickey − Fuller Test		Philips − Perron Test		Integration and Lags	
Daily data	Levels	1Δ	Levels	1Δ	1	Lags
Q	-18.6		-15.03		0	3
A	-20.5		-24.5		0	3
P2	-14.93		-17.28		0	3
R	-4.06		-4.14		0	2
I	-3.93		-4.75		0	3
ER**	1.54	-26.13	1.52	26.11	1	0
Dif2	-3.49		-4.24		0	3
Dif1	-2.81		-3.45		0	3
TRL	-3.57		-3.69		0	3
TRV	-3.29*	-10.62*	-3.03*	-23.79*	0	4

* With trend and level: -3.9749 at 1%, -3.4180 at 5%, -3.1311 at 10%.

** The hypothesis for order stationarity can be assumed at 75.8% confidence probability.

[5] McKinnon's critical values for DF and PP tests – without trend: -3.4415 at 1%, -2.8657 at 5% and -2.5690 at 10%.

General Description of ARCH Models

The base of the model is the autoregressive conditional heteroskedasticity (ACRH) of the time series. The reason to choose this model is the fact that, according to Hamilton (1996), in this type of daily data the interest rate variance is different. In essence, the autoregressive conditional heteroskedasticity means that the model specifies not only the mean, but also the variance in the series, the latter being conditionally dependent on variance displayed in past periods. Engle (1982), later generalized as GARCH (generalized ARCH) by Bollerslev (1986), introduced the ARCH models to econometrics. ARCH and GARCH models are widely applied in the analysis and modeling of high-frequency financial series.

The general equation of the GARCH model with one lag is:

$$Y_t = a + Y_{t-1} + \varepsilon_t \quad (1)$$

$$\sigma_t^2 = \omega + \alpha\sigma_{t-1}^2 + \beta\varepsilon_{t-1}^2. \quad (2)$$

Equation (1) describes the behavior of the interest mean and equation (2) describes the behavior of the conditional variance of the mean. Conditional, because it refers to the whole set of information on the interest accessible till moment *T-1*. In these models the conditional variance is assumed not as a constant but as a variable whose values in *t* depend on the available information in the preceding period *t-1*. This model is applicable in studying interest rates because, as *Hamilton* points out (1996), interest dynamics follows a high level of heteroskedasticity.

Conditional variance σ_{t-1}^2 represents a GARCH component or projected variance in the penultimate period, and ε_t is an ARCH component and represents a change in the variance based on available information at the end of period *t-1*. The number of lags t in the conditional variance formula shows the duration of the impact of shocks on volatility.

GARCH models assume normal distribution of the conditional variance. This means that irrespective of the direction of the mean's movement volatility remains unchanged.

However, practice shows that there is a case where it is different depending on the direction of movement of the mean. For example, in high-frequency financial series movement of the price of a particular asset in a certain direction (most often downwards) is coupled with higher volatility. In modeling time series with asymmetrical behavior of the conditional variance TARCH (threshold autoregressive conditional heteroskedasticity) and EGARCH (exponential general autoregressive conditional heteroskedasticity) econometric models are used.

Glosten, L. R., R. Jagannathan and D. Runkle (1993) and Zakoian, J. M. (1990) introduced the TARCH model of variance independently of each other. The equation of conditional variance used in modeling is:

$$\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \gamma\varepsilon_{t-1}^2 d_{t-1} + \beta\sigma_{t-1}^2 .$$

Nelson (1991) proposes the original EGARCH model of behavior of the conditional variance. The variance equation in it is:

$$\log(\sigma_t^2) = \omega + \beta \log(\sigma_{t-1}^2) + \alpha \left| \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \right| + \gamma \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \ .$$

Hamilton (1996) uses this EGARCH model, slightly modified, in modeling the behavior of the conditional variance of federal funds rate. This prompted us to apply this approach to the modeling of the conditional variance of the function of the demand for bank reserves in Bulgaria.

Basic Models of the Demand for Bank Reserves

Demand for bank reserves denominated in levs

In modeling the demand for bank reserves in levs we follow the above-described theoretical model. The first variable used is the amount of bank reserves in the previous day. Thus we record the demand for reserves to satisfy required reserves or the martingale hypothesis in the dynamics of bank reserves. As simple testing of the significance of this relationship shows, in the first model in Table 2 over 90% of the value of daily average reserves is determined by their amount at the end of the previous day.

The test of the hypothesis of dependence of the demand for bank reserves on the number *N* of payments via BISERA indicates the existence of a statistically significant direct relationship (see the second model in Table 2) with a coefficient of elasticity at about 5%. The test for significance of the impact of the relative change in the interbank interest rate (the opportunity cost of maintaining minimum required reserves in levs) shows the theoretically assumed statistically significant inverse relationship with a coefficient of elasticity at 42% (third model). The last variable, independently tested in the fourth model, is the interest rate differential between the average interbank interest rate in levs and the average LIBOR for the euro. The hypothesis of existence of inverse relationship between bank reserve demand and the percentage change in the interest rate differential is confirmed.

The fifth model presents a generalized model of the demand for bank reserves in levs. An equation for variance modeling is used because after the

OLS[6] model was applied the LM test for autoregression in the residual value of the error was confirmed (see Table 4 in the appendices). This entailed the use of different versions of the ARCH models.

In modeling variance some of the variables in the equation of the mean began to lose some of their statistical significance and we had to include them in the equation of the conditional variance and then add variance itself in the equation of the mean. In other words, by including variance of demand in modeling the mean demand we check the hypothesis of the mean value being affected by the expected variance of demand.

To check the hypothesis we use a version of the ARCH-M (ARCH in the average value) model. This type of model is introduced by Engle (1987) and is used by Nautz (1998) in modeling the demand for bank reserves. The basic equation of the mean under ARCH-M using the standard deviation (σ) in modeling the mean under uncertainty is:

$$Y_t = x_t^{'}\gamma + \sigma_t^2\bar{\gamma} + \varepsilon_t$$

where

$x^{'}$ is vector of exogenous variables, which determine the behavior of the mean.

Results obtained from the application of this model did not confirm the hypothesis of a relationship between the average value of the demand for bank reserves and the expected variance or the expected standard deviation.

As we noted, Hamilton (1996) confirmed the existence of asymmetrical reaction of the expected variance to the direction of the impact of interbank market innovations in a similar study. This provoked us to test the hypothesis of asymmetrical impact on the demand for bank reserves using the available data.

To this end we used EGARCH model and assessed its efficiency by comparing the LogL values obtained from applying the ordinary ARCH model (see Table 2).

Sprindt and Hoffmeister (1998), Balduzzi (1993) and Robertds (1994) extensively describe dependence of variance on the day within the period of maintenance. It is higher in days coinciding with the end of the maintenance period, on Fridays and other days preceding holidays.

Based on the available information for the preceding and the current period market agents can form their preliminary expectations of variance on the respective day of the maintenance period.

[6] The method of least squares.

We use dummy variables in modeling the expected behavior of the variance in different days of the maintenance period. For example, *D1* to reflect the impact of the last day of the maintenance period on the expected volatility. According to Hamilton (1996), volatility should be higher at the end of the maintenance period. The dummy variable *D3* reflects business days preceding holidays, when volatility should be higher. *D4* reflects the first day of a new maintenance period, when volatility should be lower.

In addition to dummy variables in the equation of the conditional variance we include variables relating to payments via BISERA, their number and amount respectively. This should be done because, in our opinion, banks would expect greater volatility in the demand for bank reserves if payments on the respective day are active and *vice versa*. We should note that in period *t* banks have information only on the number and amount of their own payments.

Table 2

MODELS OF DEMAND FOR BANK RESERVES IN LEVS

Model	**I**	**II**	**III**	**IV**	**V**
	Mean modeling – Log(TRL)				
Level	0.47 (0.52)	12,2 (47,2)	13,3 (487)	12.6 (994)	0.16 (3.14)
LTRL(-1)	0.96 (98.4)				0.99 (241.2)
L(P)		0,05 (2.5)			
L(I)			-0.42 (-15.7)		
L(DIF1)				-0.17 (-5.68)	-0.007 (-7.5)
L(Q1)					-0.0005 (-2.92)
L(DIF1(-2))				-0.09 (-3.10)	

(continued)

(continued)

Conditional variance modeling					
C					-0.83 (-8.19)
ABS(RES)/SQR[GARCH](1, 1)					0.61 (13.2)
RES/SQR[GARCH](1, 1)					-0.16 (-5.59)
EGARCH(1)					0.82 (44.3)
LOG(Q1)					-0.23 (-9.9)
LOG(P1)					0.24 (6.41)
D3					3.55 (17.9)
D1					-0.44 (-2.1)
D4					-0.49 (-2.0)
Sample	Complete	Business days	Business days	Business days	Complete
R^2 adj.	0.93	0.01	0.32	0.45	0.93
DW	1.75	0.04	0.12	0.13	1.78
Loglikelihood	1120	85	184	240	1348

Results and Conclusions from Modeling Bank Reserve Dynamics Using Basic Models

Inclusion of the interbank interest rate in the overall model proved to be of lower statistical significance compared with the interest rate differential. This shows that banks model their demand giving preference to interest rate differential because this enables them to perform arbitrage between operations in the domestic and international money markets.

Existence of a lag in the conditional variance is indicative of the fast adaptation of the demand for bank reserves in lev terms to shocks external to the model. The effect of innovations on conditional variance is asymmetrical, which coincides with the conclusions of Hamilton (1996). In terms of dummy variables, *D3* (the days preceding holidays) had the strongest positive impact on conditional variance, which coincides with the conclusions of Hamilton (1996).

The test shows that dummy variables *D1*, *D3* and *D4* have statistically significant effects on expected variance. The effect of *D3* causes an increase

in expected variance in the days preceding holidays. This result is consistent with the behavior of the conditional variance in other countries with similar institutional scheme of maintaining minimum required reserves. As far as the other two dummy variables *D*1 and *D*4 are concerned, they have little impact and in the opposite direction, contrary to the conclusions of Hamilton (1996). This can be explained by the fact that banks do not wait the last day to compensate their minimum required reserves, but achieve this earlier. Similarly banks disregard fulfillment of minimum required reserves in the beginning of a new maintenance period due to the long outstanding period during which they can offset the shortfall.

The variables reflecting active payment operations via BISERA (*Q1* and *P1*) indicate a statistically significant impact on the conditional variance. An increase in the number of payments causes an increase in the variance of the demand for reserves, while an increase in the total amount of payments effected through BISERA causes a decrease in the demand variance. The latter reflects the fact that the largest number of payments is effected to transfer revenues to budget accounts from commercial banks (which are agents on the cash basis execution of the budget) into the BNB. As in the previous days these funds have been received by agent banks on their current accounts with the BNB, they use them only to meet their minimum required reserves, keeping them until the day of transfer. Therefore on the transaction day to the BNB commercial banks do not look for additional bank reserves, which leads to a decrease in the aggregate demand in the banking system.

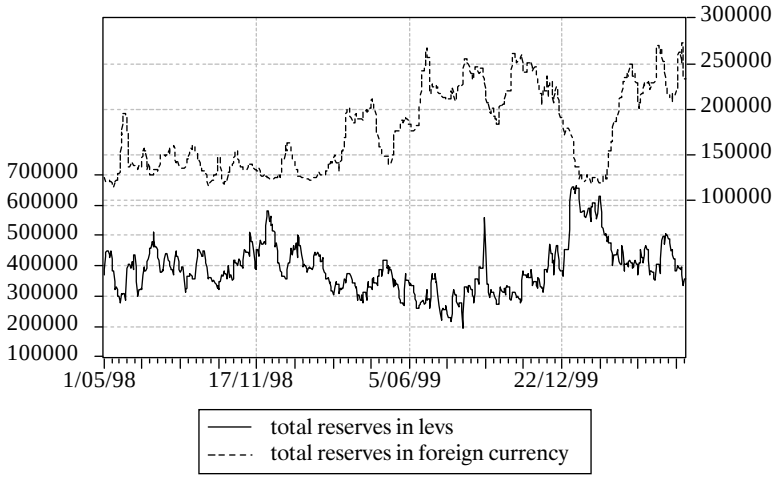
Demand for bank reserves denominated in foreign currency

Since bank reserves denominated only in levs are used in settlements, a transaction component of the demand for bank reserves denominated in foreign currency is absent. Therefore transaction components are not present in the function of demand for bank reserves.

Bank reserves denominated in foreign currency play the role of a liquidity source in case of necessity for a specific commercial bank. Therefore they represent liquidity buffer that can be used always when there is a shortfall in lev bank reserves. This assumes a negative correlation between reserves denominated in levs and reserves denominated in foreign currency (see Chart 1). Given the liquid role of bank reserves in foreign currency, to estimate their demand we will use the amount of bank reserves in levs at the end of the previous day TRL_{t-1}. We assume reverse relationship between the two variables:

$$R^d = f(TRL_{t-1}).$$

Chart 1



The second function of the reserves in foreign currency is that of a store of bank reserves' real value. By store of real value we mean minimizing the opportunity cost of maintaining noninterest-bearing reserves which has a two-sided effect: missed interest income and missed income due to devaluation of the lev/euro exchange rate to the US dollar. This suggests a direct positive relationship between demand for bank reserves in foreign currency and the exchange rate ER_t:

$$R_d = f(TRL_{t-1}, ER_t).$$

Since theory assumes existence of autocorrelation, in the function of the demand for reserves we also include reserves in foreign currency at the end of the previous day TRV_{t-1}:

$$R_d = f(TRL_{t-1}, ER_t, TRV_{t-1}).$$

To estimate the function of the demand for bank reserves in order to preserve their value we also add the logarithm of the interest rate differential between lev money market and the weekly LIBOR on deposits denominated in US dollars $DIF2_t$:

$$R_d = f(TRL_{t-1}, ER_t, TRV_{t-1}, DIF2_t).$$

Summarized results are shown in Table 3.

ARCH-LM test of the model presented in the fourth model of Table 3 does not show evidence of residual autocorrelation (see appendices).

Table 3

DEMAND FOR BANK RESERVES IN FOREIGN CURRENCY

Model	I	II	III	IV	V
			Log(TRV)		
Level	0.1 (1.79)	19.2 (37.4)	10.7 (163)	1.11 (7.51)	0.94 (7.96)
LTRL(-1)		-0.56 (-13.98)		-0.05 (-6.16)	-0.04 (7.54)
LTRV(-1)	0.99 215			0.95 (114.5)	0.96 (155)
L(ER)			2.27 (21.3)	0.14 (4.98)	0.09 (4.91)
L(DIF2)				0.006 (1.90)	
			Conditional variance modeling		
Level					0.0006 (14.97)
ARCH(1)					0.28 (10.02)
GARCH(1)					0.13 (3.45)
D4					-0.0007 (-16.54)
Sample	Complete	Complete	Complete	Complete	Complete
R2 adj.	0.98	0.2	0.37	0.99	0.99
DW	1.66	0.04	0.03	1.70	1.71
Loglikelihood	1533	48	138	1559	1599

Results and Conclusions from Modeling Bank Reserve Dynamics Using ARCH, EGARCH and TARCH Models

Modeling of the average value of bank reserves denominated in foreign currency, including all independent variables, shows that the amount of reserves at the end of the preceding day and the exchange rate have the strongest impact on the mean. The interest rate differential has no statistical significance together with the other variables. The amount of reserves denominated in levs is with a reverse sign, which coincides with the conclusion that banks use a portion of their reserves in foreign currency as a liquidity buffer.

In modeling expected variance the test for asymmetrical impact of innovations by using EGARCH and TARCH did not confirm. Therefore the

ARCH (1,1) model used yielded the best result. The dummy variable *D*4, which reflects the beginning of the new maintenance period, shows that expected variance of forex reserves decreases in this model. The other dummy variables used in the model of demand for bank reserves denominated in levs have no statistical significance.

Sources of Shocks on Bank Reserve Supply

Constructed models of the demand for bank reserves in levs and foreign currency enable us to estimate banks' expected reserves on day *t* of the maintenance period using the information available to them at the end of that period. This can be based on checking the models by using the redundant variable test, which rejects the hypothesis of the availability of such information. Therefore the difference between demand for bank reserves and their actually reported value in the model gives an idea of the amount and dynamics of unexpected shocks.

The possibility of exerting unexpected shocks on commercial bank reserves is one of the institutional peculiarities of the Bulgarian monetary system. The most typical unexpected shock on supply is the spending policy of the Ministry of Finance. Although within a month the Ministry of Finance injects and withdraws liquidity, there is neither a clear calendar of the amounts of these payments nor any form of preliminary announcing of these payments. As most of them are effected through the settlement system, banks get information on amounts received on their accounts on the next working day.

Decisions on daily allocation of amounts are taken exclusively discretionary by the finance ministry administration and are not subject to any rules and regulations. This creates an unexpected positive shock on liquidity in the banking system, which has an immediate impact on interest rate variance.

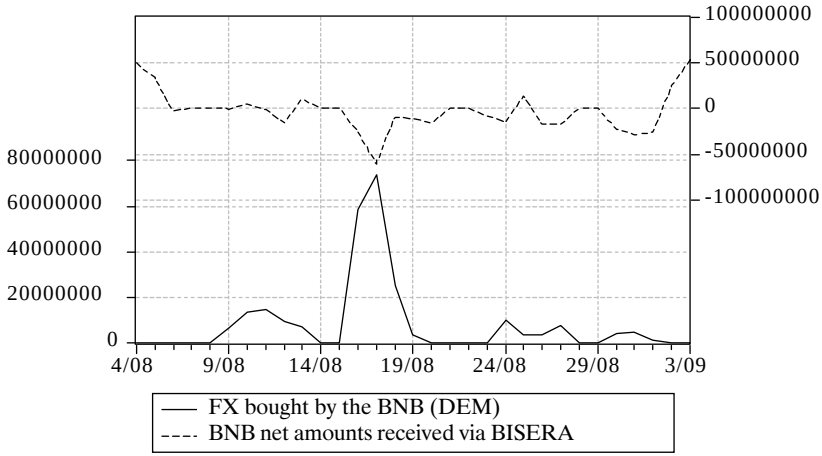
In the middle of each calendar month (on the 15th and 16th day of the month) tax offices transfer budgetary revenues into the BNB. This exposes the banking system to an unexpected liquidity shock. The size of the shock depends on the amount of revenues from taxpayers. The presence of such unexpected shocks on bank reserves explains the deviation between bank reserve demand and supply, as observed in the model. The size of this deviation for the period of the sample is 7%. The impact of unexpected shocks is accommodated through forex sales by the BNB. These are effected within the standard spot value date and therefore banks are adapting to the shock till the day after tomorrow by reducing their available reserves (see Chart 2). This causes a contraction in supply and hence affects the behavior of the in-

terest rate in the interbank market, which is the main reason for its short-term deviation from the interest rate on euro-denominated deposits abroad.

Variance in the supply of bank reserves in the conditions of lacking alternative sources of liquidity is undesirable, because it heightens volatility of the interbank market interest rate in period *t+1*. This makes banks cautious in using it as a source of liquidity regulation. Arbitrage is possible only within the *t+2* horizon due to the fact that the BNB effects spot forex operations. Higher volatility of interest rates in the interbank market is one of the reasons for the larger margin between deposit and lending rates. Saunders and Hausman (1998) have come to a similar conclusion in studying the high margin between deposits and credits in Mexico.

Chart 2

PAYMENTS VIA BISERA AND BNB FOREX OPERATIONS (AUGUST 1999)



Possibilities of Introducing More Flexible Solutions To Lower Interest Rate Volatility

Interest rate volatility in the Bulgarian interbank market (23.2%), measured through the ratio between the standard deviation and the mean for the period of the sample, is higher than that of the seven-day LIBOR for the euro (18.9%). Therefore banks in Bulgaria assume higher interest risk borrowing from the domestic interbank market than in the interbank market for eurodeposits in London.

To reduce interest rate volatility and hence limit the risk of investing and borrowing in the Bulgarian interbank market, the impact of shocks on the supply of bank reserves need to be offset. This can be achieved in several ways.

First, commercial banks should receive daily comprehensive information on the amounts the Ministry of Finance withdraws and injects into the banking system for the purposes of cash budget execution. Asymmetrical behavior of expected variance shows that variance increases with withdrawal of liquidity. This means that lack of information on the amount of liquidity withdrawn from banks creates higher uncertainty in commercial banks' demand for money. Therefore information on projected amounts to be withdrawn by the MF should be announced.

The second possibility of reducing interest rate volatility is to shorten the value date of BNB operations for forex purchases. Thus the banking system will be capable of flexibly responding to unexpected supply shocks by accommodating demand.

The third possibility is accelerated infrastructure integration of the Bulgarian payment system into TARGET to help avoid limitations on arbitrage between the two money markets imposed by the difference in value dates between payments in lev and euro.

The fourth possibility is suggested by Nenovsky and Hristov (1998) and refers to rechanneling and depositing budget resources from the BNB to commercial banks. It has already been resolved to centralize MF funds at the BNB, the direct result of which is twice as high interest rate volatility in the interbank market: for example, from 0.487 for the period from May 1998 till June 1999 before the centralization of budget funds it reached 0.89 for the period June 1999 – June 2000 after almost complete centralization.

The fifth possibility of constraining variance of demand for bank reserves is by providing the banks with information on their incoming payments from BISERA.

Conclusion

In this study we present an empirical model of the demand for bank reserves denominated in levs and foreign currency in Bulgaria for the period May 1998 – May 2000. In the course of the study the role of bank reserves is presented as a liquidity buffer absorbing part of the impact of shocks on the supply of bank reserves. Major shocks on the supply of bank reserves have been identified as well as the sources of their offsetting.

The proposed model shows that demand for bank reserves denominated in levs is dependent on demand in the preceding period, on the interest rate differential between domestic money market and the London interbank euro deposit market, as well as on the amount of payments made through BISERA. Expected variance of demand for bank reserves in levs is modeled using the asymmetrical EGARCH (1.1) model. It includes dummy variables reflecting the different level of volatility in the demand for bank reserves in different days of the maintenance period. The major reason for asymmetrical variance is the different impact of positive and negative shocks on the supply of bank reserves in levs.

Based on the difference between demand and supply the impact of shocks is identified, which are caused by transfers from and to the BNB associated with state budget cash execution.

In this regard and with a view to limiting the impact of asymmetrical shocks on volatility of the demand for bank reserves and hence on the volatility of interbank interest rate, several steps have been proposed, including pursuit of a policy of transparency by the MF. This policy should include preliminary announcing of expected liquidity to be withdrawn from the banking system in certain critical moments for the revenue in the state budget. Solutions for avoiding higher variance in demand for reserves by undertaking other practical measures, including improving the infrastructure of the money market and the payment system, have also been recommended.

As a starting point for future study the model of the demand for bank reserves can be used for projecting any possible influence that the reduction in bank reserves could have on the volatility of the interest rate in the interbank money market.

Appendices

Table 4

DEPENDENCE BETWEEN THE NUMBER OF BISERA PAYMENTS AND NET AMOUNTS RECEIVED AT BNB

Dependent Variable: B

Method: Least Squares

Date: 07/03/00 Time: 11:00

Sample(adjusted): 4/05/1998 19/05/2000 IF D5=0

Included observations: 513 after adjusting endpoints

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1852449.	675771.0	2.741237	0.0063
P	28.02809	10.24797	2.734990	0.0065
R-squared	0.014427	Mean dependent var		3489792.
Adjusted R-squared	0.012498	S.D. dependent var		7144831.
S.E. of regression	7100041.	Akaike info criterion		34.39299
Sum squared resid	2.58E+16	Schwarz criterion		34.40952
Log likelihood	-8819.802	F-statistic		7.480169
Durbin-Watson stat	1.055176	Prob (F-statistic)		0.006455

Table 5

ERROR AUTOCORRELATION TEST IN MODEL V OF TABLE 2

ARCH Test

F-statistic	3.517827	Probability	0.061096
Obs*R-squared	3.510825	Probability	0.060969

Test Equation:

Dependent Variable: STD_RESID^2

Method: Least Squares

Date: 07/04/00 Time: 17:00

Sample (adjusted): 3/05/1998 1/06/2000

Included observations: 761 after adjusting endpoints

Variable	Coefficient	Std. error	t-statistic	Prob.
C	0.932257	0.085745	10.87249	0.0000
STD_RESID^2(-1)	0.067926	0.036216	1.875587	0.0611
R-squared	0.004613	Mean dependent var		1.000215
Adjusted R-squared	0.003302	S.D. dependent var		2.147351
S.E. of regression	2.143803	Akaike info criterion		4.365665
Sum squared resid	3488.282	Schwarz criterion		4.377845
Log likelihood	-1659.135	F-statistic		3.517827
Durbin-Watson stat	1.986478	Prob(F-statistic)		0.061096

Table 6

ERROR AUTOCORRELATION TEST IN MODEL IV OF TABLE 3

ARCH Test

F-statistic	6.84E-05	Probability	0.993405
Obs*R-squared	6.86E-05	Probability	0.993394

Test Equation:

Dependent Variable: STD_RESID^2

Method: Least Squares

Date: 07/04/00 Time: 16:52

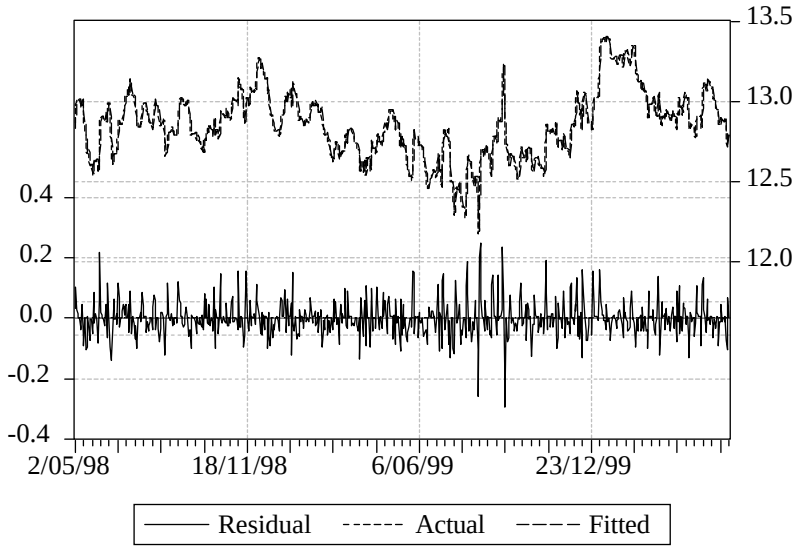
Sample(adjusted): 3/05/1998 1/06/2000

Included observations: 761 after adjusting endpoints

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1.000742	0.109843	9.110651	0.0000
STD_RESID^2(-1)	0.000300	0.036299	0.008269	0.9934
R-squared	0.000000	Mean dependent var		1.001042
Adjusted R-squared	-0.001317	S.D. dependent var		2.857604
S.E. of regression	2.859485	Akaike info criterion		4.941785
Sum squared resid	6206.082	Schwarz criterion		4.953965
Log likelihood	-1878.349	F-statistic		6.84E-05
Durbin-Watson stat	1.999220	Prob(F-statistic)		0.993405

Chart 3

ESTIMATED DEMAND FOR BANK RESERVES IN LEVS AND RESIDUAL ERROR



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A Possible Approach to Simulate Macroeconomic Development of Bulgaria

Victor Yotzov

Abstract. Transformation of centrally planned economies into market ones is a unique event and there are no established rules. In individual countries transformation runs with different intensity and success. The economic theory continues to persistently summarize accumulated experience aiming at establishing 'transition laws'. However, no break has been made in this field yet. Consequently, this impedes employment of quantitative methods in transition economies. The approach and models developed under a centrally planned economy proved inapplicable and there are no new models developed, although the need of at least a medium-term perspective for economic development still exists.
Given the macroeconomic modeling experience based on the monetary approach applied to the balance of payments and neoclassical growth models, this paper presents a model attempting to combine both traditional modeling methods and the specificity of a particular transition economy under a currency board. The model is aggregated and of structural type which allows to study causality relationships in the economy and makes simulation possible. Based on some assumptions for medium-term economic development various scenarios have been designed, with the model being applied to each individual scenario. The model's open nature allows for further development and improvement by including new variables and deriving new equations.

Резюме. Трансформирането на централнопланови*те* икономики в пазарни е уникално по рода си събитие и за него няма установени правила. В различните страни процесите протичат с различна интензивност и с различен успех. Икономическата теория продължава настойчиво да обобщава натрупания опит и непрекъснато се стреми да изведе някакви закони на прехода, но пробив в това направление така или иначе още не е направен. Това от своя страна има негативен ефект върху възможностите за приложение на количествените методи в икономиката в условията на преход. Подходът и моделите, разработени при плановото стопанство, са неприложими, нови модели няма, а необходимостта от поне средносрочен поглед върху бъдещото развитие остава.

Въз основа на натрупания опит в макроикономическото моделиране, основаващо се на паричния подход към платежния баланс и на неокласическите модели на растежа, в настоящата статия е приложен модел, който прави опит за съчетаване на традиционните методи за моделиране със специфичните особености на страна в преход, функционираща в условията на паричен съвет. Моделът е агрегиран, от структурен тип, което позволява проследяването на причинно-следствените връзки в икономиката, и са формулирани различни сценарии, като моделът е решен за всеки от тях. Отвореният характер на модела позволява по-нататъшното му развитие и обогатяване чрез включване на нови променливи и формулиране на нови уравнения.

Contents

1. Overview

The macromodel described in this paper does not pretend to be *completely* new. Studies of a number of authors in the field of econometric macromodeling and programming have been used in the paper.[1] Notwithstanding, this model may be called unique at least because there are no developed macromodels dealing with the specific characteristics of the currency board in Bulgaria. To this end, the model provokes interest and is open for additional study and improvement.

In respect of theoretical fundamentals, the model is based mostly on the neoclassical approach to economic growth. However, it would be appropriate to say that the model is not completely based on any particular economic theory or trend. It contains both elements of the Keynesian approach (but taking into account economic agents' expectations) and monetarist concepts. For instance, the balance of payments is considered as a difference between changed money demand and changed net domestic assets which is based on a purely monetarist approach.

Concurrently, this approach complies with the purely Keynesian understanding of elasticity effect in determining the volume of imports. Eclectism of the selected approach may be inappropriate from theoretical point of view, but it allows development of a rational structural model.

The model relies on the monetary approach to the balance of payments with the assumed relationship between monetary aggregates changes and balance of payments changes. In principle, this model may be successfully applied to small and open economies, with the external sector being of critical importance for the economy. Reliability of this approach significantly increases under a currency board since it allows for more precise money supply estimation given the lack of internal sources of reserve money growth.

The model is of structural type and represents a system of equations and identities which are solved with preliminary set assumptions linked with the external environment and the economic policy pursued. Solu-

[1] *Mikkelsen, J.* (1998) A Model for Financial Programming, *IMF Working Paper*, WP/98/80; *Bier, W.* (1992) Macroeconomic Models for the PC, *IMF Working Paper*, WP/92/110; *Barth, B., B. Chadha*. A Simulation Model for Financial Programming, IMF, WP/89/24; *Fisher, S*. (1997) Applied Economics in Action: IMF Programs, *American Economic Association (AEA) Papers and Proceedings*, vol. 87, #2; *Reinchart, C*. (1991) A Model of Adjustment and Growth: An Empirical Analysis, in Macroeconomic Models for Adjustment in Developing Countries, Khan, M., P. Montiel and N. Haque eds, IMF.

tion of behavioral equations requires preliminary computation of the model's parameters (coefficients) which is the most difficult and critical part of the formulation and specification. Reliability of the parameters is a 'litmus paper' for any model. After the publication of Robert Lucas Jr.'s classical article *Econometric Policy Evaluation: A Critique* in 1976, econometrists and politicians demonstrated reservation, even bias against structural models. This, in turn, requires arguments in support of the proposed model.

1.1. Selection of a Structural Model

The major advantage of the structural model is that it gives a rational explanation of the causality relationship between variables included in the model. Although the predictive power of the models based on the statistical analysis of time series is usually stronger, it is hard to give a logical explanation if an individual variable is estimated to be strongly dependent on other variables taken with a lag of two or even five periods. Such results may be obtained if VAR models are used. These models are very useful in establishing impulse response of various variables to external shocks. However, it is also true that these models are dominated by statistics and econometrics, rather than economic rationale. Even taking the risk of a bigger error (*not necessarily*), models establishing immediately implications of any decision is to be preferred under the conditions of a transforming economy with a key role of structural changes and government regulation.[2]

1.2. Monetary Approach to the Balance of Payments

Limited central bank's traditional functions associated with money supply regulation entail a different approach to modeling of credit aggregates. The impact of quasi-monetary policy implemented by the government through the amount of deposits in the Issuing Department balance sheet needs to be formalized,[3] since money supply follows currency board rules but is also strongly impacted by government financial

[2] The article of *Francis Diebold* The Past, Present, and Future of Macroeconomic Forecasting, *NBER, Working Paper #6290* literally reads: "Nonstructural models are unrestricted reduced-form models. As such they are useful for producing unconditional forecasts in a variety of environments ranging from firm-level business forecasting to economy-wide macroeconomic forecasting. Again, however, in macroeconomics we often want to analyze scenarios that differ from the conditions presently prevailing, such as the effects of a change in a policy rule or a tax rate. Such conditional forecasts require structural models."

[3] See *Nenovsky, N., K. Hristov* (1998) Financial Repression and Credit Rationing under Currency Board Arrangement for Bulgaria, BNB, *Discussion papers* #2.

operations. Provision of macroeconomic equilibrium under a currency board requires employment of IMF traditional restrictions in order to avoid the shift of budget account fluctuations into money supply fluctuations.

1.3. Parameters of the Model

The issue of dependence of parameters in structural models on changes in the economic policy could not be disregarded. However, the effects of parameters instability (in terms of quality of forecasting) may be smoothed. The first step is to limit their number, thus ensuring parsimony of the model. Quite intentionally they are limited to the acceptable minimum in the present model which helps reduce errors. The second step allows certain exogenizing and calibration of parameters. Actually, this means that recalculation of parameters is not based only on econometric calculations but also on particular adjustments associated with expected changes (in terms of theory). For example, the parameter characterizing the relationship between growth and investment should be exogenously increased, unless bigger capacity utilization is expected due to particular reasons. Obviously, in this case growth will be higher under unchanged level of investment.[4]

2. Specification of the Model

2.1. General Description

The structure of the model has been chosen in a manner to enable formalization of demand and supply of goods and services (real sector), currency (monetary sector) and forex reserves (external sector). The government sector is also individually studied: its fiscal and quasi functions are clearly delimited. It is assumed that the monetary sector is balanced, that is demand and supply are equal by definition. As regards the real sector, it is assumed that particular fluctuations between short-term demand and long-term supply of goods and services may occur based on the concept of potential (long-term) and short-term growth.

In principle, currency board rules entail employment of a fixed exchange rate against the euro. However, due to purely technical reasons

[4] To this end *G. Minassian* writes: "This approach to economic modeling allows for successful combination of the established scheme of quantitative computation and various (even opposite) understandings for future development dependent on the economist's research potential." See *Minassian G., M. Nenova and V. Yotzov* Currency Board in Bulgaria, p. 208.

indicators in foreign currency are denominated in US dollars.[5] This impacts the model to some extent, so far as changes in the BGN/USD exchange rate are inevitably assumed irrespective of the pegged exchange rate of the lev to the euro. Despite the assumption of this flexibility, exchange rate changes may not be considered as a policy variable, since they reflect only expected changes of the euro against the US dollar and are based on forecast of authoritative international financial institutions, not on government actions. Provided that the balance of payments will soon be compiled in euro (levs), the model may be easily reformulated into the entirely fixed exchange rate and all ensuing adjustments.

The model is dynamic and allows to follow changes in the policy pursued in the medium-term prospect. To this end, short-term changes in fiscal and monetary[6] policies impact supply, while in the long run supply is determined as neoclassical, that is based on a Cobb-Douglas production function. Demand, in its turn, is determined by final consumption, investment and net exports of goods and services. Equations describing relationships between income, household final consumption and import demand are behavioral, that is they are described using elasticity coefficients, while public consumption and exports are considered externally determined (outside the model). Private investment is determined by the production function assuming that *short-term growth is an exogenously determined target*.

Convergence between short-term (dependent on changes in fiscal and monetary policies) and long-term (impacted by factors of production) nominal GDP is effected through changes in the price level. Consequently, under unchanged price level any change in fiscal and/or monetary policies will cause fluctuations of the short-term growth

[5] In spite of the fact that Bulgaria's foreign trade flows have been definitely oriented towards European markets after the introduction of a currency board, a significant amount of incomes and expenses are denominated in US dollars. Bulgaria's foreign debt and foreign debt service are also denominated in US dollars. However, the most important fact is that Bulgaria's balance of payments is also compiled in US dollars which obscures to some extent the theoretical direct link between the balance of payments and money supply, leaving room for valuation adjustments.

[6] Under currency board rules no active monetary policy is pursued. The BNB may only change the percentage of minimum required reserves which have a direct effect on money multiplier and supply of broader monetary aggregates. The possibility to increase money supply through refinancing commercial banks is likely to be only theoretical. On the other hand, monetary implications of the fiscal policy (the so-called quasi-monetary policy implemented through changing government deposit) should not be disregarded as they signal a quasi-monetary policy pursued under a currency board, the only difference being that this policy is not implemented by the BNB.

around long-term growth which is considered potential at a particular employment level in the economy.

The monetary sector is formally described through money demand and supply, with supply of broad money aggregates dependent on general money multiplier and reserve money. Reserve money supply is determined by changes in net foreign and domestic assets, while demand is described by behavioral equations, including money multiplier components and changes in government deposit in the balance sheet of the Issue Department. Net capital flows (direct and portfolio investments and external loans) are determined exogenously and the target of forex reserves level is based on the ratio of forex reserves to imports of goods and nonfactor services in months. Treatment of the exchange rate needs to be clarified. Despite the assumed possible exchange rate changes against the US dollar, the exchange rate should not be treated as floating, as in the context of the model this means an automatic equilibrium of the external sector (given the target of forex reserves and assumptions in respect of net capital flows) attained through changes in the BGN/USD exchange rate. In this respect, we may not be sure that exchange rate changes based on forecast will be able to provide external sector equilibrium. It is possible for the expected changes to be quite divergent from those necessary to attain equilibrium. In this context, equilibrium may be achieved by reviewing the target of forex reserves or assuming a possibility of disequilibrum resulting in a balance of payments financial gap which will require additional financial sources. This specification is of critical importance, since employment of the exchange rate as a nominal anchor and related constraints on the monetary policy predetermine the key role of the fiscal policy in providing real sector equilibrium.

After external sector equilibrium is achieved, fiscal and monetary policies may be designed in a manner ensuring equilibrium of both real and monetary sectors at a price level which should not exceed a preliminary set inflation target. Under a set net foreign assets target, net domestic assets (domestic credit) can be determined in accordance with money market equilibrium. Consequently, various combinations of fiscal measures, including both revenue and expenditure sides of the budget may be used to restore real sector equilibrium and to subdue short-term growth fluctuations to its potential values.

2.2. Description of Specific Economic Sectors

2.2.1. Real Sector

Supply in the structural model is described by the following equations:

$$\Delta \ln Q_{lt} = \alpha_1 \Delta \ln K_t + \alpha_2 \Delta \ln L_t + \alpha_3 \quad (1)$$

$$K_t = I_t + (1 - \delta) K_{t-1} \quad (2)$$

$$I_t = \hat{I}_{gt} + I_{pt} \quad (3)$$

$$\Delta \ln Q_{lt} = \ln(1 + \bar{g}_{lt}), \quad (4)$$

where Q_{lt} is real GDP in the long run, K_t and L_t are capital stocks (in real terms) and labor in private and real sectors in the period *t*. I_t are total investments distinguished between private [I_{pt}] and public [I_{gt}] sectors. The link between capital stocks in two consecutive periods is determined through δ, which shows the average percentage of depreciation costs.

In the first equation long-term (potential) GDP growth is determined as a function of production factors: growth depends both on extensive (labor and capital) and autonomous growth factors assumed as a constant. The economic meaning of this constant is to show that growth is still possible under unchanged size of capital stocks and number of employed ($\Delta \ln K_t = \Delta \ln L_t = 0$). This may be a result of various reasons which are beyond the scope of this model, and it is assumed that coefficient α_3 reflects the impact of autonomous growth factors. Since variables referring to capital stocks reflect capital availability and not the degree of capital utilization, in addition the coefficient α_3 reflects changes in capacity utilization. Coefficients α_1 and α_2 reflect factor productivity of capital and labor correspondingly.

From a theoretical point of view, employment of production functions in valuing long-term (potential growth) is based on sound economic grounds. However, some difficulties occur at a higher technical level. First, problems related to determination of capital stocks. Reliability of statistical data provided is insufficient. If we are sure about reliability of information on the size of investment and equation (2) is used, it will be possible to generate a dummy time series of capital stocks, which is admissible in the context of econometrics since not the

absolute figures but dynamics in them is significant in computing coefficients. Consequently, the problem relates mostly to reliability of statistical data on the amount of investment, and particularly depreciation costs. Second, difficulties associated with formulation of the production function occur. Various approaches are known in economic literature, including isolation of technical progress as an autonomous factor. However, treatment of relationships between factor productivity of capital and labor is of greater importance, that is possibilities for substitution between them and the effect on total factor productivity.

In equation (4) long-term GDP growth is formulated in a manner which significantly diverges from that in the first equation and shows the link with short-term growth determined as an exogenous target. It should be noted that unlike standard stabilization programs implemented under the IMF model, the growth variable target in this model is shown in its long-term aspect. Exogenous short-term growth may not be determined separately from exogenous inflation, since inflation has effect both on fiscal and monetary policy, which, as it has already been mentioned, may shift short-term growth from its long-term dynamics. In other words, long-term (potential) growth determined through equation (1) should not be interpreted as a maximum admissible limit but as anticipated growth from the point of view of extensive factor dynamics (amount of capital and number of employed), the intensive component (factor productivity) and autonomous factors. To this end, monetary and fiscal policies should be dosed in a manner to minimize fluctuations of short-term growth around the long-term trend.

Taking into account that the major task of any macroeconomic model is to 'produce' maximum reliable forecasts and allow for simulation of various implemented policies, exogenous determination of target growth ($\overline{g}_{lt}$) should be sustainable and consistent in the longer run. Theoretically, the model may be also realized under unrealistically high growth target. It is possible to undertake particular measures to achieve or even realize this target. However, this would be a mistake since the economy may overheat in a particular future period. We realize that such warnings may sound strange in the context of current economic situation in Bulgaria when all efforts are focused on searching sources of accelerated economic growth. Notwithstanding, the problem is reduced to particular figures: 3%, 5% and 10% growth. Growth rate may be high but sustainable and lower but volatile, and therefore unhealthy. Qualitative assessment of economic growth is not an academic whim and real life examples proved quite convincing.

The above considerations raise the following question: "How to determine sustainable economic growth if its real nominal amount is unhelpful". It is well known from the theory of economic growth that growth sustainability in the long run requires an increasing ratio of GDP to capital stocks, or at least a constant function. Provided the ratio decreases (if capital stocks grow faster than GDP), in the long run all domestic resources should be used for investment, in order to maintain a minimal growth rate. This will inevitably lead to an economic crisis. Undoubtedly, as a result of increased domestic savings (at the expense of reduced consumption) and use of foreign GDP in the form of investment the crisis may be postponed but not avoided. In this context, maximum sustainable growth ($0 < \alpha_1 < 1$) may be attained under a constant ratio between GDP produced and required capital. Maintenance of the above ratio over time requires fulfillment of the following condition in the long run: $\Delta \ln Q_{lt} = \Delta \ln K_t$, that is growth rates of GDP and capital stocks should be equal. If the above condition is substituted in equation (1) and solved in respect of long-term growth target, we will obtain:

$$\bar{g}_{lt} = \frac{\alpha_2 \lambda + \alpha_3}{1 - \alpha_1} \ , \tag{5}$$

where λ is the increase in the number of employed in the long run.

Statistical and econometric research for Bulgaria estimates the α_3 parameter at 0.0162, with autonomous factors of economic growth approximating 1.6% annually in the long run. Having assumed that total factor productivity ($\alpha_1 + \alpha_2 = 1$) is a constant, equation (5) is written as: $\bar{g}_{lt} = \lambda + \frac{\alpha_3}{\alpha_2}$. This allows for some quantitative assessments of the long-term economic growth stability under various assumptions on employment growth and its marginal productivity.

Let us assume that the government will pursue an investment-oriented (domestic and foreign) policy intended to reduce unemployment to 8% of total labor force in the long-term prospect (ten years). Based on demographic statistics showing a decline in total number of individuals and labor force, an 8% unemployment target means an increase in employment in the 10-year period by approximately 30,000 persons per annum which allows to estimate it at 0.0146 on an average annual basis. Taking into consideration these assumptions, long-term

economic growth can be displayed as a function of marginal labor productivity:

Table 1

LONG-TERM ECONOMIC GROWTH SUSTAINABILITY AT DIFFERENT VALUES OF MARGINAL LABOR PRODUCTIVITY

Growth, %, in period	0.80	0.75	0.70	0.65	α_2 = 0.60	0.55	0.50	0.45	0.40
1	3.70	3.83	3.99	4.16	4.37	4.62	4.91	5.27	5.72
2	3.62	3.75	3.90	4.08	4.29	4.54	4.83	5.19	5.64
3	3.58	3.71	3.86	4.04	4.25	4.50	4.79	5.15	5.60
4	3.54	3.67	3.83	4.00	4.21	4.46	4.75	5.11	5.56
5	3.47	3.61	3.76	3.94	4.15	4.39	4.69	5.05	5.50
6	3.44	3.58	3.73	3.91	4.12	4.36	4.66	5.02	5.47
7	3.41	3.55	3.70	3.88	4.09	4.33	4.63	4.99	5.44
8	3.38	3.52	3.67	3.85	4.06	4.30	4.60	4.96	5.41
9	3.35	3.49	3.64	3.82	4.03	4.27	4.57	4.93	5.38
10	3.33	3.46	3.61	3.79	4.00	4.25	4.54	4.90	5.35

It should be admitted that instability of the production function impedes precise measurement of any of the coefficients. Employment of various techniques in individual periods helped estimate more thoroughly autonomous factors, while frequent shocks on labor supply during the last 15 years[7] hampered valuation of marginal factor productivity. If estimations made between 1950 and 1980[8] are considered relatively stable, it may be assumed that the coefficient indicating marginal labor productivity ranges between $0.6 < \alpha_1 < 0.8$. This means that Bulgaria's long-term sustainable economic growth varies within 3% and 4% on an average annual basis.[9] The rate of long-term economic growth corresponding to the marginal labor productivity will be further used in the model ($\alpha_2 = 0.75$).

Exogenous growth determination helps unambiguously identify the amount of required private investment by expressing it as a function of GDP growth, employment increase and the level of capital stocks dur-

[7] The emigrant wave to Turkey in 1989 followed by another emigrant wave to Europe and the USA between 1991 and 1993, structural changes and liquidation of a number of industries between 1998 and 1999 impacted significantly labor supply.

[8] See Econometric Macromodels on National Economy Development, Sofia, 1984, *BAS Publishers*, pp. 23 – 35.

[9] These valuations closely approach the valuations published in an IMF study where Bulgaria's long-term economic growth (valued according to various methods) ranges between 3.93% and 5.31%. See *Fisher, S., R. Sahay and C. Vegh* (1998) From Transition to Market: Evidence and Growth Prospects, *IMF Working Paper*, WP/98/52.

ing the previous period and exogenously determined investment in the public sector.

$$I_{pt} = \frac{[\bar{g}_{lt} - \alpha_2(\Delta L_t / L_{t-1}) + \alpha_1\delta - \alpha_3]}{\alpha_1} K_{t-1} - I_{gt} \qquad (6)$$

From the point of view of demand, real GDP is determined by the following identity:

$$Q_t = C_{pt} + \hat{C}_{gt} + I_{pt} + \hat{I}_{gt} + \hat{X}_t - M_t \ , \qquad (7)$$

where C_{pt} and C_{gt} denote final consumption in private and public sectors (in real terms) respectively, and X_t and M_t denote the volume of exports and imports of goods and nonfactor services (in real terms). Consumption and public sector investment are considered exogenous as they are controlled by the government. Strictly speaking, volumes of exports are also exogenous but only in the context of this model. In practice export volumes are dependent both on internal (real sector performance, inflationary expectations and structural changes) and external factors (international market situation, state of trade partners, the effect of changes in the real exchange rate).

Private sector consumption [C_{pt}] is derived as a function of disposable income in the private sector [Y_{dpt}] by the equation:

$$\ln C_{pt} = \beta_0 + \beta_1 \ln Y_{dpt} \qquad (8)$$

The assessment of this equation reveals a strong dependence between consumption and income: the coefficient of determination approaches 1, and strong first order autoregression occurs (DW = 0.79). To avoid the effect of autoregression, the equation may be formulated in another way:

$$\Delta \ln C_{pt} = \beta_0 + \beta_1 \Delta \ln Y_{dpt} + \beta_2 \ln C_{pt-1} + \beta_3 \ln Y_{dpt-1}$$

The use of this specification requires preliminary stationarity test showing that income and consumption are integrated in I (1). This means that their first differences are stationary.

The results of econometric estimations of above equation are summarized in the table below which shows the disposable income elasticity of consumption.

Table 2

DISPOSABLE INCOME ELASTICITY OF CONSUMPTION

Dependent variable: DLOG(CONSP)
Method: Least squares
Sample (adjusted): 1994:2 1999:4
Included observations: 23 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.116939	0.053181	-2.198880	0.0405
DLOG(YDP)	0.873376	0.024426	35.75610	0.0000
LOG(CONSP(-1))	-0.359748	0.108586	-3.313013	0.0037
LOG(YDP(-1))	0.365828	0.110179	3.320307	0.0036
R-squared	0.986205	Mean dependent var.		0.195687
Adjusted R-squared	0.984027	S.D. dependent var.		0.267828
S.E. of regression	0.033850	Akaike info criterion		-3.776998
Sum squared resid.	0.021770	Schwartz criterion		-3.579521
Log likelihood	47.43548	F-statistic		452.7621
Durbin-Watson stat.	1.778090	Prob. (F-statistic)		0.000000

Volumes of imports of goods and nonfactor services are also determined by a behavioral equation:

$$\ln M_t = \gamma_0 + \gamma_1 \ln(RER) + \gamma_2 \ln(C_t) + \gamma_3 \ln(I_t), \qquad (9)$$

where RER is the real exchange rate obtained as a ratio of domestic (P_t^d) and external[10] (P_t^w) price levels and the nominal change in the exchange rate E_t determined as the amount of national currency required for the purchase of a unit of foreign currency, $RER = \frac{P_t^w}{P_t^d} E_t$.

Theoretically, the expected value of the coefficient indicating the impact of the real effective exchange rate on import volumes is: $\gamma_1 < 0$. In other words, the real depreciation of the national currency (when the nominal increase in the exchange rate exceeds the differences in inflation rates) increases the cost of imports and represses them. However, the effect of this factor in Bulgaria is quite contradictory due to the relatively big share of imported energy inputs which have low price elasticity. As imports of consumer goods are concerned, the impact of

[10] Usually indices of the real effective exchange rate changes are computed. This is much more convenient, since there is no need of dealing with price levels but directly with inflation rate. The effective nature of the real exchange rate means that a particular basket of currencies determined through foreign trade weights of major trading partners is used.

the depreciation is very strong. This was clearly pronounced during the crisis at the end of 1996 and early 1997. Under a fixed exchange rate, real effective exchange rate indices depend only on differences in inflation. To this end, it should be reminded again that exogenously determined changes in the nominal exchange rate of the lev against the US dollar may not be treated as a way to reduce imports and improve balance of payments current account. As to the other two coefficients, they should have (and they have) positive values but with lower impact.

The results[11] of the assessment of the effect of the real effective exchange rate, consumption and investment on import volumes are displayed in the table below:

Table 3

REAL EFFECTIVE EXCHANGE RATE, CONSUMPTION AND INVESTMENT ELASTICITY OF IMPORTS

Dependent variable: DLOG(M)
Method: Least squares
Sample (adjusted): 1994:2 1999:4
Included observations: 23 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.013856	1.228584	3.267059	0.0056
DLOG(RER)	-0.708952	0.184284	-3.847067	0.0018
DLOG(CONS)	0.414514	0.191984	2.159100	0.0487
DLOG(I)	0.119040	0.080792	1.473420	0.1628
LOG(M(-1))	-0.236249	0.153320	-1.540889	0.1456
LOG(RER(-1))	-0.426585	0.218340	-1.953762	0.0710
LOG(CONS(-1))	0.327478	0.180311	1.816190	0.0908
LOG(I(-1))	-0.084872	0.121032	-0.701231	0.4947
DUMMY	1.092181	0.150829	7.241171	0.0000
R-squared	0.944098	Mean dependent var.		0.184170
Adjusted R-squared	0.912154	S.D. dependent var.		0.304011
S.E. of regression	0.090105	Akaike info criterion		-1.689503
Sum squared resid.	0.113666	Schwartz criterion		-1.245179
Log likelihood	28.42929	F-statistic		29.55485
Durbin-Watson stat.	2.080900	Prob. (F-statistic)		0.000000

To complete the formal description of the real sector, it is necessary to determine the disposable income of the entire economy (Y_{dt}) as well as of the private sector (Y_{dpt}).

[11] Due to nonstationarity of variable levels, the equation (similar to equation 8) is valued by using first differences of variables which are stationary. A dummy variable reporting forex crises in the spring of 1994 and early 1997 is used in computations.

$$Y_{dt} = \frac{P_{qt}Q_t + F\hat{S}_t + \hat{G}_t}{P_{qt}} \tag{10}$$

$$Y_{dpt} = Y_{dt} - \frac{R_t}{P_{qt}}, \tag{11}$$

where $F\hat{S}_t$ is the net nominal amount of external factor services, $\hat{G}_t$ is the net nominal amount of transfers, R_t is the net nominal amount of public sector revenue, and P_{qt} is the GDP deflator. It is of note, that the nominal amount of the private sector disposable income is not deflated by consumer price index but by the implicit GDP deflator. Other conditions being equal, this makes the private sector disposable income less sensitive to exogenously determined changes in terms of trade.

As it has been already mentioned above, the relationship between short-term demand (impacted by fiscal and monetary policies) and long-term supply (dependent on factors of production and their marginal productivity) is effected through changes in the price level.

$$\pi_t = \pi_t^* + \kappa\left(\frac{Q_t}{Q_{lt}} - 1\right), \tag{12}$$

where $\pi_t = \frac{\Delta P_t^d}{P_{t-1}^d}$ is the rate of domestic inflation in period t, and π_t^* the rate of expected inflation in the same period. Q_t and Q_{lt} are the real amounts of short-term and long-term GDP defined in equations (4) and (7). According to theory, the parameter $k > 0$, that is when short-term demand exceeds long-term supply, inflationary pressure occurs. On the other hand, expected inflation can be defined as $\pi_t^* = \omega\pi_{t-1} + (1-\omega)\overline{\pi}_t$ indicating that economic agents' expectations are expressed as an average weight of previous period inflation and the inflation target in the current period. It is obvious that parameter ω, showing economic agents' confidence in government's ability to achieve the inflation target, ranges within $0 \le \omega \le 1$. Lack of confidence ($\omega = 1$) results in purely adaptive expectations in which economic agents extrapolate their inflationary expectations only on a past basis. A typical example of this kind of expectations is when the government has undertaken commitment in advance to compensate sala-

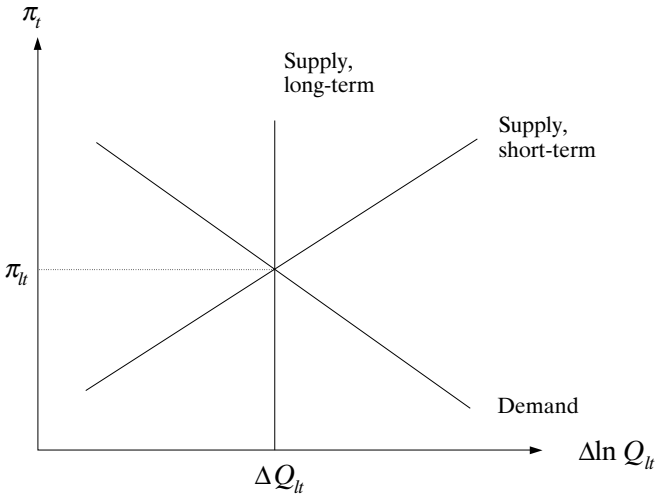
ries with the amount of inflation in the previous period. The opposite case ($\omega = 0$) means that economic agents' inflationary expectations entirely coincide with the inflationary target.

The relationship between short-term demand and long-term supply will be more clearly pronounced if equation (12) is rewritten in a manner showing short-term demand in the right side and long-term supply in the left side of the equation, assuming that the desired inflation target in period t coincides with real inflation ($\pi_t = \overline{\pi}_t$):

$$Q_t = [\frac{(\pi_t - \pi_{t-1})\omega}{k} + 1]Q_{lt} \qquad (13)$$

Chart 1

PRICE LEVEL AND AGGREGATE DEMAND AND SUPPLY



The economic meaning of the above equation reflects the necessity of converging short-term demand into long-term supply in order to preserve control over inflation.

Chart 1 shows the theoretical assumption that in the long run supply is absolutely rigid to changes in the price level which meets condition $k \to \infty$. Economic agents' credibility in governing authorities' ability to

observe the price target ($\omega = 0, \pi_t = \pi_t^*$) also suggests a vertical line of long-term aggregate demand. Long-term equilibrium is achieved at the point where short- and long-term supply intersect demand, being defined both from the targeted price level and the GDP growth rate. In the short run, however, changes in demand caused by various governing authorities' decisions will result in different combinations of growth and inflation, which balance by way of movements on the short-term supply line. At the same time, given exogenous long-term economic growth, short-term fluctuations in the long run balance through the movement of the demand line. The values used in the model are based on expert estimates: $\omega = 0.5$ and $\kappa = 4$.

The price level (within the economy) in the model at the end of each period is set as a target variable and the average annual price level through the linear interpolation of end-of-period values. Hence the domestic rate of inflation will differ from GDP deflator to the extent to which the rate of change in domestic prices will differ from those of exported goods.

The price levels of consume (P_{ct}) and investment (P_{it}) goods are determined in the same way: as an average weight resulting from a change in the general price level (P_t) and the exogenously set price level of imported goods and nonfactor services (P_{mt}).

$$P_{ct} = \xi_1 P_t + (1 - \xi_1) P_{mt} E_t \tag{14}$$

$$P_{it} = \xi_2 P_t + (1 - \xi_2) P_{mt} E_t \tag{15}$$

The values for ξ_1 and ξ_2 used in the model are 0.2 and 0.4 respectively.

2.2.2. Monetary Sector

The model could be specified for a different degree of monetary aggregate aggregation. Based on the standard approach of establishing the relationship between monetary aggregates and inflation, it would be appropriate to include the monetary aggregate with the strongest impact on inflation dynamics. This involves specific econometric tests to be run as illustrated below:

Table 4

MONETARY AGGREGATES IMPACT ON INFLATION PRIOR TO CURRENCY BOARD INTRODUCTION (DECEMBER 1991 – JUNE 1997)[12]

Monetary aggregates	Short-term relationship		Long-term relationship		R^2	DW	S.E.	F-stat.
	Coefficient	*t*-stat.	Coefficient	*t*-stat.				
Reserve money	1.86	5.88	1.38	1.89	0.73	1.76	0.22	9.97
M2	1.97	8.99	1.38	2.00	0.90	1.96	0.13	35.67
M3	1.90	8.92	1.37	2.02	0.91	1.99	0.13	36.12

Table 5

MONETARY AGGREGATES IMPACT ON INFLATION AFTER CURRENCY BOARD INTRODUCTION (JULY 1997 – DECEMBER 1999)

Monetary aggregates	Short-term relationship		Long-term relationship		R^2	DW	S.E.	F-stat.
	Coefficient	*t*-stat.	Coefficient	*t*-stat.				
Reserve money	-0.017	-0.551	0.090	1.52	0.58	1.81	0.01	8.77
M2	0.026	0.589	0.167	1.79	0.56	1.75	0.01	7.85
M3	-0.015	-0.261	0.262	1.59	0.64	1.79	0.01	11.01

Econometric tests show definitively that there is no relationship between money supply and inflation after currency board introduction. This result is only logical, as the major function of the currency board is to reverse inflationary expectations associated with unjustifiable growth in monetary aggregates. The choice of a monetary aggregate therefore cannot be determined in view of its relationship with inflation as there is no such relationship under a currency board arrangement.

The broadest monetary aggregate M3 is chosen in the model because it allows greater freedom in forecasting credit aggregates, in particular credit to the real sector.

Under a currency board arrangement money is an endogenous variable while money supply is restricted by changes in the official forex reserves. This makes it possible to define broad money supply as:

[12] Econometric checks are based on the following equation:

$$\Delta \ln(CPI) = \alpha_1 + \alpha_2 \Delta \ln(MA) + \alpha_3 \ln(CPI_{-1}) + \alpha_4 \ln(MA_{-1}) + \varepsilon_t$$

where CPI is the consumer price index and MA is the monetary aggregate under review. The parameter α_2 reflects the short-term relationship and $\frac{\alpha_4}{-\alpha_3}$ the long-term one.

$$M3^s_t = \mu RM^s_t , \tag{16}$$

where RM^s_t is the reserve money supply and μ is the money multiplier that is partly controlled by the central bank. On the other hand, reserve money is shown as the sum of currency outside banks (COB) and commercial bank reserves (CBR) comprising minimum required reserves, excess reserves and cash balances at commercial bank vaults, i. e. $RM_t = COB_t + CBR_t$. The money multiplier is defined as: $\mu = \frac{1+c}{c+r}$, where c is the ratio of currency outside banks to deposits and r is the ratio of commercial bank reserves to deposits.[13]

According to the methodology of monetary statistics the sources of reserve money growth (i.e. its supply) are changes in net foreign assets (a result of BOP dynamics) and changes in net domestic assets. Under a currency board arrangement the impact of domestic assets is reduced to a minimum. Strictly speaking, these should be excluded as a source of monetary base growth. However, the model leaves room for changes in domestic assets reflecting the fact that not all changes in reserve money can be *strictly* ascribed to changes in net foreign assets driven by changes in official foreign exchange reserves. For example, the government is capable of decreasing or increasing money supply by issuing government securities. In practice this policy is implemented by means of the issuance calendar which depends on the current execution of the state budget. In the cases of budgetary revenue and expenditure gaps the government can reduce the amount of its deposit without causing a change in foreign assets and thus increase money supply[14]. The opposite case is also possible with unexpected inflows into the budget (i. e.

[13] The money multiplier is derived as follows: by definition broad money is the sum of currency outside banks and deposits (quasi-money), i. e. $M3 = COB + D$. Therefore

$$\mu = \frac{M3}{RM} = \frac{COB + D}{COB + CBR} = \frac{\frac{COB}{D} + \frac{D}{D}}{\frac{COB}{D} + \frac{CBR}{D}} = \frac{c+1}{c+r} .$$

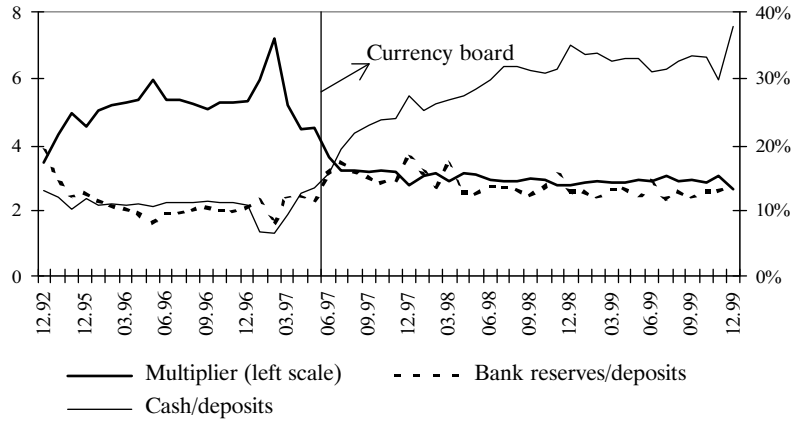
[14] In view of Bulgaria's commitments to implementing the IMF extended program some clarification should be made. The fiscal reserve is set as a trough below which it cannot fall. This trough is 'flexible' and generally depends on IMF tranches and government payments on the foreign debt service. Thus the government's possibilities of raising funds by way of decreasing deposits are severely restricted. The model refers to the more general case that does not necessarily require an agreement with the IMF and subsequent observance of such restriction.

higher tax collection) causing an increase in the government deposit which, without being linked to foreign assets, results in withdrawal of liquidity from the banking system. In the context of this model this means that both sources of reserve money growth can become endogenous since changes in forex variables are endogenous variables in the external sector and the needs of bank financing can be determined as a resultant value in the public sector.

As already pointed out, the model requires equilibrium between demand for and supply of money. As broad money supply depends both on changes in reserve money supply and changes in the money multiplier, there are two possible approaches in determining the multiplier: by formalizing it in a specific equation or by its exogenous setting. The second approach is preferable not only because it is simplified, but also in view of multiplier stabilization and predictability after currency board introduction.

Chart 2

MONEY MULTIPLIER AND ITS COMPONENTS



As shown in Chart 2, the multiplier is sufficiently stable after currency board introduction, which allows for its exogenous setting.

The money demand function is key for any model based on monetary approach to balance of payments. The economic literature dedicated to this issue is abundant. In the model under review a simplified version of money demand as a function of incomes is presented. In the context of the broadest monetary aggregate M3 no distinction is made between money demand from households and that from economic agents. The theory suggests that money demand be *negatively* related to

the interest rate. However, econometric tests for Bulgaria do not show a statistically significant relationship between interest rates (irrespective of their choice) and money demand. This proves definitely that the interest rate has not turned into *price of money*.

Results from econometric tests for real money demand can be summarized in the tables below:

Table 6

DEMAND FOR MONEY (INCOME ELASTICITIES)[15]

Period	Long-term relationship		Short-term relationship		R^2	DW	S.E.	F-stat.
	Coefficient	*t*-stat.	Coefficient	*t*-stat.				
XII'92 – XII'99	1.94	2.91	0.59	12.01	0.91	1.90	0.06	33.5
XII'92 – VI'97	1.30	1.74	0.62	7.64	0.93	2.18	0.07	22.4
VII'97 – XII'99	0.17	2.74	0.33	2.08	0.98	2.44	0.01	78.7

* OLS estimates.

Table 7

DEMAND FOR MONEY (INCOME ELASTICITIES)

Period	Long-term relationship		Short-term relationship		R^2	S.E.	F-stat.	Log likelihood
	Coefficient	*t*-stat.	Coefficient	*t*-stat.				
XII'92 – XII'99	1.81	3.31	0.54	3.11	0.41	0.16	3.91	13.76
XII'92 – VI'97	1.20	0.28	0.59	2.15	0.59	0.17	4.31	8.74
VII'97 – XII'99	0.23	10.4	0.35	4.67	0.98	0.01	84.5	35.6

* Cointegration techniques estimation.

Results from econometric tests, despite their rather simplified form, are reassuring. The theoretical concept of a strong statistical relationship between money demand and real income is confirmed. In the context of the model, and given money multiplier stability this is extremely favorable, enabling us to formulate the following relationship between money demand and supply:

[15] The money demand function is specified in a way that allows measurement of the short- and long-term relationship similarly to the consumption function.

$$\Delta \ln\left(\frac{M3}{CPI}\right) = \varphi_1 + \varphi_2 \Delta \ln\left(\frac{GDP}{CPI}\right) + \varphi_3 \ln\left(\frac{M3_{-1}}{CPI_{-1}}\right) + \varphi_4 \ln\left(\frac{GDP_{-1}}{CPI_{-1}}\right) + @\,seas(4) + @\,trend + AR(1)$$

OLS (ordinary least squares) means the method of least squares. The dummy variable *seas* is introduced due to seasonal increases in monetary aggregates at each year's end, relating to closing of budgetary accounts.

$$M3^s = \mu RM^s = \mu(NF\hat{A}_{cb} + ND\hat{A}_{cb}) = M3^d, \quad (17)$$

where NFA_{cb} and NDA_{cb} are the central bank's net foreign assets and net domestic assets respectively, which are endogenous variables and money demand is defined by the above behavioral equation.

Thus money demand represents the reciprocal value of the velocity of circulation (the ratio between nominal GDP values and money supply), i. e. elasticity coefficients obtained from econometric tests can be used directly in the macroeconomic model. In this respect it is interesting to consider both the behavior of the money multiplier and the velocity of circulation.

2.2.3. External Sector

Under a currency board arrangement the external sector plays a key role in the formation of monetary and credit aggregates and the overall model. The underlying and structurally determining identity helps define the current account presented below:

$$CAB_t = \hat{X}_t - M_t + F\hat{S}_t + \hat{G}_t \ , \quad (18)$$

where $\hat{X}$ is the exogenously set volume of exports of goods and nonfactor services. The other variables have the same values as in equations (9) and (10). It is obvious that transfers and factor services are fully exogenous factors and there is no economically rational way of their endogenizing. Moreover, their relatively low levels do not affect significantly the current account. However, the issue of exogenous setting of exports is quite different as the balance on the current account is almost completely determined by the trade balance. From a purely theoretical point of view export volumes can be presented as a function of the variables in the model. In the literature on macroeconomic modeling there are such models. In this model, however, we have discarded this approach because of identification problems. This entails in-debt examination of major principles and approaches in forecasting exports in the suggested model.

It should be noted that exogenous setting of exports (not as an instrumental variable through which pre-set targets can be achieved) does not mean that exports are set independently of the other parameters. It is natural to opt for a certain tradeoff between changes in the real effective exchange rate and exports. Long-term economic growth

rates also impose certain restrictions on potential export growth. It is obvious that rapid export growth is not possible in a decapitalizing economic environment with a sustained downward trend in economically active labor force. On the other hand, Bulgaria's competitive strengths in traditional exports of goods and services in which Bulgaria specialized when the Comecon was active should be taken into account. For example, existing capacities in the chemical industry and metallurgy, though outdated, continue to produce about 40% of exports. At the same time, loss of markets in former USSR countries affected seriously exports of the light and food industries. The general trends in Bulgarian export dynamics in recent years show that the issue of setting exports exogenously should not be approached by using statistical and econometric techniques but rather be based on analysis of trends and their projection in the future. Ultimately this approach requires that *real volumes* be distinguished from *physical volumes*.

Although volumes in the balance of payments are presented in terms of value, from the point of view of modeling and forecasting real volumes are of greater importance. As a first step it is necessary to make an in-dept analysis of exports based on their commodity and geographic structure while eliminating the price factor. In terms of commodity structure, the deeper the segregation, the better the possibilities of identifying problems in the specific industry or production. This is the most reliable approach but it is hardly applicable to macroeconomic models. Rather these models focus on a greater degree of aggregation and the same approach is applied in this model. Analysis of export commodity structure dynamics both in absolute and relative values shows a strong relationship between the progress of economic reform (particularly privatization) in specific industries and productions and their export volumes. Definitely, this fact can be used to outline the future path. The cross commodity and geographic structure is very helpful as it allows for distinguishing between internal and external factors. For example, if the fall in exports of a specific product (e.g. cigarettes) is concentrated in a particular country then it is evident that the problem is not in the manufacturing and supply of this product but rather in the importing country. Based on the cross commodity and geographic structure sufficiently credible assumptions on short- and medium-term export developments can be made.

The next step involves collecting and processing of information about current changes in the international commodity markets. Forecasts and expected prices of major commodity items in Bulgaria's ex-

port list can be derived from this type of information. This, in turn, allows for a shift from real export volumes to export volumes in terms of value. Based on this information, expectations of changes in the terms of trade are constructed which subsequently have an impact on defining the GDP deflator and distinguishing it from the consumer price dynamics.

After resolving the problems with exogenous setting of exports by way of using the basic balance of payments identity the so-called financial gap can be defined, typical of the fixed exchange rate regime. We would like to remind that there is no financial gap under a floating exchange rate regime inasmuch as changes in the nominal exchange rate affect the trade balance and hence forex reserves.

$$GAP_t = \Delta NF\bar{A}_{cbt} - CAB_t - \Delta F\hat{C}_{gt} - \Delta F\hat{C}_{pt}\,, \qquad (19)$$

where ΔNFA_{cbt} is the change in central bank net foreign assets and ΔFC_{gt} and ΔFC_{pt} are changes in net capital flows (loans) in the public and private sectors respectively. In turn, central bank net foreign assets are treated as a target variable inasmuch as these are the difference between foreign liabilities (preliminary known) and assets (official forex reserves), namely the latter are set as a target variable in the form of forex reserves in months of imports of goods and nonfactor services.

2.2.4. Public Sector

Formalizing public sector budget constraints ultimately specifies the model.

$$C_{gt} + I_{gt} + INT_{gt} + NL_t - R_t = \Delta FC_{gt} + \Delta DCCB_{gt} + \Delta DCB_{gt} + \Delta B_t + GAP_t, \qquad (20)$$

where the left side of the identity is overall public sector balance defined as a sum of consumption, investment, interest payments (on internal and external obligations) and net lending[16] less total earnings. The right side stands for financing where ΔFC_{gt} are net foreign credits drawn by the government, $\Delta DCCB_{gt}$ are changes in the fiscal position of the government in the central bank's balance sheet, ΔDCB_{gt} is domestic credit drawn by commercial banks and ΔB_t is the financing of

[16] Net lending is defined as the difference between loans made by the government and their repayment, relating to a specific policy implementation, not to liquidity management (direct or indirect). The most typical example is subsidies and aids granted. From this point of view, they are classified in the group of expenses although it contains elements of financing.

the nonbank (private) sector. Foreign financing and banking sector financing (central bank and commercial banks) are exogenously determined, and the model assumes that government sector financial gap is equal to that of the external sector as defined in equation (17). The only variable not explicitly determined is private sector nonbank financing, usually in the form of government securities issue.

With the exception of total revenue all variables on the left side of the identity are exogenously set. This suggests that the above identity can be satisfied for any combination of revenue and nonbank financing, i.e. lower expenditure is automatically offset by higher nonbank financing and *vice versa*. Taking into account equation (7), however, which includes exogenously set government expenditure and investment, in practice there is only one combination of total income and nonbank financing that provides for equilibrium in the real sector under a preliminary determined level of admissible change in the price level. The balancing mechanism is effected in the following way: The impact of changes in total government revenue (at a given level of total expenditure) is evidenced through the consumer function of the private sector described in equation (11). An increase in government revenue comes through taxes, which cause, other conditions being equal, a decline in the disposable income of the private sector and hence reduce its possibility of public sector financing.

Based on these calculations total public sector revenue represents an endogenous variable inasmuch as it results from its relationships with the other variables in the model. Any other estimation of the results obtained after solving the model needs further analysis which is reduced to answering the question: Which level of deficit in the public sector balance can be assumed as admissible and sustainable in the context of the possibilities of financing?[17] When the fiscal deficit proves higher than the possibilities of sustainable financing (i.e. not leading to lower growth or higher inflation), then general measures taken are usually related to cutting expenditure and/or increasing revenue but this takes time as it requires amending the tax legislation. To this end preliminary research in terms of tax revenue elasticity to the tax base is very helpful as a safeguard against gross errors in the course of drawing up and implementing the consolidated fiscal program. Usually GDP is used as proxy of the tax base and long-term ($\frac{\alpha_3}{-\alpha_2}$) and

[17] See *Horne J.* (1991) Indicators of Fiscal Sustainability, *IMF Working Paper*, WP/91/5; *Blanchard O.* (1990) Suggestions for New Set of Fiscal Indicators, *OECD Working Paper.*

short-term elasticity of total revenue to the tax base is estimated using the following function:

$$\Delta \ln(REV_t) = \alpha_0 + \alpha_1 \Delta \ln(GDP_t) + \alpha_2 \ln(REV_{t-1}) + \alpha_3 \ln(GDP_{-1}) .$$

The results of the analysis for Bulgaria for the period 1990 – 1999 can be summarized in the table below:

Table 8

GDP ELASTICITY OF STATE REVENUE

Long-term relationship		Short-term relationship		R^2	DW	F-stat.	S.E.
Coefficient	*t*-stat.	Coefficient	*t*-stat.				
0.99	1.56	0.91	12.3	0.99	1.98	130.1	0.09

The analysis should be extended further to distinguish changes in revenue due to higher tax collection from those due to changes in tax rates. Only then we can assume that the value solved by the model is realistic.

3. Simulation Possibilities

A significant advantage of structural modeling is the possibility of performing simulations of the type what will happen if instrumental variables controlled by the government change in one or in the other direction ('what – if analysis'). The specification of the proposed model allows for the use of this approach. Since the model is macroeconomic and the number of endogenous variables and relevant equations is limited, the possibilities of simulation analysis are reduced to the most significant macroeconomic variables.

Based on specific statistical data about Bulgaria for the period 1990 – 1999 the parameters of the model are calculated using standard econometric techniques. Where this is not possible, or the results are not satisfactory, parameters are determined on the basis of cross-country studies or by examining short-term relationships in the preceding years. In this regard we should note once again that the proposed model is the first attempt at constructing a comprehensive econometric macromodel. Undoubtedly there are other possibilities of improving the quality of estimates, including that of parameters.

Since the model is described by a simultaneous system of equations it is not enough to solve all equations separately. This entails the use of

an iterative process in calculations. The model is based on the popular software product *Microsoft Excel*, and iteration is effected through the standard function of the *MS Excel – Solver Add-In Utility* electronic table. At this stage of research it is neither possible, nor reasonable to construct the entire model on a purely econometric software product such as the Eviews, although it provides enhanced possibilities. However, this specialized econometric program is widely used for estimating parameters in specific equations.

In practice the model is constructed on different sheets of the electronic table and the main sheet – the simulation block – is constructed by using the software options of *Visual Basic Editor*, a standard application of the software package *MS Office*.

Input statistical data necessary for the model and future values of exogenously set variables are described in the applications. The first three columns in the table give the explanation of the specific variable, its name and status, i.e. whether it is treated as endogenous (marked *END*) or exogenous (*EXOG*).

(*NM*) designates variables beyond the scope of the model. In the general case they perform auxiliary functions and their projections in the future (if necessary to outline a full macroeconomic picture) are usually set as proportionate values to adequately chosen endogenous variables. The rows in the tables shown against light gray background indicate that exogenous (manual) setting is required to start the simulation process.

A basic scenario of behavior of exogenous variables covering the period 2000 – 2004 is presented in the applications.

• Long-term exogenous GDP economic growth is relatively stable over time and meets the requirements for sustainability formulated in Table 1.

• Growth rates of real export volumes are higher in the first years of the simulation period and slow down over time. This hypothesis of behavior reflects recovery of export volumes caused by the Kosovo conflict and blocked transportation of contracted export goods.

• Given ongoing social security and health care restructuring, public sector expenditure will increase at the beginning of the projected period both in nominal terms and as a share of GDP. Likewise, the government's investment program is expected to intensify in regard with construction and maintenance of important infrastructure projects. This in turn will cause a certain decrease in government fiscal reserves and reflect on monetary and credit aggregates.

• Official forex reserves will sustain their high level and will not fall below six months in terms of months of imports of goods and nonfactor services throughout the period. This will be possible thanks to a decrease in the current account deficit in combination with expected privatization revenue.

• Expected inflation has no fiscal sources, given a low budget deficit and its non-inflationary funding. However, monetary sources of inflation may emerge if there is an unexpectedly high private investment inflow that could not be sterilized by the government. This scenario is not examined as a basic one. In general, pushing ahead with the price liberalization process will foster inflation in the first two years. The other major factor will be price level convergence with other European countries, but given the low level of incomes this will be a long process and its effect is to be felt even after the end of the simulation period.

• In the first year of the projected period a decrease in commercial banks' minimum required reserves maintained with the central bank is expected: from 11% to 8%. Consequently a higher money multiplier is embedded resulting in, other conditions being equal, higher money supply. At the end of the simulation period yet another decrease of required reserves is envisaged: up to 5% of funds attracted by commercial banks.

Based on the above-mentioned economic preconditions the results from the simulations performed are given in the tables in the appendix.

4. General Assessment of the Model

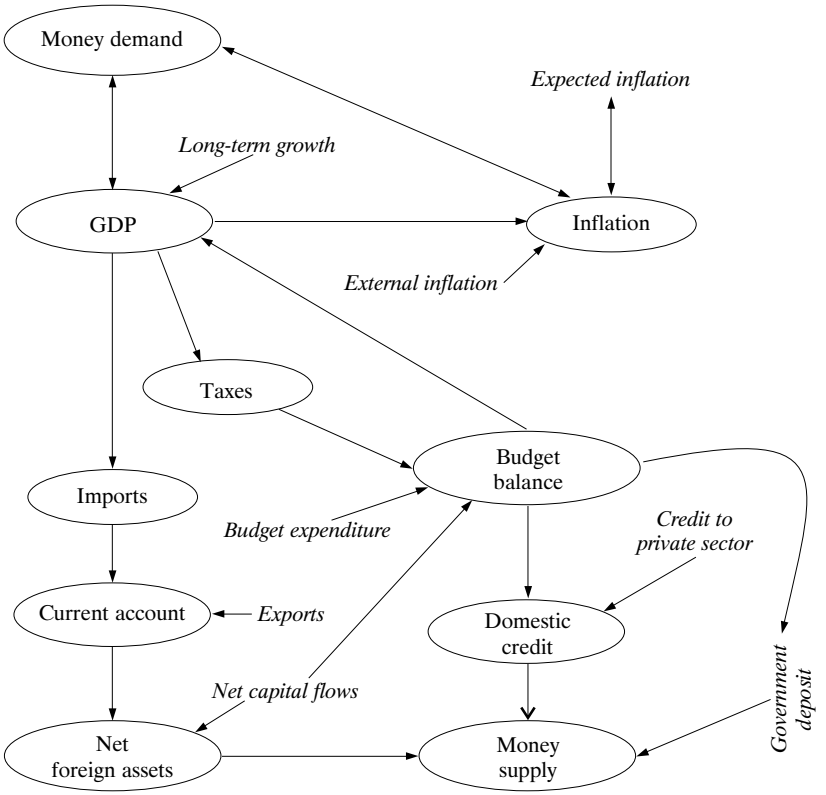
The presented model can be viewed as a starting point in formulating a more detailed estimated program for economic action. Its basic merits are its relative simplicity, the limited scope of necessary statistical data and the clear relationship between the targets set by each economic projection with the possible ways of its practical implementation. The structure of the model is based on the theoretical concepts of medium-term macromodels, including economic growth as a target variable. In this respect the model is a step forward in comparison with IMF stabilization models.

The logic of the model can be summarized as follows: In a small and open economy functioning under currency board arrangement (fixed exchange rate) changes in domestic credit are offset by changes

in forex reserves in the long run. This in turn leads to a change in money supply and its adjustment to real demand is almost automatic. Providing equilibrium between money supply and demand is critical inasmuch as short-term monetary impulses may divert the long-term trend of economic growth in one or other direction. Given the peculiarities of the Bulgarian version of a currency board, the model assumes existence of a strong relationship and interdependence between fiscal and monetary policy, or what is left of it. The structure of the model is described in the chart below in the context of its economic logic.

Chart 3

STRUCTURE OF THE MODEL



Definitely, it should be noted that Bulgaria enters a period when purely stabilization programs intended to solve deep structural disequilibria need be abandoned. Macroeconomic stabilization achieved after currency board introduction puts to the fore the issue of recovering sustainable economic growth rates. The invitation extended to Bulgaria to start negotiations for full accession to EU economic and political structures is a key factor in this direction. From this point of view, formulating and implementing models that ensure only the achievement of macroeconomic stabilization can be regarded as a past stage because such models are based mostly on restricted spending and consumption and limit the possibilities of economic prosperity. Changes in Bulgaria's economic setting in the last two years demand a new approach to economic processes modeling focusing on growth rates.

As an attempt at formulating the problems of macroeconomic modeling in the conditions of a restructuring economy in the light of economic growth the proposed model has a number of unsolved issues and shortcomings. Should input information be improved the separate blocks of the model can (and should) undergo changes:

• Endogenizing long-term economic growth instead of representing it in equation (4) as a preliminary set target. This, in turn, will allow reformulation of equation (6) describing investment in the private sector.

• As private sector consumption has a key impact on aggregate demand and through it on fiscal and monetary policy measures, equation (8) describing the private sector consumer function can be extended to include additional variables. In the ideal case these could be variables reflecting economic agents' expectations (rational or adaptable) and changes in preferences, if possible.

• Exogenous setting of exports can be reconsidered and improved as possible large deviations in its setting may affect seriously projected and simulated possibilities of the model. Complete endogenizing of exports is hardly possible at this stage because exports are affected by various external factors that cannot be included in the model. Nevertheless, it is possible to include that part of export volumes into endogenous variables, which is defined by purely internal supply-related factors.

• Financial sector presentation may be extended to include the stock exchange market and nonbank financial institutions. The dynamics of the broadest monetary aggregate used, M3, does not reflect fully the relationships in the field of financial mediation. So far the lack of

sufficient statistical data (i.e. financial statement) does not allow development of the model in this direction.

• Possibilities of including interest rates in the model should be sought. Their absence is partly related to the former problem. Yet a more serious reason is that all attempts at including interest rates in the function of money demand either in the consumer or the investment function of the private sector show either insignificant statistical dependence or results which contradict economic logic.

• It would be reasonable (following the models of the World Bank) to separate a special block treating the issues of foreign debt and the impact of its service on the balance of payments. Specific difficulties of purely technical nature may arise, as this requires unrestricted access to the record of external obligations.

• In the conditions of the Bulgarian version of currency board government deposits exert strong influence on money supply. From this point of view the model would gain much if appropriate ways of their endogenous inclusion in the model were found. This entails more extensive presentation of the public sector.

Appendix

Table 9

BULGARIA: INPUT SIMULATION DATA

(million levs unless stated otherwise)

	1998	1999	2000	2001	2002	2003	2004
Real sector							
Resources		34595					
Gross domestic product		22776					
Import of goods and nonfactor services		11818					
Expenditure		34595					
Individual consumption		18288					
Collective consumption		1914					
Private investment		2557					
Public investment		1076					
Change in inventories		707	0	0	0	0	0
Export of goods and nonfactor services		10054					
Memorandum items:							
National disposable income		23275					
Private sector disposable income		19274					
Real export growth of goods and nonfactor services (%)		-2.6	7.0	6.0	5.0	5.0	5.0
Short-term real GDP growth (%)		2.5					
Long-term (potential) GDP growth (%)		3.5	4.5	5.0	5.0	5.0	5.0
Total factor productivity growth (%)		1.6	1.6	1.6	1.6	1.6	1.6
Maximum possible GDP sustainable growth (%)		5.0	5.0	5.0	5.0	5.0	5.0
External sector							
Current account		-1266					
Export of goods and nonfactor services		10054					

(continued)

(continued) (million levs unless stated otherwise)

	1998	1999	2000	2001	2002	2003	2004
Import of goods and nonfactor services		-11818					
Factor services		296	184	152	204	98	24
External support and transfers		203	346	438	477	514	514
Capital account		2182	1526	1987	1824	1966	1996
Public sector loans (net)		669	346	587	524	616	616
BNB loans (net)		565	380	600	500	550	580
Private and other loans (net)		948	800	800	800	800	800
Growth in forex reserves		916					
Nonfinancial public sector							
Total revenue and aids (current transfers excluded)		4001					
Including aids		203	250	300	300	300	300
Total expenditure (current transfers excluded)		4152					
Current consumption		1914					
Investment		1076					
Interest payments on domestic debt		208	220	238	254	267	280
Interest payments on foreign debt		690	605	657	686	873	959
Loans (net)		264	200	200	200	150	150
Balance on other items from nonfinancial public sector		-62	-65	-68	-72	-75	-79
Overall balance (external aids excluded)		-415					
Overall balance (external aids included)		-212					
Financing		212					
Foreign financing, net		669	346	587	524	616	616
Net domestic financing from BNB		-208	-260	-100	-50	-60	-65
Net domestic financing from commercial banks		-145	-100	0	0	0	0
Other financing		-103					

(continued)

(continued) (million levs unless stated otherwise)

	1998	1999	2000	2001	2002	2003	2004
Memorandum items:							
Current consumption as a share of GDP (%)		8.4	8.4	8.4	8.4	8.4	8.4
Investment as a share of GDP (%)		4.7	4.7	4.8	5.0	5.0	5.0
Banking sector							
I. Monetary survey							
Assets	6597	7351					
Net foreign assets	5499	6151					
Net domestic assets	1098	1201					
Liabilities	6597	7351					
Narrow money (M1)	2756	2997					
Currency circulation	1742	1957					
Demand deposits	1014	1039					
Quasi-money	3842	4354					
Time and savings deposits	3425	3917					
Import and restricted deposits	417	437					
II. BNB							
Assets	2387	2722					
Net foreign assets	3645	3996					
Net domestic assets	-1258	-1274					
Claims on government, net	-282	-490	-750	-850	-900	-960	-1025
Claims on private sector	230	230					
Other assets, net	-1205	-1014					

(continued)

(continued) (million levs unless stated otherwise)

	1998	1999	2000	2001	2002	2003	2004
Liabilities	2387	2722					
Reserve money	2387	2722					
Currency circulation	1742	1957					
Commercial bank vaults	103	122					
Bank reserves	542	642					
Memorandum items:							
Gross forex reserves in months of imports	#N/A	6.4	6.3	6.1	6.0	6.0	6.0
Bank reserves/demand and time deposits (%)	14.5	15.4					
Bank reserves and commercial bank vaults/demand deposits + savings and time deposits (%)	14.5	15.4	12.4	12.4	9.4	9.4	9.4
Currency circulation/demand deposits (%)	171.9	188.3	188.3	188.3	188.3	188.3	188.3
Time deposits/demand deposits (%)	337.9	376.9	376.9	376.9	376.9	376.9	376.9
Money multiplier	1.15	1.10	1.16	1.16	1.24	1.24	1.24
Price indices and exchange rate							
Prices of domestic goods (end of period)	0.97	1.03	1.123	1.196	1.260	1.311	1.350
Prices of domestic goods (end of period, recalculated)	0.94	1.00	1.090	1.161	1.224	1.272	1.311
Prices of domestic goods (annual average)	1.13	1.00	1.046	1.159	1.228	1.29	1.33
GDP deflator	0.98	1.00					
Consumer goods prices	0.98	1.00					
Investment goods prices	1.05	1.00					
Imported goods prices	0.99	1.00	1.020	1.040	1.072	1.104	1.137
Exported goods prices	1.08	1.00	1.014	1.035	1.057	1.079	1.101
Exchange rate (BGN/USD)	0.95	1.00					
Nominal exchange rate (BGN/USD)	1.76	1.85					

Table 10

BULGARIA: MATRIX OF COEFFICIENTS

	Real capital stocks k(t)	Real output ln ql(t) -ln ql(t-1)	Employment ln l(t) -ln l(t-1)	Real individual consumption ln cp(t) -ln cp(t-1)	Real imports ln (m(t) -mp(t))	Real money demand ln M(t) -ln P(t)	Consumer prices PC(t)	Investment prices PI(t)	Supply-side inflation P(t)/P(t-1)-1
Constant		0.016	0.015	-0.02		-0.20			
i(t)	1.00								
k(t-1)	0.85								
ln k(t)-ln k(t-1)		0.55							
ln l(t)-ln l(t-1)		0.45							
ZQT(t)		1.00							
ln cp(t-1)-ln cp(t-2)				0.08					
ln ydp(t)-ln ydp(t-1)				0.83					
ln yd(t)-ln yd(t-1)						0.59			
ln(PM(t)*E(t)/P(t))					-0.464				
ln P(t)-2 ln P(t-1)+ln P(t+2)						-0.20			
P(t)							0.20	0.40	
PM(t)							0.80	0.60	
CP(t)+CG(t)					0.55				
IT(t)					0.20				
P(t-1)/P(t-2)-1									0.50
q(t)/ql(t)-1									4.00

cp	real individual consumption
cg	real collective consumption
E	exchange rate (BGN/USD)
M1	money supply

i	real investment
k	real capital stocks
m	real imports of goods and nonfactor services
P	price level of domestic output supplied in Bulgaria
PC	price level of consumer goods
PI	price level of investment goods
PM	price level of imported goods and nonfactor services
q	real output (GDP)
ql	long-term real output (GDP)
yd	real national disposable income
ydp	real private disposable income
ZQT	total factor productivity growth

Table 11

BULGARIA: TARGET AND INSTRUMENTAL VARIABLES

(% unless stated otherwise)

	Reporting 1999	Estimate 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004
Target variables						
Short-term real GDP growth	2.5	5.3	3.7	5.3	4.9	5.1
Long-term real GDP growth	3.5	4.5	5.0	5.0	5.0	5.0
Inflation (end of period)	6.2	9.0	6.5	5.4	4.0	3.0
Gross forex reserves in months of imports	6.4	6.3	6.1	6.0	6.0	6.0
Instrumental variables						
Minimum required reserves	15.4	12.4	12.4	9.4	9.4	9.4
BNB net domestic assets, million levs	-1274	-1849	-2631	-3368	-4109	-4906
BNB net foreign assets, million levs	3996	4726	5782	6615	7603	8639
Internal financing of nonfinancial public sector, million levs	-457	48	-228	-442	-780	-1086
Internal financing of nonfinancial public sector as a share of GDP						
Overall balance (including aids)	-0.9	-1.6	-1.4	-0.5	0.2	0.9
Total revenue	17.6	15.9	16.1	17.0	17.9	18.6
Total expenditure	18.2	17.2	17.3	17.3	17.5	17.5
Other major variables			**Share of GDP**			
BOP current account	-5.6	-4.9	-5.9	-5.3	-5.1	-4.8
BOP capital account	9.6	6.3	7.6	6.5	6.6	6.2
Investment	15.9	16.9	18.0	17.9	18.0	17.9
Private investment	11.2	12.2	13.2	12.9	13.0	12.9
Government investment	4.7	4.7	4.8	5.0	5.0	5.0
Consumption	88.7	90.1	90.2	89.8	89.2	88.5
Individual consumption	80.3	81.7	81.8	81.4	80.8	80.1
Collective consumption	8.4	8.4	8.4	8.4	8.4	8.4
			Growth			
Reserve money	14.0	5.7	9.5	3.0	7.6	6.8
Money demand (M1)	8.7	11.8	9.5	9.4	7.6	6.8
Real individual consumption	2.5	6.7	4.2	4.3	3.5	3.7
Real private investment	-6.5	15.4	10.6	3.2	5.0	4.9
Real capital stocks	2.3	4.0	4.9	4.9	4.9	4.9
Total factor productivity	1.6	1.6	1.6	1.6	1.6	1.6
GDP deflator	1.6	8.0	4.7	7.2	5.7	4.9
Consumer prices (annual average)	1.8	8.5	4.3	7.8	6.2	5.5

Table 12

BULGARIA: MODEL SIMULATION RESULTS

(million levs at current prices unless stated otherwise)

	Reporting 1999	Estimate 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004
Real sector						
Resources	34595	39465	43214	48633	53722	58981
Gross domestic product	22776	25920	28154	31783	35247	38868
Imports of goods and nonfactor services	11818	13545	15060	16849	18476	20113
Expenditure	34595	39465	43214	48633	53722	58981
Individual consumption	18288	21182	23017	25879	28470	31143
Collective consumption	1914	2177	2365	2670	2961	3265
Private investment	2557	3173	3715	4114	4572	5033
Public (government) investment	1076	1218	1351	1589	1762	1943
Change in stocks	707	0	0	0	0	0
Exports of goods and nonfactor services	10054	11714	12766	14381	15957	17597
Memorandum items:						
National disposable income	23275	25656	29507	32966	36063	39080
Private sector disposable income	19274	22484	24283	27309	29998	32828
External sector						
Current account	-1266	-1262	-1656	-1695	-1799	-1866
Exports of goods and nonfactor services	10054	11714	12766	14381	15957	17597
Imports of goods and nonfactor services	11818	13545	15060	16849	18476	20113
Factor services	296	197	164	232	115	29
External support and transfers	203	371	474	542	605	622

(continued)

(continued) (million levs at current prices unless stated otherwise)

	Reporting 1999	Estimate 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004
Capital account	2182	1638	2149	2074	2314	2417
Public sector loans (net)	669	371	635	596	725	746
BNB loans (net)	565	408	649	568	647	702
Private and other loans (net)	948	859	865	909	942	969
Change in forex reserves	916	376	493	379	515	552
Nonfinancial public sector						
Total revenue (current transfers excluded)	4001	4111	4526	5411	6298	7219
Including aids	203	268	324	341	353	363
Total expenditure (current transfers excluded)	4152	4465	4865	5493	6168	6800
Current consumption	1914	2177	2365	2670	2961	3265
Investment	1076	1218	1351	1589	1762	1943
Interest payments on domestic debt	208	220	238	254	267	280
Interest payments on foreign debt	690	650	711	780	1028	1161
Loans (net)	264	200	200	200	150	150
Balance on other items from nonfinancial public sector	-62	-65	-68	-72	-75	-79
Overall balance (external aids excluded)	-415	-687	-731	-495	-299	-24
Overall balance (external aids included)	-212	-419	-407	-154	55	340
Financing	212	419	407	154	-55	-340
Foreign financing (net)	669	371	635	596	725	746
Net domestic financing from BNB	-208	-260	-100	-50	-60	-65
Net domestic financing from commercial banks	-145	-100	0	0	0	0
Other financing	-103	407	-128	-392	-720	-1021

(continued)

(continued) (million levs at current prices unless stated otherwise)

	Reporting 1999	Estimate 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004
BNB						
Assets	2722	2877	3151	3247	3495	3733
Net foreign assets	3996	5075	6254	7520	8948	10461
Gross official reserves	6272	7111	7655	8425	9238	10056
Net domestic assets	-1274	-2198	-3103	-4273	-5454	-6728
Claims on government (net)	-490	-750	-850	-900	-960	-1025
Other assets (net)	-1014	-1014	-1014	-1014	-1014	-1014
Liabilities (reserve money)	2722	2877	3151	3247	3495	3733
Memorandum items:						
Money demand (M1)	2997	3351	3670	4014	4320	4614
Money multiplier	1.10	1.16	1.16	1.24	1.24	1.24
Gross forex reserves in months of imports	6.4	6.3	6.1	6.0	6.0	6.0

Table 13

BULGARIA: MODEL SIMULATION RESULTS

(share of GDP, %)

	Reporting 1999	2000	2001	2002	2003	2004
Real sector						
Resources	151.9	152.3	153.5	153.0	152.4	151.7
Gross domestic product	100.0	100.0	100.0	100.0	100.0	100.0
Imports of goods and nonfactor services	51.9	52.3	53.5	53.0	52.4	51.7
Expenditure	151.9	152.3	153.5	153.0	152.4	151.7
Individual consumption	80.3	81.7	81.8	81.4	80.8	80.1
Collective consumption	8.4	8.4	8.4	8.4	8.4	8.4
Private investment	11.2	12.2	13.2	12.9	13.0	12.9
Public (government) investment	4.7	4.7	4.8	5.0	5.0	5.0
Change in stocks	3.1	0.0	0.0	0.0	0.0	0.0
Exports of goods and nonfactor services	44.1	45.2	45.3	45.2	45.3	45.3
Memorandum items:						
National disposable income	102.2	99.0	104.8	103.7	102.3	100.5
Private sector disposable income	84.6	86.7	86.3	85.9	85.1	84.5
External sector						
Current account	-5.6	-4.9	-5.9	-5.3	-5.1	-4.8
Exports of goods and nonfactor services	44.1	45.2	45.3	45.2	45.3	45.3
Imports of goods and nonfactor services	51.9	52.3	53.5	53.0	52.4	51.7
Factor services	1.3	0.8	0.6	0.7	0.3	0.1
External support and transfers	0.9	1.4	1.7	1.7	1.7	1.6
Capital account	9.6	6.3	7.6	6.5	6.6	6.2
Public sector loans (net)	2.9	1.4	2.3	1.9	2.1	1.9
BNB loans (net)	2.5	1.6	2.3	1.8	1.8	1.8
Private and other loans (net)	4.2	3.3	3.1	2.9	2.7	2.5

(continued)

(continued) (share of GDP, %)

	Reporting 1999	2000	2001	2002	2003	2004
Change in forex reserves	4.0	1.5	1.8	1.2	1.5	1.4
Nonfinancial public sector						
Total revenue (current transfers excluded)	17.6	15.9	16.1	17.0	17.9	18.6
Including aids	0.9	1.0	1.2	1.1	1.0	0.9
Total expenditure (current transfers excluded)	18.2	17.2	17.3	17.3	17.5	17.5
Current consumption	8.4	8.4	8.4	8.4	8.4	8.4
Investment	4.7	4.7	4.8	5.0	5.0	5.0
Interest payments on domestic debt	0.9	0.8	0.8	0.8	0.8	0.7
Interest payments on foreign debt	3.0	2.5	2.5	2.5	2.9	3.0
Loans (net)	1.2	0.8	0.7	0.6	0.4	0.4
Balance on other items from nonfinancial public sector	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2
Overall balance (external aids excluded)	-1.8	-2.7	-2.6	-1.6	-0.8	-0.1
Overall balance (external aids included)	-0.9	-1.6	-1.4	-0.5	0.2	0.9
Financing	0.9	1.6	1.4	0.5	-0.2	-0.9
Foreign financing (net)	2.9	1.4	2.3	1.9	2.1	1.9
Net domestic financing from BNB	-0.9	-1.0	-0.4	-0.2	-0.2	-0.2
Net domestic financing from commercial banks	-0.6	-0.4	0.0	0.0	0.0	0.0
Other financing	-0.5	1.6	-0.5	-1.2	-2.0	-2.6
BNB						
Assets	11.9	11.1	11.2	10.2	9.9	9.6
Net foreign assets	17.5	19.6	22.2	23.7	25.4	26.9
Net domestic assets	-5.6	-8.5	-11.0	-13.4	-15.5	-17.3
Claims on government (net)	-2.2	-2.9	-3.0	-2.8	-2.7	-2.6
Other assets (net)	-4.5	-3.9	-3.6	-3.2	-2.9	-2.6
Liabilities (reserve money)	11.9	11.1	11.2	10.2	9.9	9.6

Table 14

BULGARIA: MODEL SIMULATION RESULTS

(million levs at 1999 prices unless stated otherwise)

	Reporting 1999	2000	2001	2002	2003	2004
Real sector						
Resources	34595	36360	38273	40039	41715	43502
Gross domestic product	22776	23993	24889	26207	27492	28891
Imports of goods and nonfactor services	11818	12367	13384	13832	14223	14611
Expenditure	34595	36360	38273	40039	41715	43502
Individual consumption	18288	19514	20332	21210	21963	22776
Collective consumption	1914	2006	2089	2188	2284	2388
Private investment	2557	2950	3262	3367	3534	3706
Public (government) investment	1076	1133	1187	1300	1362	1431
Change in stocks	707	0	0	0	0	0
Exports of goods and nonfactor services	10054	10758	11403	11973	12572	13201
Memorandum items:						
National disposable income	23275	24519	25453	26844	28053	29374
Private sector disposable income	19274	20714	21451	22383	23141	24009
Short-term real GDP growth	2.5%	5.3%	3.7%	5.3%	4.9%	5.1%
Long-term (potential) GDP growth	3.5%	4.5%	5.0%	5.0%	5.0%	5.0%
Exports of goods and nonfactor services growth	-2.6%	7.0%	6.0%	5.0%	5.0%	5.0%
Imports of goods and nonfactor services growth	-6.4%	4.6%	8.2%	3.3%	2.8%	2.7%

(continued)

(continued) (million levs at 1999 prices unless stated otherwise)

	Reporting 1999	2000	2001	2002	2003	2004
Changes in prices and exchange rate						
Prices of domestic goods (end of period)	6.2%	9.0%	6.5%	5.4%	4.0%	3.0%
GDP deflator	1.6%	8.0%	4.7%	7.2%	5.7%	4.9%
Consumer goods prices	1.8%	8.5%	4.3%	7.8%	6.2%	5.5%
Investment goods prices	-4.6%	7.6%	5.9%	7.3%	5.9%	5.0%
Imported goods prices	0.7%	2.0%	2.0%	3.0%	3.0%	3.0%
Exported goods prices	-7.7%	1.4%	2.1%	2.1%	2.1%	2.1%
Exchange rate (BGN/USD)	5.1%	7.4%	0.7%	5.1%	3.5%	2.9%

Table 15

BULGARIA: MODEL SIMULATION RESULTS CONCERNING EXTERNAL SECTOR

(million USD)

	Reporting 1999	Estimate 2000	Forecast 2001	Forecast 2002	Forecast 2003	Forecast 2004
External sector						
Current account	-685	-635	-828	-806	-827	-833
Exports of goods and nonfactor services	5437	5899	6383	6841	7332	7858
Imports of goods and nonfactor services	6391	6821	7530	8015	8489	8982
Factor services	160	99	82	110	53	13
External support and transfers	110	187	237	258	278	278
Capital account	1180	825	1075	986	1063	1080
Public sector loans (net)	362	187	318	284	333	333
BNB loans (net)	306	205	324	270	297	314
Private and other loans (net)	513	433	433	433	433	433
Change in forex reserves	496	189	247	180	237	246

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DP/17/2001

Надзор на консолидирана основа

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Резюме. В материала последователно се разглеждат обхватът на консолидацията и надзорът на консолидирана основа. И докато консолидацията е процес на подготвяне на финансовата информация за една група предприятия, така че тя да изглежда като едно предприятие, то надзорът на консолидирана основа, осъществяван чрез надзорните регулации за ранно предупреждение, може да се прилага с ограничен обхват според националните различия на отделните държави.

Направено е сравнение между българското и европейското банково законодателство по отношение на обхвата и приложението на надзора на консолидирана основа, без да се цели изчерпателност. В подкрепа на основната цел на изследването – да се подготвят икономическите субекти за съществуващите проблеми в българската икономика – са очертани схематично насоките за адекватното им решаване.

Abstract. The paper consistently considers the scope of the consolidation and the consolidated supervision. And while the consolidation is a process of preparing financial information for one group of enterprises in such a way that it appears as one enterprise, the consolidated supervision realized by the early warning supervision regulations, could be implemented with a limited scope according to the national divergences between the different countries.

A comparison between Bulgarian and European banking legislations has been made, without being exhaustive, regarding the scope and application of the consolidated supervision. In support of the main objective of the paper – which is to prepare the economic actors for the ongoing problems in the Bulgarian economy – some guidelines have been outlined for the mentioned problems to be adequately resolved.

Съдържание

Общ поглед към надзора на консолидирана основа

Непрекъснато нарастващият процес на глобализация и новата подвижност на свободно плаващия локално необвързан капитал[1] създават предпоставки за установяване на трайна тенденция на сливания и вливания между мултинационални компании, както и придобиване на големи пакети от акции в различни дружества с регионално значение. Тенденцията се поддържа и от нарастващата конкуренция на финансовите пазари, като свободното движение на капитали вече не се сблъсква с реалните граници на отделните държави, а единствено с установени регулативни ограничения в икономиките им. Тези световни процеси водят до създаването на сложни по форма структури, които включват различни видове дейности – от финансови до производствени.

Най-динамични са промените във финансовите пазари и това насърчава дружествата да създават вертикално и/или хоризонтално сложни структури, обединяващи банкова, застрахователна и инвестиционна дейност. Появяват се финансови холдингови кампании, холдингови компании със смесена дейност или финансови конгломерати. Като резултат от тези световни процеси, за се избегне двойното отчитане на капитала в тях и да се запази стабилността на финансовата система както на регионално, така и на глобално ниво, възниква необходимост от адекватно развитие на надзорната дейност, нейното усъвършенстване и ефективно приложение.

Надзорът на консолидирана основа е едно от съвременните постижения при регулирането на финансовия пазар, прилаган винаги към група от дружества, в която поне едно от тях е кредитна и/или финансова институция (по българското законодателство понятието „банка“ е аналог на кредитна институция). Докато под понятието „надзор“[2] се разбира процес на наблюдение, оценяване и въздействие върху кредитните и финансовите институции с оглед прилагането на определен набор от стандарти за регулиране, то под дефиницията „консолидиран надзор“[2] следва да се раз-

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[1] Бауман, Зигмунт. Глобализацията. Последици за човека, 1999, изд. ЛИК.

[2] Директива на Съвета на ЕО 83/350/ЕЕС от 13 юни 1983 г. за надзора на кредитните институции на консолидирана основа, Official Journal L193, 18.VII.1983.

бира надзорна оценка от компетентните власти на финансовото състояние на кредитна институция в група с различни видове дейности.

Консолидираният надзор е следователно специфична страна от най-важните дейности на банковия надзор, който се прилага едновременно с надзора върху отделната кредитна институция.

Консолидираният надзор трябва да се разграничава и от счетоводната консолидация, въпреки че се вземат под внимание годишните и консолидираните счетоводни отчети, изготвени от дружествата.

Друга отличителна черта е разграничаването на консолидирания капитал, който се използва за надзорни цели и към който се отнасят определени приспадания, задължителни според капиталовите изисквания, от капитала, изчислен на индивидуална основа, за отделната единица от дадена група.

Надзорът на консолидирана основа е допълнително средство за осъществяване на банков надзор върху институция с кредитна или финансова дейност в рамките на дадена група. Той представлява изчерпателен, всеобхватен подход за наблюдение и оценка. Възниква в отговор на непрекъснато развиващия се банков бизнес и посредством него се оценява финансовото състояние на цялата група. Консолидираните отчети за надзорни цели обхващат дейности, които се определят от структурата на групата и включените в нея дружества, като по-често те са чисто банкови или в комбинация с инвестиционни (за по-слабо развитите пазари). За развитите пазари консолидираните отчети за надзорни цели освен споменатите обхващат и застрахователни дейности. Разделянето на „слаборазвити пазари“ и „развити пазари“ е пряко свързано с наличието на холдингови структури и финансови конгломерати, както и с развитието на надзорната дейност и правомощията на надзорните органи. Поради оскъдната информация по отношение на финансовите структури в страната може да се счита, че във финансовия ни сектор преобладават предимно дъщерни дружества на чуждестранни банки и няколко български банки майки с ограничен брой и размер съучастия във финансови и нефинансови дружества.

Обхват на консолидацията и надзор на консолидирана основа

Консолидацията е процес на подготвяне на финансово-счетоводната информация за една група предприятия, така че тази информация да представя групата като едно предприятие.

Консолидацията се извършва винаги от дружеството майка и обхваща дружествата, които са под неин контрол. Това са всички дъщерни дружества, в които дружеството майка пряко или непряко притежава повече от половината от капитала и гласовете им. При извършването на консолидацията, съответно изготвянето на консолидираните финансово-счетоводни отчети, главно място заема степента на контрол, който дружеството майка упражнява върху предприятията, в които има съучастия. В литературата се срещат различни дефиниции за контрол, но ние ще се спрем на една от най-популярните, посочена в Международен стандарт 27 „Консолидирани счетоводни отчети и отчитане на инвестициите в дъщерни предприятия“. И така под контрол се разбира[3] „властта да се ръководи финансовата и оперативната политика на едно предприятие така, че да се извличат изгоди в резултат на дейността му“. Това са всички случаи, при които дружеството майка притежава половината и повече от капитала и гласовете на друго дружество. Съществуват изключения, при които в дадено дружество има пълен контрол, независимо че съучастието на дружеството майка е под 50%. Когато майката притежава власт над повече от половината гласове по силата на договор между отделните инвеститори тя може да назначава и освобождава мнозинството от членовете на управителния орган или притежава властта да ръководи финансовата и оперативната дейност на това дружество по силата на договор.

В българската нормативна база при определяне на групата за консолидиране за надзорни цели изключение представляват застрахователните **дъщерни** дружества, които са обект на други надзорни регулации.

В обхвата на консолидацията се включват дружествата, в които майката има значително влияние и които не са дъщерни дру-

[3] Международни счетоводни стандарти, МСС 27 „Консолидирани счетоводни отчети и отчитане на инвестициите в дъщерни предприятия“, 1999, изд. „Форком“.

жества, нито част от съвместно предприятие (*joint venture*). Това са т. нар. асоциирани (присъединени) дружества**.** В МСС 28 „Отчитане на инвестициите в асоциирани предприятия“ **значителното влияние** се дефинира като „право на участие при вземането на решения, свързани с финансовата и оперативната политика на предприятието, в което е инвестирано, но не и контрол или съвместен контрол върху тази политика“[4]. Обикновено това са дружества, в които банката майка има съучастие между 20 и 50% от капитала и притежава в съответния диапазон права на глас.

И тук извън обхвата на надзора на консолидирана основа попадат всички асоциирани дружества, чиято дейност не съвпада с основната дейност на дружеството майка, т. е. промишлените предприятия и застрахователните дружества.

Консолидация се прилага и по отношение на дяловите участия в смесени предприятия. Според дефиницията, посочена в МСС 31 „Счетоводно отчитане на дялове в смесени предприятия“ „смесено предприятие е договорно взаимоотношение, по силата на което две или повече страни се заемат със стопанска дейност, която подлежи на съвместен контрол“. Съвместните дружества, обикновено под формата на *joint venture* или консорциум, са юридически независими институции, присъединени към страната, където техните основни операции се управляват и контролират от две и повече предприятия майки. Докато моделът на акционерния състав може да осигури ефективен (пълен) контрол на една институция майка спрямо други миноритарни участия, съвместните дружества са най-вече типични с това, че представляват набор от миноритарни акционери. Съществуването на смесено предприятие е възможно в случаите на договорно споделяне на контрола върху стопанската му дейност, т. е. при наличие на **съвместен контрол**. Отчетите на консолидирана основа се изготвят в зависимост от процентното участие в капитала и правото на глас, което упражнява всеки инвеститор.

При надзора на консолидирана основа, осъществяван чрез надзорните отчети по регулациите за ранно предупреждение, всеки инвеститор поема частта от рисковете, които възникват, до размер, съответстващ на дела му.

[4] Международни счетоводни стандарти, МСС 28 „Отчитане на инвестициите в асоциирани предприятия“, 1999, изд. „Форком“; Consolidated Supervision, workshop paper, Oct. 19 – 21, 1998, Hungary; Workshop on Consolidation of Banks Accounts and Banking Supervision on Consolidated Basis, May 24 – 28, 1999, Austria.

В европейската практика съществуват **дружества за спомагателна банкова дейност**, които се включват в обхвата на консолидираните финансово-счетоводни отчети и които към момента нямат аналог в страната ни.

Консолидираните финансово-счетоводни отчети обхващат и всички дружества, дъщерни и асоциирани, които са разположени в други страни. В европейската практика съществува деление между страни – членки на Европейския съюз, към които се прилагат общите принципи на консолидацията, като в тези страни до известна степен е постигнато уеднаквяване на отчитането и контрола. Към страните, които не са членки на Европейския съюз, са заложени по-рестриктивни изисквания поради съществуващите различия както в законодателството, така и по отношение на мерките и начините за прилагане на надзорни регулатори за ранно предупреждение.

За по-ефективното прилагане на тези принципи основно място заема обменът на информация между отделните надзорни институции в различните държави. Той се осъществява чрез подписване на двустранни споразумения при равнопоставеност на ефективността на надзорните дейности. В българското банково законодателство съществува изискване за сключване на такъв тип споразумения между отделни държави, засегнати от процеса на консолидация. Необходимо е да бъдат разработени разпоредби, в които да се определи периметърът на обмена на информация и отговорностите на надзорните органи.

Консолидацията може да се извършва по вертикала на структурата на групата, когато в нея са включени отделни подгрупи. Обикновено това са банкови подгрупи, които могат да бъдат определени в рамките на финансова или смесена холдингова компания. Когато съществува подгрупа, чиято майка е кредитна институция, разположена понякога в друга държава, представляваща в същото време дъщерно дружество в рамките на по-голяма банкова група, банката майка на подгрупата се отчита на **подконсолидирана основа.** В този случай местната надзорна институция трябва да изисква от чуждестранното дъщерно дружество да отчита на подконсолидирана основа всички операции, извършени на нейната територия, като една група, а надзорът на консолидирана основа на цялата група ще се осъществява от местната надзорна институция по седалище на дружеството майка.

В обхвата на консолидацията не се включват операциите на

дъщерни и асоциирани дружества с промишлена дейност. Тези съучастия се отчитат като инвестиции на дружеството майка и за надзорни цели се приспадат от капитала на групата, която се отчита на консолидирана основа.

Законодателна основа в европейските страни и у нас

В рамките на Европейската общност е разработена всеобхватна програма от мерки за преодоляване на трудностите, които възникват при развитието на групите, включващи в структурата си банкови и инвестиционни компании. Програмата включва специфични изисквания, свързани с консолидирания надзор и контрола над капиталовата адекватност. Тези изисквания са залегнали при разработването на Базелските правила[5] за ефективен банков надзор, използвани в общността. Разработването на редица документи от Базелския комитет по банков надзор и тяхното непрекъснато изменение и допълнение са продиктувани от поредицата фалити на банкови институции[6] в страните от Г-10, от които по-големи са тези на *Bankhaus Herstatt* през юни 1974 г. и последвалата криза на европейските валутни пазари, Banco Ambrosiano през 1982 г. и последвалият спор между Люксембург и Италия за отговорността на надзорните органи в двете държави и фалита на BCCI през 1991 г., който показа назрялата необходимост от развитие на принципите на консолидирания надзор.

Чрез дейността си Базелският комитет по банков надзор определя широки надзорни изисквания и насоки за най-добрата банкова практика, като отделните надзорни органи в страните членки ги прилагат чрез националните си системи и закони.

Основни документи, свързани с надзора на консолидирана основа са:

• Базелски конкордат (ревизиран) от 1983 г. и последващите допълнения в него;

• „Основни надзорни методи“ – сборник документи, издадени от Базелския комитет за банков надзор;

• Директиви на Европейския съюз: Директива 77/780/EEC за съгласуване на закони, подзаконови нормативни актове и адми-

[5] Основни надзорни методи. Сборник документи, издадени от Базелския комитет по банков надзор. Т. I, 1997, БНБ.

[6] Walker, George. Consolidated Supervision, Butterworths Journal of International Banking and Financial Law/February, 1996.

нистративни разпоредби относно дейността на кредитните институции; Втора директива 89/646/ЕЕС, изменяща Директива 77/780/ЕЕС; Седма директива 83/349/ЕЕС (споразумение за консолидираните сметки), Директива 83/350/ЕЕС за надзор върху кредитните институции на консолидирана основа, отменена от Директива 92/30/ЕЕС за надзор върху кредитните институции на консолидирана основа и наскоро публикуваната кодифицирана Директива 2000/12/ЕС от 20 март 2000 г. относно предприемане и извършване на дейност от кредитни институции.

Основният Базелски принцип за осъществяване на контрол от дружеството майка е развит за първи път в Директива 77/780/ЕС. Въпреки това необходимостта от надзор на консолидирана основа не се дефинира ясно до излизането на първата Директива за надзор върху кредитните институции на консолидирана основа от 1983 г.

Тя се появява като логично следствие от фалита на *Banco Ambrosiano* и наложилите се промени в Базелския конкордат (издаден за първи път през 1975 г.). Тази директива се отнася само за група дружества, управлявани от кредитна институция, т. е. дружеството майка е кредитна институция. Чрез директивата се прави опит да се поставят основите на надзора на консолидирана основа, като се определят видовете контрол и особено този при вертикалните съучастия на кредитната институция в други финансови институции. След развитието на финансовия пазар и появата на нови по-сложни структури се налага ревизиране на вече съществуващата директива. Създава се необходимост от разширяване и на обхвата на надзора на консолидирана основа в областта на отчитане и управление на пазарния риск. След фалита на BCCI от 1991 г. бе приета втората Директива за надзор на консолидирана основа от 1992 г., в която групите – обект на консолидиран надзор, се управляват от финансови холдингови компании или смесени холдингови компании. Директива 92/30/ЕС за надзор върху кредитните институции на консолидирана основа представя специфични правила, свързани с обхвата и методите за надзор на консолидирана основа, там, където има международни групи, включващи две или повече кредитни или финансови институции. Директивата дава възможност за отчитане на пазарния риск при надзора на консолидирана основа, както и да се определят отговорностите и компетенциите на отделните надзорни институции в случаите, когато групата е разположена в няколко

държави и когато дружеството майка не е кредитна или финансова институция. По този начин чрез Директива 92/30/ЕЕС се постига разширяване на принципите и обхвата, заложени в Директива 83/350/ЕЕС.

Областите, в които се прилага надзорът на консолидирана основа, са платежоспособност на групата, адекватност на собствените средства във връзка с отчитането на пазарния риск, контрол на големите експозиции и квалифицираните съучастия в нефинансовите предприятия.

В българското законодателство надзорът на консолидирана основа е разработен предимно като надзор на консолидирана основа на банкова група (Наредба № 12 на БНБ за надзор на консолидирана основа, ДВ, бр. 62 от 28 юли 2000 г.). Стеснението обхват по отношение на обектите на консолидиран надзор е поради недостатъчно развитата икономическа практика, частичното приложение на основни дефиниции и разпоредби, свързани, от една страна, с определяне на структурата, подлежаща на консолидиран надзор, и, от друга страна, липсата на възможност за обмен на информация между отделни надзорни органи както в страната, така и извън нея. По отношение на областите, които се наблюдават на консолидирана основа, също са заложени ограничения, като се акцентира най-вече върху платежоспособността на банковата група и контрола върху концентрацията на големите експозиции. Отново причина за стеснения обхват е по-слабо развитият финансов пазар в страната и липсата на рискове, които са присъщи за пазарните икономики, например отчитането на пазарния риск.

Непрекъснатото развитие на икономическата среда и навлизането на чуждестранен капитал в страната, вследствие на което на финансовия пазар възникват чуждестранни дъщерни и асоциирани дружества, а също и смесени дружества от типа *joint venture* необходимостта от разработването на надзора на консолидирана основа се засилва.

Цели и задачи

Основната цел на надзора на консолидирана основа е да се осигури цялостен контрол над банките (кредитните институции), които посредством своите дъщерни и асоциирани дружества извършват дейност на територията на различни държави. Ако тези

дружества не са обхванати се създава възможност за нарушаване на конкуренцията с местните банки. Стремежът е да се създадат приблизително сходни условия за прилагане на единни регулатори както към местните кредитни институции, така и към международните, а също и прилагане на сходни надзорни мерки и контрол.[7]

Посочените надзорни цели и прилагането на принципите на консолидиран надзор се осъществяват в рамките на Европейския съюз. Този процес се развива и постепенно ще обхване и държавите извън общността. Към настоящия момент прилагането на принципите на консолидирания банков надзор може да се осъществи чрез сключване на двустранни споразумения между отделните държави, на които кредитни институции или техни дъщерни дружества извършват дейност на българския финансов пазар. Този етап на координиране ще спомогне за премахване на първоначално съществуващите пречки при обмена на информация между отделните надзорни органи, от една страна, и ще спомогне за преодоляване на някои несъответствия при прилагането на основните регулации в българската банкова практика, от друга. Изпълнението на основните цели на надзора на консолидирана основа се свежда до определяне на икономическите субекти, формиращи финансови групи от национално значение, тяхното контролиране на консолидирана основа и прилагането на единни регулатори и сходни мерки за надзор към банките, представляващи част от международна структура.

Изискванията за надзор на консолидирана основа дават възможност за по-точна оценка на финансовото състояние на банката (кредитната институция) и измерване на капитала ѝ, като се отчитат и вътрешногруповите връзки и задължения между отделните участници. По този начин чрез комбиниране на балансите на всички дружества, контролирани пряко или косвено от банката майка, е възможно да се определи една обща картина на капиталовата адекватност на групата, като се избегне двойното отчитане на капитала и се проследи приложението на основните надзорни регулатори. Данните от извършената консолидация трябва да се използват заедно с финансово-счетоводната информация, получена на индивидуална основа за всяка банка като

[7] Директива на Съвета на ЕО 92/30/ЕЕС от 6 април 1992 г. относно надзора върху кредитните институции на консолидирана основа, Official Journal L110, 28.IV.1992, с. 0052 – 0058.

част от групата.

Въпреки че надзорът на индивидуална основа, прилаган към отделни дружества в една обща група, не съдържа достатъчно изчерпателни данни и затруднява извършването на ефективен надзор върху финансови групи или холдинги, консолидираният надзор **не може** да замести надзора на индивидуална основа.

Принципи и методи

Правилното извършване на надзор на консолидирана основа изисква да бъдат спазени голям брой условности с цел уеднаквяване на счетоводната политика. Необходимо е едни и същи правила да бъдат прилагани както към банковата група, така и към индивидуалните банки, за да се осигури еднакво отношение към всички финансови институции без оглед на организационната структура на групата.

Във връзка с осъществяването на банков надзор на консолидирана основа се прилагат някои основни принципи, по-важните от които са:

1. Всяка кредитна институция (банка), която участва в друга кредитна институция (банка) или финансова институция, подлежи на надзор въз основа на консолидиране на финансовото ѝ състояние с това на другите участници в групата. Този принцип е основен в директивата за надзор на кредитните институции на Съвета на Европейските общности (Директива 92/30/ЕЕС).
2. Всички международни банкови групи и международни банки трябва да бъдат надзиравани от местните надзорни институции в страната, която е лицензирала дружеството майка и са упълномощени да извършват консолидиран надзор. Към този принцип се отнася и принципът, че надзорът над чуждестранен банков клон е изцяло отговорност на дружеството майка.
3. Надзорните органи трябва да притежават правото и властта да събират информация от своите задгранични банкови или финансови дружества или банкови групи, за които се явяват местна надзорна институция.
4. Надзорът върху чуждестранно банково дружество е съвместна отговорност между местния надзорен орган в страната, където е лицензирана банката майка и надзорния

орган – домакин на дъщерното дружество.

Във връзка с този принцип ако надзорният орган домакин определи, че някои от използваните минимални стандарти за него са незадоволителни, към чуждестранното банково дружество могат да бъдат приложени по-рестриктивни мерки, за да се изпълнят изискванията за ранно предупреждение.

При прилагането на основните принципи за банков надзор на консолидирана основа са необходими (законово установени) консултации и контакти между надзорния орган домакин и местния надзорен орган. Между двата надзора трябва постоянно да протича информация за състоянието на чуждестранната банка или клон.

Съществуват **три основни метода**[8] за извършване на консолидацията, които се прилагат в зависимост от процента на контрол, упражняван от дружеството майка. В нашата практика те ще навлизат постепенно. Сега проблемите са свързани с тяхното разработване, тъй като са налице условия за прилагането им.

Методът на ***пълната консолидация*** се прилага към кредитните и финансовите дружества, които са дъщерни дружества и са под контрола на дружеството майка. Този метод позволява да се наблюдават активите и пасивите, върху които майката упражнява пълен контрол, както и резултатите от дейността и изменението на финансовото състояние на групата.

Пропорционалната консолидация е алтернатива на пълната консолидация. В този случай процентът от активите и пасивите съответства на дела на инвеститора в дружеството. Този метод е подходящ за съвместни дружества от типа *joint venture*, където две или повече банки са включени в управлението на едно дружество и заедно споделят отговорностите и рисковете. Общото за всички съвместни предприятия, спрямо които се прилага пропорционалната консолидация, е наличието на договорно споразумение между съдружниците и упражняването от тях на съвместен контрол.

Във всички останали случаи на съучастия се използва ***капиталовият метод***[8]. Той е развитие на първите два метода в отговор на несъответствията, които възникват при отчитане на дългосрочни инвестиции в асоциирани дружества или дружества, чиято

[8] MacDonald, Ronald. Consolidated Supervision, 1998, Handbooks in Central Banking; Международни счетоводни стандарти, 1999, изд. „Форком“.

дейността е несъвместима с основната дейност на дружеството майка. Традиционно такива инвестиции се отразяват в баланса по тяхната себестойност, а доходите от тях – само на базата на получени дивиденти. Този метод е много подходящ и при отчитане на съучастията на банката в небанкови (например застрахователни) и нефинансови дружества.

Понякога под понятието ***„соло консолидация“***[9] се разбира индивидуален надзор спрямо отделна кредитна институция. В действителност консолидираният надзор на соло база се прилага в случаите, когато дадено дъщерно дружество – самостоятелно юридическо лице, се третира като неразделна част от дружеството майка. Този начин на отчитане и надзор се прилага при определени обстоятелства. В английската практика соло консолидацията се прилага при следните условия:

1) банката майка притежава най-малко 75% от дъщерното дружество;
2) дъщерното дружество е или изцяло финансирано от банката майка и няма депозити от граждани, или всички негови активи представляват вземания на банката майка;
3) управлението на дъщерното дружество е под директен контрол от страна на банката майка;
4) общата инвестиция на банката майка в соло консолидираното дъщерно дружество не надвишава нейната чиста стойност.

Банките, които са обект на соло консолидация и са дружество майка, изготвят консолидирани отчети за своите дъщерни и асоциирани дружества по гореспоменатите методи.

Обекти на консолидиран надзор

Съществуването на различни форми на корпоративно групиране, към които банките принадлежат, и практическите трудности, възникващи при надзора върху тези банки, определят необходимостта от дефиниране на обектите на консолидирания надзор. Получаването на ясна и точна информация за структурата на групата и включените в нея отделни дружества е един от основните проблеми при осъществяването на предварителен контрол. По-

[9] MacDonald, Ronald. Consolidated Supervision, 1998, Handbooks in Central Banking; Международни счетоводни стандарти, 1999, изд. „Форком“.

някога е много трудно, при условие че не е докладвана свързаност между дружества, да се определи групата и елементите (дружествата), които подлежат на надзор на консолидирана основа. Съществуват обаче две основни дефиниции, обхващащи почти всички разновидности на структурите, спрямо които се упражнява надзор на консолидирана основа. Това са всяка кредитна институция (банка), имаща друга кредитна или финансова институция за дъщерно дружество или със съучастия в такива институции, и всяка кредитна институция с дружество майка – финансова холдингова компания.

Основните обекти на надзор на консолидирана основа са:

Банкова група, която съществува, когато всяка банка създаде или придобие дъщерно дружество или има съучастие със същия предмет на дейност в друго дружество.

Като основно правило банките се насочват за инвестиране в други компании само поради факта, че те извършват банкови или финансови дейности, например търговия с ценни книжа, лизинг или просто преводи (трансфер) на пари. По този начин се формира банкова група с широк спектър от банкови и финансови дейности, която в някои случаи се управлява от холдингова компания.

В националното ни законодателство понятието „банкова група“ е дефинирано като банкова група, в която банка има за дъщерни дружества само други банки и/или небанкови финансови институции (чл. 4, ал. 2 от Закона за банките). Трябва да се отбележи, че понятието „банкова група“ не се използва в Директива 92/30/ЕЕС, като банката (кредитната институция) се разглежда във връзка с нейните вертикални и хоризонтални връзки в различните структури.

Вторият по значение обект на надзор на консолидирана основа е финансовата холдингова компания. **Финансовата холдингова компания**[10] е финансова институция, чиито дъщерни предприятия са или изключително, или предимно кредитни/финансови институции, като най-малко едно от тези дъщерни подразделения е кредитна институция (банка).

За приложението на тази дефиниция в българското банково

[10] Директива на Съвета на ЕО 92/30/ЕЕС от 6 април 1992 г. относно надзора върху кредитните институции на консолидирана основа, Official Journal L110, 28.IV. 1992, с. 0052 – 0058.

законодателство трябва да се определи понятието „финансова институция“. В действащия Закон за банките съществува дефиниция на „небанкова финансова институция“, която частично покрива съдържанието на „финансова институция“.

Разновидност на холдинговото дружество е холдинговата компания със смесена дейност. **Холдинговата компания със смесена дейност**[11] е предприятие майка, различно от финансова холдингова компания или кредитна институция, чиито дъщерни предприятия включват най-малко една кредитна институция.

Най-сложната структура, която съществува на финансовия пазар, е финансовият конгломерат.

Финансов конгломерат[12], често срещан в литературата като хетерогенен финансов конгломерат, е икономически субект, чийто бизнес е предимно финансов, и чиито банкови, застрахователни и инвестиционни предприятия са в сферата на надзорно регулиране.

Основното значение на понятието финансов конгломерат се свежда до това, че тази група упражнява различни видове финансови дейности, извършващи се традиционно и по закон поотделно, които не са обект на едни и същи регулации в много държави. Следователно може да се приеме, че в страни, където е позволено банките да притежават собствени инвестиционни дружества, банковите групи попадат в обхвата на тази дефиниция и между надзора на финансови конгломерати и консолидирания надзор на банкови групи съществува известно припокриване.

В литературата съществуват три типа финансови конгломерати:

1) конгломерати с предимно банкова дейност (повече от 80%) – обект на банков надзор;
2) конгломерати с предимно застрахователна дейност (повече от 80%) – обект на застрахователния надзор; и
3) смесени конгломерати – към тях се прилага комбиниран банков и застрахователен надзор.

В конгломерата като нерегулирани отново остават производс-

[11] Joint Forum on Financial Conglomerates, Supervision of Financial Conglomerates (prepared by Tripartite Group of Banking, Securities and Insurance Regulators), February 1999.
[12] Ibidem.

твените дейности.

В българското национално законодателство не е дефинирано понятието „конгломерат“, съответно „финансов конгломерат“.

Разгледаните обекти на надзора на консолидирана основа са изградени от т. нар. елементи. Това са дружества, в които предприятието майка има различни по размер съучастия. Елементите не включват банковите клонове, които са оперативни предприятия и нямат отделна законова регламентация, т. е. те са неразделна част от кредитната институция (банката майка).

Един от основните елементи е дъщерното дружество. **Дъщерно дружество**[13] по смисъла на чл. 1, ал. 1 от Директива 83/349/ЕЕС е всяко дружество, върху което по мнението на компетентните органи предприятието майка упражнява ефективен контрол. Всички дъщерни дружества на дъщерни дружества се считат също за дъщерни дружества на предприятието майка.

Дефиниция на дъщерно дружество в националното ни законодателство е посочена в Търговския закон (чл. 277, ал. 3), на която се позовава и Законът за банките. Съществува разликата в съдържанието между дефиницията на дъщерно дружество от Директива 92/30/ЕЕС и тази в българското законодателство.

Не се покрива и понятието **„участие“**[14], което в Директивата за надзор върху кредитните институции на консолидирана основа е определено като „собствеността, пряка или косвена, върху 20% или повече от капитала, или правото на глас в едно предприятие“. От друга страна съществува различие и между дефинициите на „дъщерно дружество“, използвани в МСС 27 „Консолидирани счетоводни отчети и отчитане на инвестициите в дъщерни предприятия“ и НСС 27 „Консолидирани счетоводни отчети“.

Елемент на дадена група може да бъде асоциираното дружество. Под **асоциирано (присъединено) дружество**[15] се разбира дружество, в което дружеството майка има пряко или косвено участие в капитала или в правото на глас при управлението в размер на 20% и повече, ако дружеството майка не го контролира изцяло.

Друг елемент, участващ в структурата на обектите на консолидиран надзор, е **дружество за спомагателни банкови услуги**[16]

[13] Директива на Съвета на ЕО 92/30/ЕЕС от 6 април 1992 г. относно надзора върху кредитните институции на консолидирана основа, Official Journal L110, 28.IV.1992, с. 0052 – 0058.

[14, 15, 16] Пак там.

Това е предприятие, чиято основна дейност включва собствеността върху или управлението на имущество, управление на услуги по обработката на данни или всяка друга подобна дейност, която се явява спомагателна по отношение на основната дейност на една или повече кредитни институции.

Последните две понятия – асоциирано дружество и дружество за спомагателни банкови услуги – не са дефинирани в националното ни банково законодателство, а това затруднява прилагането на надзорните регулации спрямо тях.

По отношение на обхвата на надзора на консолидирана основа обектите могат да бъдат разделени на регулирани и нерегулирани. Регулирани са обектите, към които се прилагат надзорните регулации. Тъй като обхватът на надзора на консолидирана основа в националното ни законодателство е стеснен, то и регулираните обекти се разглеждат ограничено. Регулирани са банковите групи, подгрупите, които съществуват в рамките на финансовия холдинг, и банките, които имат съучастия в дружества, различни от банки и финансови (небанкови) дружества. Всички останали формирования са извън правомощията на надзорния орган и законово регламентирания обхват на консолидирания надзор[17].

Количествен и качествен надзор на консолидирана основа[18]

Оценката на дадена група може да се разглежда в количествен и в качествен аспект.

Консолидираните надзорни отчети за ранно предупреждение позволяват да се анализира финансовото състояние на банкова група или финансов холдинг чрез количествени показатели. Количествената оценка, която включва показателите за адекватността на капитала, качество на активите, концентрация на големи и свързани експозиции, измерване и управление на пазарния риск, определя финансовата позиция на банката и банковата група.

Адекватността на капитала на банките се регулира във връзка с кредитния риск чрез системата на рисковите тегла. Определя

[17] Закон за банките, ДВ, бр. 52 от 1 юли 1997 г., чл. 4, ал. 1.

[18] Ronald MacDonald, Consolidated supervision of banks, 1998 , Handbooks in Central banking; Financial Services Authority (FSA), A Guide to banking supervision policy: Notes, 2000.

се общо съотношение на платежоспособност (според Базелските стандарти минимум 8%, а в националното ни законодателство – 12%), което трябва да се спазва като изискване както на неконсолидирана основа за всяка банка поотделно, така и на консолидирана основа за цялата група.

Друг основен количествен показател, посредством който се определя финансовото състояние на банковата група, е контролът върху големите експозиции. Наблюдението и контролът върху отделните големи експозиции е най-важният аспект на консолидирания надзор. Определянето на лимитите на отделна голяма експозиция към един клиент или свързани лица на групово ниво не се различава от този, установен за отделна банка. Рискът от концентрация трябва да се следи внимателно и при експозициите, които възникват от свързани с банката лица, каквито са мажоритарните собственици, директорите и техните роднини, а също и отделни дружества, които са под контрола и управлението на акционери и други свързани с банката лица.

Количествен показател са и установените лимити по отношение на финансовите дълготрайни активи и квалифицираните участия. В нашето законодателство съществуват разпоредби, лимитиращи размера както на финансовите дълготрайни активи, така и на квалифицираните участия. Тези ограничения обаче не са включени в обхвата на надзора на консолидирана основа в нашата практика и следователно не могат да бъдат регулирани. В тази връзка е необходимо по-нататъшното разработване и включване на този показател с изчисляване на групово ниво.

Измерването и управлението на пазарния риск във връзка с капиталовата адекватност на банките е следващият основен количествен показател. Това е една от областите, която предстои да бъде развита, тъй като все още не се надзирава на индивидуална (неконсолидирана) основа.

Качественият аспект на надзора на консолидирана основа се фокусира върху общия бизнес, контрола, организацията и управлението на групата. Разглежда се също и общата бизнес среда на банката и на основните участници в групата, като се изчисляват рискове, които са различни от тези при количествената оценка на групата. Основните рискове за качествена оценка при надзора на консолидирана основа са:

- **операционен риск**, който включва всяко неизпълнение или нарушение на вътрешните правила и процедури на групата,

наличие на неадекватна информационна система, възможни измами, форсмажорни обстоятелства и други подобни рискове от операционен характер;
- **законов риск**, който възниква при сключване на споразумения и договори с отделни контрагенти на банката;
- **риск от репутация**, който обхваща грешки от неизпълнение на клиентски нареждания, а също и допуснати грешки и несъответствия при прилагане на регулации и законодателство, нарушение при разположението на активите на групата.

Организацията на дейността и управлението на групата често не съответства на законово изградената структура. Основен проблем пред надзорната институция е как органите на управление на групата организират едновременно и дейността, и контрола над нея, а също и перспективите ѝ за развитие. В зависимост от това в групата може да съществуват едно или няколко дружества, които да извършват основната дейност и да акумулират основните доходи на групата. Тези дружества могат да играят първостепенна роля при разпространението на основните продукти на групата на международно (глобално) или на регионално ниво, дори и в отделен географски район.

За ефективното извършване на надзор на консолидирана основа чрез качествена оценка на групата е необходима информация за организацията и управлението както за групата като цяло, така и за отделните дружества, участващи в нея.

Основен проблем се явява събирането и достоверността на информацията за отделните дружества в групата, подлежаща на надзор на консолидирана основа.

Основни рискове, наблюдавани на консолидирана основа

Надзорът на консолидирана основа се осъществява по отношение на всички рискове, които възникват при извършване на банкова и/или инвестиционна дейност.

От надзорна гледна точка рискът е възможността очаквани и неочаквани събития да окажат неблагоприятно влияние върху капитала или доходите на банката. Оценяването на рисковете в отделните включени в общата структура дружества поотделно и заедно на консолидирана основа, представя общия профил на

групата като една глобална организация.

Определянето на рисковия профил на банката като част от дадена структура е основна задача на надзора на консолидирана основа. Обикновено това се осъществява чрез измерване на количествените показатели, разгледани по-горе.

Кредитният риск е основен финансов риск, който включва оценката на качеството на активите и концентрацията на експозиции, които пък от своя страна определят платежоспособността на кредитната институция. При извършване на анализ на групата на базата на консолидирани надзорни отчети може да се установи, че рисковият профил и качеството на активите за отделна банка могат да бъдат коренно различни от тези за групата като цяло. От друга страна, индикаторите за диверсификация на кредитния риск също могат да бъдат повлияни от размера на различните експозиции на индивидуалните дружества срещу тези на групата посредством относителния размер на собствените средства на дружествата.

Следователно общата структура на активите, които са носители на кредитен риск, и оценката на вида дейност на банката ще се различават винаги, когато групата е оценена като цяло срещу индивидуалната оценка на банката.

Определянето на капиталовата адекватност на групата е основен количествен показател, пряко свързан с оценката на кредитния риск и неговата концентрация. При изчисляването на консолидирания показател за платежоспособност (капиталова адекватност) активите на групата нарастват, докато собствените средства намаляват, т. е. рисковете се увеличават, а нетната стойност на капитала спада. Фактически при този процес активите са сумирани (обобщени), докато капиталът и резервите са компенсирани. В българската нормативна база съотношението за платежоспособност на банките (капиталова адекватност) подлежи на наблюдение и оценка на консолидирана основа.

При осъществяването на консолидиран надзор местният надзорен орган на банката майка поема главната отговорност за контрол над системата за ликвидност в банковата група. Трябва обаче да се отбележи, че пълна консолидация не може винаги да се приложи при изчисляването на ликвидност поради различията в местните регулации и пазарните ситуации и различията във времевите зони и валутите. Надзорният орган – домакин на дъщерното дружество има задължението да информира незабав-

но местната надзорна институция на банката майка за всяко посериозно ликвидно нарушение на нейния клон или дъщерно дружество.

Консолидацията влияе (променя) матуритетната структура на баланса на банката. Наблюдението, измерването и контролът върху лихвения риск изискват едно широкогрупово обсъждане на характеристиките на лихвения процент и матуритетите на активите и пасивите в групата. В банковата ни практика измерването и отчитането на лихвения риск на индивидуално и групово равнище предстои да бъде разработен.

Всички дружества, включени в обхвата на консолидацията, за надзорни цели трябва да притежават адекватен механизъм за извършване на вътрешен контрол както в рамките на групата, така и като индивидуални участници в нея. Вътрешният контрол на групата, начините и механизмите, с които той се осъществява, е част от качествената оценка на финансовото ѝ състояние.

Оценката и управлението на пазарния риск в цялата структура е един от основните въпроси при определяне на финансовото състояние на групата на консолидирана основа. В много случаи съществуването на различен пазарен риск в отделните части на групата затруднява определянето и управлението на този риск в групата като цяло. Оценката и управлението на пазарния риск са пряко свързани с определянето на адекватността на капитала на групата. Тези сравнително сложни технически механизми за оценка на пазарния риск, както и недостатъчно развития пазар на ценни книжа в България определят неговото частично приложение при банковите регулации. Все още не е дефинирано съдържанието на търговския портфейл, а оттам и подходите и начините за оценка на пазарния риск.

Състояние и проблеми на надзора на консолидирана основа в България

Непрекъснато засилващата се конкуренция на световните финансови пазари и развитието на процеса на глобализация разширяват приложението на консолидацията за надзорни цели. Променят се и се разширяват надзорните регулатори за ранно предупреждение. Сложните финансови структури оказват съществено влияние при развитието на банките и налагат прилагането на един всеобхватен надзор, осъществяван чрез сложни модели за

определяне на риска и за комплексна оценка на финансовото състояние на групата. Безспорно тези важни икономически процеси засягат и българската икономика. Въпреки че в съвременния етап на развитие на националната икономика липсва практика в областта на надзора на консолидирана основа, необходимостта от него нараства. Това се обуславя най-вече от бързото навлизане на чуждестранен капитал в страната, от придобиването на големи пакети акции в различни финансови дружества и създаването на нови по структура стопански субекти. Наред с появата на сложните икономически структури, обединяващи различни дейности, важно значение придобива навлизането на европейската практика в нашата икономика.

Проблемите, които възникват у нас като следствие от проявлението на световната тенденция към сливания и вливания, могат да се групират в две основни насоки. Първата по значение е създаването на възможност за достъп до информация, която би осигурила прозрачност на финансовото състояние за отделните части (дружества) в обектите на консолидирана група. Развитие на обхвата на надзора на консолидирана основа по отношение на областите, в които се прилагат регулаторите за ранно предупреждение, е вторият по значимост проблем при разработването на този способ.

Други проблеми с първостепенно значение са липсата на някои основни дефиниции, използвани при разработването на надзора на консолидирана основа и тяхното частично приложение по отношение на съдържанието им. Това затруднява осигуряването на законова рамка на надзора, когато той се извършва на консолидирана основа.

Съществен проблем в разглежданата област е непрекъснатият обмен на информация между компетентните надзорни органи по седалището на чуждестранните банки и надзорния орган – домакин на техните дъщерни дружества. Така например специфични банкови събития в чуждестранната банка майка могат да застрашат дейността на клоновете и дъщерните ѝ дружества в България. Това би могло да включва проблеми с платежоспособността, ликвидността, управлението на рискове, репутацията и др. Преодоляването на този проблем е свързан с размяната на информация между местния надзорен орган на страната, в която е лицензирана банката, и надзорния орган в страната – домакин на дъщерното дружество.

По отношение на консолидацията и надзора на консолидирана основа понастоящем практиката в отделните държави – членки на ЕС, и в тези, които кандидатстват за членство в Европейския съюз, се различава. Унифицирането на тази практика очевидно е сложен процес, който не се очаква да приключи в близко бъдеще.

За нашата страна е необходимо разработване и усъвършенстване на надзорните процедури с оглед ефективното приложение на основните принципи на консолидацията, както и подобряване на техниките за надзор на консолидирана основа.

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Real Wage Rigidity and the Monetary Regime Choice

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Abstract. This paper presents theoretical and empirical analyses of the labor market in the framework of Bulgaria's monetary regime. The theoretical section examines the relationship between labor market and monetary regime, analyzes wage integration with exchange rate dynamics and selected major economic identities. Sources of labor market rigidity in a transition economy are reviewed. The empirical section includes, inter alia, construction of real wage rigidity index (study of its dynamics and comparison with EU countries), econometric simulation of real wage flexibility through VAR models, identification of sectors with rigid and flexible wages through a panel model. The theory of optimum currency areas is briefly reviewed from a labor market perspective and analysis of the relation between Bulgaria's future integration into the European Union and the state of the labor market is made.

Резюме. Изследването се състои от теоретичен и емпиричен анализ на пазара на труда в България от гледна точка на паричния режим. Теоретичната част обхваща изучаване на връзката между пазара на труда и паричния режим, анализ на интегрирането на заплатите в динамиката на валутния курс, както и в някои основни макроикономически тъждества. Представени са източниците на негъвкавост (ригидност) на пазара на труда при икономика в преход. Емпиричната част съдържа построяване на индекс на ригидност на реалните работни заплати (изучаване на неговата динамика и сравняването му със страните от ЕС), иконометрична симулация на гъвкавостта на реалните работни заплати чрез VAR-модели, определяне на отраслите с гъвкави и ригидни заплати чрез панелен модел и др. Направен е и кратък преглед на теориите за оптималните парични зони от гледна точка на трудовия пазар, както и анализ на връзката между бъдещото интегриране на България в Европейския паричен съюз и на състоянието на пазара на труда.

Contents

Importance and Structure of the Study

In mid-1997 the monetary regime in Bulgaria was radically changed from discretionary central bank and floating exchange rate to currency board arrangement and fixed exchange rate. Discussion on Bulgaria's accession strategy to the European Monetary Union and prospective introduction of the euro[1] logically raises the issue of the necessary preconditions to facilitate integration processes. It is important to consider institutional changes in the Bulgarian monetary regime in the context of labor market and its dynamics, which has been given little attention so far. At the same time, the EU and the other candidate countries have been actively discussing labor market reforms and liberalization in the context of central bank, monetary policy, exchange rate regime and the introduction of the single European currency (see e.g. *Calmfors, L.* (1998, 1998a); *Viñals, J., J. Jimeno* (1998); *Berthold, N., R. Fehn, W. Thode* (1999); *Soltwedel, R., D. Dohse, C. Krieger-Boden* (1999); *Ferenczi, B.* (1999); *Cukierman, A., F. Lippi* (1999, 1999a); ECB (2000); BIS (2000)). Recently it has been argued that rigid labor market is critical to both EU member countries and candidate countries. Furthermore, the ECOFIN report of 7 November 2000 on the compatibility of exchange rate regimes of EMU candidates states: "Fixed exchange rate regimes, including Currency Board arrangements, can be sustainable in small and open economies with sufficient wage and price flexibility, strict fiscal discipline and sound financial system."[2]

The main task of the study is to analyze the relation between the monetary regime and the state of the labor market in Bulgaria. Although labor market rigidity is not completely reduced to real wage rigidity, the latter is a major issue in the theoretical and practical debate. Therefore, we focus on real wage behavior.

The paper is structured as follows: section two provides a brief analytical interpretation of the relation between labor market flexibility (especially real wage flexibility) and monetary regime rigidity. It focuses on the role of labor market flexibility for smooth currency board operation and credibility. Section three reviews the sources of labor market rigidity, especially real wage rigidity in a transition economy. Empirical study of labor market rigidity is presented in section four. A real wage rigidity index is constructed applying the methodology of

[1] In actual fact, sooner or later, Bulgaria will introduce the euro (we are concerned here only with the time dimension).

[2] *ECOFIN* (7.XI.2000).

Layard, R., S. Nickell, R. Jackman (1991), updated by *Viñals, J., J. Jimeno* (1996, 1998) and its application to developed countries. The relation between unemployment and real wages and their impact on fiscal reserves, reserve money and interest rates are examined. A hypothesis of the relation between state sector and private sector wages is stated. Section five deals with the relation between euro adoption and labor market. The final section concludes and makes some practical recommendations for labor market liberalization as a precondition for Bulgaria's integration into EMU and its transition to the single European currency.

The Labor Market and the Monetary Regime Choice

The relation between labor market and exchange rate regime[3] is two-way.[4] On the one hand, the state of the labor market (i.e. degree of flexibility) is a major precondition for monetary regime choice and a factor in the institutional change of money. On the other hand, imposition of a monetary regime (softer or harder) has a reverse effect on the degree of labor market flexibility. Given this effect, the choice of a monetary regime can be seen as instrumental in enhancing real economy flexibility. Traditionally, it is argued that a more flexible labor market allows for the choice of a firmer monetary regime (optimum currency area theory). A most recent hypothesis argues that the more rigid the monetary regime is, the stronger is the flexibility of the labor market (*Borjas, G.,* 2000).[5]

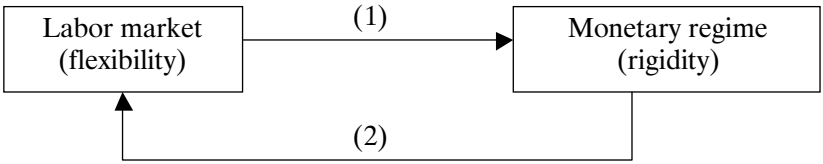
[3] We examine the currency board as a formal part of the institutional system of money. Following the standard definition of institutional system (*North, D*., 1990), we assume that the institutional system of money (i.e. money supply and demand) can be reduced to three components: monetary regime (combination of formal rules), informal rules and a mechanism for enforcement of formal and informal rules. Informal institutions play key role in the overall structure of the institutional system. In this paper, we will consider only formal rules (the currency board).

[4] See the schematic presentation of the relation between monetary policy (discretionary bank) and trade union claims in *Nenovsky, N.* (1991), and the empirical testing of the relation between unemployment and inflation in European countries in *Nenovsky, N., K. Schram, M. Ziad* (1993/1994).

[5] *Borjas, G.* (2000) proves empirically the relation by examining the relation between labor market and monetary regime (reduced to floating, fixed exchange rate or dollarization), using Mexico as an example.

Figure 1

LABOR MARKET AND MONETARY REGIME



The major problem in the relation between labor market (LM) and monetary regime stems from the existing lag between (1) and (2), where a rise in unemployment may tempt into higher inflation and devaluation, leading eventually to a collapse of the rigid monetary regime (i.e. transition to a flexible one), unless structural measures for enhancing LM flexibility are taken. Hence the need for parallel LM liberalization at hard monetary regime introduction, which, in turn, would lead to an even harder monetary regime. In this line of reasoning the hypothesis of the two spiral-like multi-equilibrium dynamics of the monetary regime – LM relation in both directions (hard peg —> flexible LM and soft peg —> rigid LM) can be derived.

In mainstream macroeconomics, the impact of LM on the monetary regime can also be derived from the *monetary regime credibility problem*. The more rigid the LM, the higher the equilibrium level of unemployment and the graver the problem with monetary authorities' credibility. In this situation, inflation also increases due to monetary authorities' strongly pronounced time inconsistency – they would benefit to a greater extent from devaluation and monetary expansion.[6] The credibility issue is even more critical under a fixed exchange rate regime, especially currency board arrangement, which imposes tight constrains on devaluation. Therefore, LM becomes crucial to currency board stability.

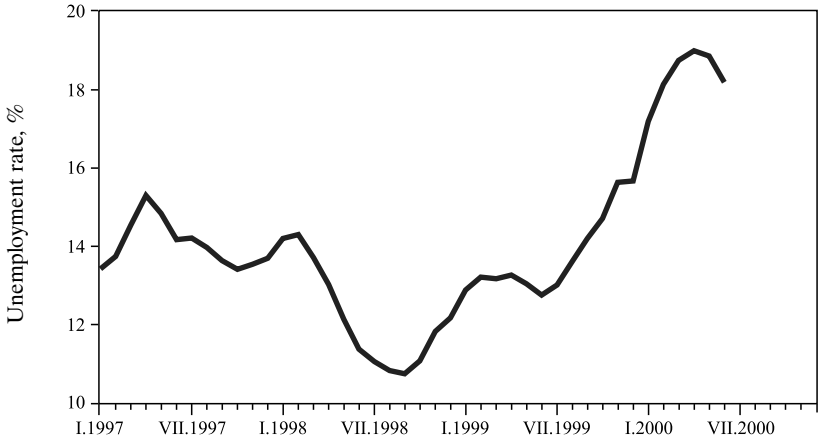
Why is this so? For simplicity, we reduce *the channels through which the economy adjusts to four*: exchange rate, labor market, fiscal policy, and monetary policy. The currency board regime leaves only fiscal policy and LM flexibility. According to the empirical research in *Berthold, N., R. Fehn, E. Thode* (1999) for EU countries, the more rigid

[6] According to some new studies, real wage flexibility, unemployment, the degree of syndication, and the manner of wage setting should be taken into consideration in conducting monetary policy and in establishing the optimum contract of the central bank (*Cukierman, A., F. Lippi, 1999, 1999a, Lawler, P.,* 2000).

the real wages are, the higher are the budget deficit and domestic debt. Since fiscal policy under a currency board is constrained by the requirement to maintain fiscal equilibrium so as not to threaten the fixed exchange rate (through depletion of forex reserves), LM flexibility becomes the major substitute of exchange rate movements. It can be reduced to flexibility of volumes – labor force dynamics (N), and price flexibility – real wage dynamics. If real wages (W/P) are flexible, unemployment is absorbed and does not threaten the fixed exchange rate. Otherwise (as is in most cases), unemployment becomes a major threat to currency board stability. Chart 1 illustrates an upward trend in unemployment rate after currency board introduction in mid-1997.

Chart 1

UNEMPLOYMENT DYNAMICS
(JANUARY 1997 – JUNE 2000)



In their game model of currency board credibility,[7] *Rivera-Batiz, L., A. Sy* (2000) assume that monetary authorities face the trade-off between *devaluation and unemployment* and a deviation from the natural rate of unemployment is seen as an argument in the government loss function.

[7] Publications attempting to model the currency board through the theory of games as a kind of continuation of game models for analyses of fixed exchange rates (*Obstfeld, M*., 1996) are few. Apart from the cited model of *Rivera-Batiz, L., A. Sy* (2000), *Ho, C.* (1999) also attempts a game model of an attack against CB, using the bank panic model in the tradition of *Diamon – Dybvig*. The idea of modeling an attack against CB was presented in *Nenovsky, N., K. Hristov, B. Petrov* (1999) but was not formalized.

Unemployment hysteresis is seen as one of the major parameters determining the result of the game between government (monetary authority) and economic agents, and the decision on exiting the level of the fixed exchange rate (and the CB system). The shock simulated in this model arises from LM. Although the 'devaluation or unemployment' dilemma chosen by the authors may be subject to theoretical critique, experience with existing CBs shows that unemployment does threaten the stability of a CB or fixed exchange rate regimes.

Let us consider this from the perspective of CB adjustment mechanism. It is generally assumed that movement in economic agents' real income as a component of aggregate demand is an important element of the *CB automatic adjustment mechanism*. For example, if money supply contracts (caused by a deficit in the balance of payments), public income needs to be reduced in order to lower money demand and hence reduce the price level and improve competitiveness of the economy under a fixed exchange rate regime. Low inflation and price volatility under CB allow for the better reading of signals arising from changes in nominal wages and for the better matching of labor demand and supply.

The relation between *wages and productivity* gains particular importance under a fixed exchange rate regime, for one of the most frequently criticized issues is exchange rate overvaluation and current account worsening. We denote the real exchange rate as e_r, e is the nominal exchange rate in direct quotation,[8] p is the price level, q is productivity, and w are nominal wages (where * means the level of the respective variable abroad), all variables taken in logarithm, we derive the following equations:

$$e_r = e + p^* - p \quad (1)$$

$$p = w - q \quad (2)$$

$$p^* = w^* - q^* \quad (3)$$

Overall, the real exchange rate can be expressed as:

$$e_r = e + (w^* - q^*) - (w - q) = e + w^* + q - w - q^* \quad (4)$$

Equation (4) shows that the real exchange rate depreciates, i. e. $e_r\uparrow$ increases with increases in the nominal exchange rate, wages abroad and domestic productivity, and vice versa: it appreciates as domestic nominal wages and productivity abroad increase. The productivity/wages ratio should also be differentiated for the tradable and

[8] Local currency units per 1 foreign currency unit.

nontradable sector (to take into account the *Balassa–Samuelson* effect). As we know, wages in the nontradable sector tend to equal those in the tradable sector, though their productivity is comparatively lower. When wages are inflexible, the *Balassa–Samuelson* effect enhances. Thus part of wage growth is not motivated by higher productivity which leads to faster overvaluation of the exchange rate (*Nenovsky, N., V. Yotzov, K. Hristov*, 2000).[9]

It is possible to link the *quantitative theory of money* (where real income is presented as the sum total of consumption, investment, public spending and net exports) and equation (2), which explains prices through wage and productivity dynamics. After elimination of prices, we drive the following complex relationship to determine wages:

$$m + v = y + p \tag{5}$$

$$y = c + i + g - t + x - imp \tag{6}$$

$$w = m + v + t + imp + q - c - i - g - x, \tag{7}$$

where

m is money stock,
v is money velocity,
y is real income,
t is taxes in real terms,
imp is imports in real terms,
i is private investment in real terms,
g is public spending in real terms,
x are exports in real terms (variables are taken in logarithm).

Clearly, nominal wages increase as money stock, money velocity, imports, taxes and productivity increase, and decreases as consump-

[9] The analysis of exchange rate overvaluation is complicated by a common relation used in the labor market theory, *the efficiency wage theory*. It is based on the theoretical hypothesis of the existing positive relation between wages and productivity. According to a number of empirical analyses, wages maximizing labor productivity and minimizing opportunistic behavior are above equilibrium in the neo-classical model. There exists a function of labor efforts where higher wages stimulate employees, tie them to companies and discourage them from participation in trade unions. This is one explanation of the issue why adjustments arising from changes in labor demand are effected through the number of employees not through wages. If we reason in the context of the Bulgarian monetary system, it may turn out that wages below the natural level constrain productivity thus causing a faster overvaluation of the fixed exchange rate. Of course, this is a theoretical hypothesis and empirical analyses are needed to determine the level of wages at which the function of labor efforts will reach its maximum. The above relations lead to a change in equation (4) which assumes the form:

$$e_r = e + w^* + q(w) - w - q^*(w^*). \tag{4'}$$

tion, investment, government spending and exports decrease.

Let us consider the sources of CB rigidity in transition economies and in the specific case of Bulgaria.

Theoretical Aspects of Labor Market Rigidity Sources in a Transition Economy

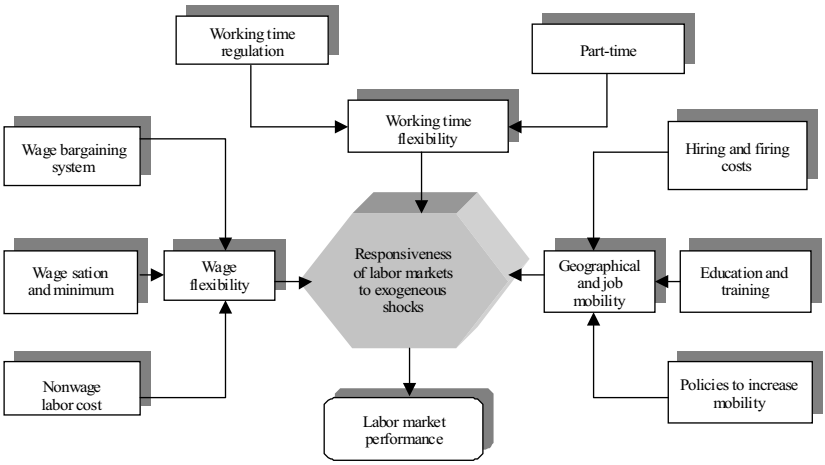
From the outset of reforms in the former centrally-planned economies, the *determining role of the LM* both for financial stabilization (wage growth should not be higher or lower than productivity growth) and real economy restructuring (workers should move to those productions where productivity allows growth in wages) was recognized in most theoretical models. Clearly, the LM had to absorb most of the changes, particularly changes in ownership and closure of loss-making businesses and in productivity as well as determine growth prospects. For this reason, a great number of theoretical and empirical models of transition were reduced more or less to modeling the dynamics of different LM flows, adding to this mainframe different components of monetary variables, exchange rates, the balance of payments, etc. (from the many publications see those of *Layard, R.,* (1991, 1994); *Coricelli, F., G. Milesi-Ferretti* (1993); *Aghion, P.* (1993); *Wyplosz, C. (1993); Chadha, B., F. Corricelli, K. Krajnyák (1993); Garibaldi, P., Z. Brixiova* (1997)). Particularly interesting are the analyses made by Olivier Blanchard (*Blanchard, O.,* 1997) who synthesizes in his book the LM dynamics and the overall transformation process in Central and Eastern Europe (CEE).

Let us imagine the economic system as a *pyramid*: the corporate system at the base, the fiscal and monetary regime at the top, and LM in the middle of the pyramid. In the absence of political and economic will to restructure corporate organization, the hard monetary regime will run counter to macroeconomic fundamentals if the labor market is not liberalized. If rigidities in corporate organization are accompanied by rigidities in the LM, soft and discretionary monetary regime and a central bank should offset this. The introduction from *top downward* of tighter forms of monetary regimes (as the CB in Bulgaria) is a kind of institutional response, aimed to spread monetary constraints across the entire chain downward, and a form of pressure on the LM to liberalize. A rapid rise in unemployment after the introduction of hard monetary regimes is an indirect proof of hidden wage rigidity at the time of soft monetary constraints.

Mainstream macroeconomics postulates that LM is one of the major sources of rigidity in the economic system.[10] Broadly speaking, *LM flexibility* is seen as a possibility to permanently adjust wages and employment in accordance with labor supply and demand by economic sector and by labor category. At a more specific level of analysis, LM flexibility has different dimensions: flexibility of the general level of real wages, of relative real wages, of work hours, of labor contracts and labor legislation in general, of geographic mobility of workers, etc. (see *Soltwedel, R., D. Dohse, C. Krieger-Boden*, 1999, and Figure 2). According to some economists, real wages are flexible when unemployment exerts strong pressure on equilibrium wages (*Berthold, N., R. Fehn, E. Thode*, 1999).

Figure 2

DETERMINATION OF LABOR MARKET FLEXIBILITY



Source: Dohse, D., C. Krieger-Boden, 1998, p. 49.

The mechanisms of flexibility have deep microeconomic roots reflected in the opportunity for an employer and a worker to sign a labor contract in accordance with their preferences and expectations. In this sense, the freedom of contracting and the equal footing of the two parties (viewed as voluntary act) underlie LM flexibility. Only in these conditions can the business find that level of labor demand that best

[10] See, for example, the popular interpretation in light of disequilibrium theory of the early 1980s in *Malinvaud, E.* (1980, 1983, 1991).

matches demand for its output and workers will offer that quantity of labor that matches their spending. In the ideal condition of equilibrium, real wage dynamics will be closely tied to that of labor productivity. The stable structure of *relative wages* also matters. Any imbalance through social security benefits, unemployment benefits and employment policies lead to disequilibria, inefficiency and redistribution of incomes and resources. Income, specifically wages, may be viewed as a kind of prices, information signals for rechanneling resources in the economy.

The major *reasons for LM rigidity* are well studied (see the overview in *Romer, D.* (1997) and *Perrot, A.* (1998)), reflecting deviations from basic Walras equilibria postulates – information asymmetry[11] and strategic behavior of firms and workers.[12] Thus, to one extent or another, explanations of the deviations from the natural rate of unemployment are found. The latter, however, is a function primarily of the LM institutional structure which includes the degree of syndicateness, the structural level of bargaining between employees and employers (firm, industry, national level),[13] the social security system (minimum wage, social security, unemployment benefits, pension insurance, health in-

[11] Information asymmetry in post-communist countries is even more strongly pronounced, given the legacy of the system of labor resources and wages planning, completely dividing the labor market from its optimum state. The present LM state provides evidence on the conflict between formal institutions (labor legislation, etc.) and informal institutions of labor relations inherited from communism.

[12] At a specific level, the immediate reasons are the opportunistic behavior of workers (see for example the classical paper by *Shapiro, C., J. E. Stiglitz* (1984)), the behavior of efficiency wage, presence of implicit contracts (e. g. long-term relationship between enterprises and employees), a complex relationship between LM incoming and outgoing workers, the presence of hysteresis in unemployment behavior, as well as difficulties in accommodating vacancies with those searching jobs (expressed by the Beveridge curve or the so-called search model).

[13] The issue of the *optimum structural level of wage setting* (*wage bargaining*) is not yet resolved theoretically, although there is empirically confirmed relationships. Wage setting at an interim level – sector – is considered as most inefficient (such is the practice in France, Germany, Italy, Spain and the Netherlands). The classical study of *Calmfors, L., J. Drifill* (1988) is focused on the inefficiency of interim wage setting. According to the authors, in this case wages drift most significantly from labor productivity and macroeconomic fundamentals. At sector level, competition is lowest and the possibility for macroeconomic effects to be included in labor contracts is the smallest. Sharing their view, we argue that decentralized wage setting is most appropriate (at firm level) as it takes into account the specifics of each work place. Such is the practice in the USA and Canada (*Blanchard, O., L. Katz*, 1999). A similar proposition for decentralized wage setting in the EU is made in the OECD report (1998). There is another group of economists, however, who consider that the decentralized level leads to greater rigidity as macroeconomic fundamentals are not taken into account. This is not the case where wages are set at national level (*Layard, R.*, 1991). In our opinion, wage setting at national level (as is the practice

surance), the tax system, the size of the hidden economy, etc. (see *Layard, R.* (1991); *De La Rica, S., T. Lemieux* (1993), *Garibaldi*, *P., Z. Brixiova* (1997); *Blanchard, O., L. Katz* (1999)).[14]

Another theoretical approach to explaining the issues of LM in CEE in Bulgaria particularly, is *the approach of dual and segmented LM*.[15]

Models for the developing countries assume migration from the primary (so-called urban) to the secondary sector (rural) and respective adjustment. In contrast, models for CEE countries are totally different. Migration from the primary to the secondary sector and vice versa is very weak and this is one of the reasons for the significant official unemployment. The majority of the population, having inherited certain customs and norms of socialist behavior, prefer not to work rather than participate in the LM of the less paid and highly competitive secondary sector. The great number of higher education graduates that cannot be absorbed by the primary sector and unwilling to work in the secondary sector complicates this. It could be assumed that with a possible liberalization of labor force mobility within the EU a great number of un-

in Austria, Belgium, Portugal, the Scandinavian countries) has destructive consequences on the adjustment process in the real wages network and entails greater structural unemployment. This is so because relative wages play a role similar to that of relative prices and serve as major information signals for firms and employees (an old idea of Ludwig Mises). According to a number of BIS analyses, it is possible that EMU and the introduction of the euro will force bargaining between employers and employees to move toward centralization at EU level or to increase wage setting at firm level (BIS, 2000). *Soltwedel, R., d. Dohse, C. Krieger-Boden* (1999) argue that this trend has already begun.

[14] An interesting field of analysis would be the analysis of the LM as a form of conflict between the formal, official institutional structure of this market and the informal institutional structure (traditions, customs, etc.).

[15] The main idea is that there is no uniform LM but a variety of markets; the connection between them is often broken and there are no adjustment mechanisms. The theory of dual markets, a kind of continuation of the analyses of LM in the developing countries in the 1970s (*Harris, J., M. Todaro*, 1970; *Calvo, G.,* 1978), distinguishes two sectors: *primary* with high wages (above equilibrium), steady employment and career prospects, and *secondary* with low wages, high mobility of labor force and no career prospects. The first sector includes big public and private corporations and budget organizations (highly qualified labor force required) while the second one is typical of small and medium businesses (less qualified labor force required). The second sector is competitive and has low unemployment level, while the first one is rigid and full of asymmetric information. A third segment is the unemployed coming mainly from the primary sector. The connection between the sectors is broken because there are a number of individuals who prefer to be unemployed and wait to be employed in the primary sector rather than the secondary sector. The primary sector is characterized by the presence of internal markets expressed in implicit contracts between employers and employees (e. g. a contract for laying off workers in adverse conditions and reverse employment in favorable conditions, as is the practice in the USA).

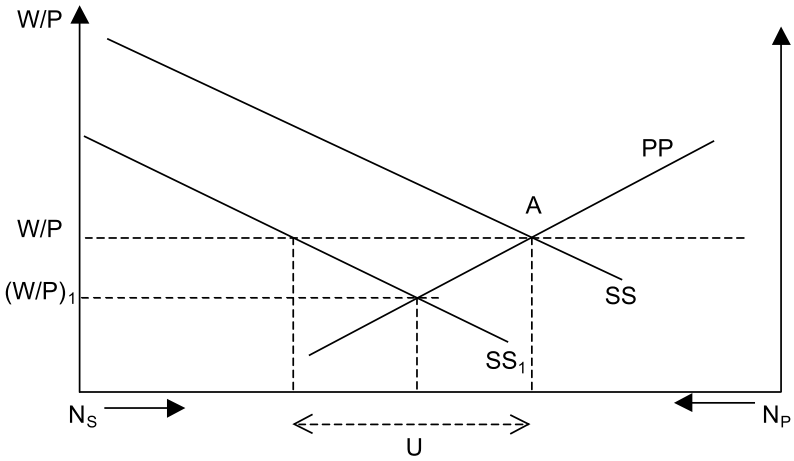
employed in Bulgaria (even those who do not want to work in the Bulgarian secondary sector) will be willing to work in the EU secondary sector because of higher wages. Increased labor supply in the EU competitive market will lead to lower wages, providing benefits to businesses in the eurozone. It is very unlikely for primary sector employees in CEE to move to EU primary sector. Thus, it may be assumed that after EU expansion three sectors would be formed: primary, a privileged place for EU employees, secondary, in which the majority of the CEE primary sector would go, and tertiary which would be typical of CEE employees.

Dynamic interaction between the two major sectors – the restructuring (and privatizing) state sector and the private sector – is particularly important for the analysis of LM rigidity and imbalances in CEE. *Blanchard, O.* (1997) constructs a general equilibrium model where the state of LM in CEE (unemployment and wages) reflects the different pace of development of state and private sectors.[16] According to him, unemployment (and the dramatic decline in GDP) can be explained by the fact that at the initial stage of reform the private sector is relatively small and incapable of absorbing the dissolution of the state sector, which may be possible at a later stage. This is the effect of changes in private sector size. The second explanation of unemployment is that real wages in the state sector are sticky and with abolishing subsidies lower labor demand from state companies leads to layoffs and unchanged wages. Demand for labor from the private sector does not change (according to Blanchard it may contract under certain conditions). If wages in the state sector were not sticky, unemployment would be overcome. Graphically, Blanchard illustrates this as shown below:

[16] In his models *Blanchard* studies the effects of unemployment benefits, type of privatization, etc. on the LM and the overall process of restructuring. According to him, the relationship is not clearly pronounced. Following the proposition that unemployment benefits increase unemployment, the author examines a situation when higher unemployment benefits would stimulate state sector employees to take the risk of restructuring enterprises, knowing that if they are unemployed they would receive higher compensations. However this process has negative effects on the private sector as the possibility of finding a job is reduced. Generally, the overall effect is not clear. The author reviews another interesting relationship. Wages in the private sector depend on the profit of the company, which in turn depends on wages to a great extent. Given the fact that wages decrease as unemployment increases it may be assumed that high unemployment stimulates job creation in the private sector. The third relationship is that the higher the unemployment, the harder the decision-making on state sector restructuring.

Chart 2

BLANCHARD LABOR MARKET IN A TRANSITION ECONOMY

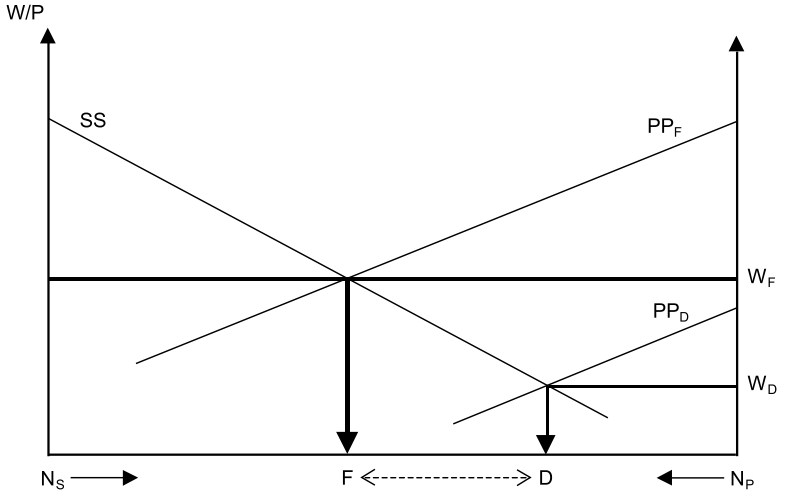


Employment N is shown on the horizontal axis. Employment in the state sector N_S increases from left to right and that in the private sector N_P, from right to left. Real wage (W/P) is designated on the vertical axis. Labor demand in the state sector is described by SS, and by PP in the private sector. Before the start of transition there was no official unemployment and equilibrium is reached in point A. After the initial abolishment of subsidies to the state sector labor demand SS contracts, reaching SS_1. As wages remain unchanged (W/P) and do not fall to $(W/P)_1$, unemployment U emerges.

To report the well-known inconsistency between declared and actual wages in the private sector, typical of Bulgaria, we modify Chart 2. Declared wages in the private sector are much lower than those in the state sector, while actual wages are much higher. This is a *de facto* concealing of incomes and gives a distorted picture of the unemployment level in the country. There is a mechanism of shifting employment from the official to the unofficial sector. It may be assumed that there is a large share of 'illusory', quasi-unemployment reflecting declared low wages in the private sector. Changes are reflected in Chart 3. PP_F is actual demand for labor in the private sector and PP_D is the officially declared one. The pay level in the state sector is between the actual and the declared pay in the private sector.

Chart 3

LABOR MARKET EQUILIBRIUM AT PRIVATE SECTOR DECLARED AND ACTUAL LABOR DEMAND (OUR MODIFICATION OF THE BLANCHARD MODEL)



The section N_SF is official employment in the state sector and N_PD is officially declared employment in the private sector. *FD* is hidden employment in the private sector. There are no restrictions for employees in the *FD* sector to register as unemployed. Therefore, given lower declared wages in the private sector, there is illusory or quasi-unemployment. The faster the two values (declared and actual) come closer, the faster will disappear the illusory unemployment and the hidden adjustment mechanism will become visible.

A focal point in the Bulgarian LM analysis is reporting the dynamics and mechanisms of the *shadow economy* (where labor relations are not formally institutionalized), which ranges from 30% to 70% of GDP according to various estimates (for instance, see *Nenovsky, N., K. Hristov*, 2000). The unofficial economy absorbs the bulk of active labor force and is a kind of LM adjustment mechanism, a buffer in the presence of rigid wages in the official sector. For instance, the shadow economy definitely impacts the increase in the so-called reservation wage, i.e. the wage that makes an individual indifferent to unemployment. This way simultaneous maintenance of illusory unemployment and employment in the shadow economy reflects on reducing the im-

pact of the weight of unemployment and LM rigidity on CB stability and the fixed exchange rate.

In the next section, we present several possibilities for empirical research and measurement of the state of the LM in Bulgaria.

Empirical Studies of Labor Market Rigidity

Vassil Tzanov's Studies

Empirical measurements of LM in Bulgaria are few. This gap is filled partly by a series of studies by Vassil Tzanov. *Tzanov, V.* (1999), does a complex modeling of the LM basic relations and constructs a general model. The analysis covers the period January 1991 – November 1997, *de facto* the beginning of the currency board operation. Based on the analysis V. Tzanov draws the following conclusions in the context of LM rigidity:

1) the Bulgarian CB is characterized by presence of imperfect competition, inherited from socialism;
2) there exists a hysteresis effect (mainly in state enterprises) and inertia in employment;
3) there are difficulties in the process of matching labor demand and supply (as derived from the Beverage curve). This is due to weak LM institutional development, which worsens the possibilities for qualitative and quantitative matching;
4) labor supply plays an insignificant role in the process of matching;
5) wage setting is based on anticipated inflation;
6) labor productivity has little weight in explaining wage setting;
7) there is no smooth relation between output movement and employment. For instance, in 1994 – 1995 wages declined and output grew, which, according to the author, indicates over-employment (adjusted later);
8) "obviously the downward pressure the rate of unemployment would exert on wages is insignificant. Therefore, it may be concluded that the labor market does not influence wage setting. The latter reflects external factors like trade unions, administrative measures, etc. rather than market forces." (*Tzanov, V.,* 1999. p. 138).

Overall, V. Tzanov's study confirms the hypothesis of LM rigidity in Bulgaria before currency board introduction.

Construction of Real Wage Rigidity Index and Its Application before and after Currency Board Introduction

To get an idea of LM rigidity in Bulgaria we construct a real wage rigidity index for the ***state sector***, assuming that unemployment is attributable to output contraction in the public sector, given the specific features of transition. Also, this is associated with our observations that LM in the private sector is much more flexible than in the public sector.

We use the methodology of studying real wage rigidity proposed by *Layard, R., S. Nickell, R. Jackman* (1991) and the rigidity index constructed by *Viñals, J., J. Jimeno* (1996, 1998). As is well-known, the real wages – unemployment relation is considered more appropriate than the nominal wages – unemployment relation as it overcomes the restrictions in the original Phillips curve model.[17] The reduced form of the equation of wages is:

$$w - p = - c\ (u - hu_{-1}) + z^w \tag{8}$$

$$z^w = e^s + e^w, \tag{9}$$

where w, p, and u are logarithms of nominal wages, price indices and unemployment respectively, u_{-1} is logarithm of unemployment with one lag, c and h are parameters for evaluation, and z^w reflects shocks on nominal wages (where e^s is the technological shock and e^w is the labor supply-side shock), h indicates inertia in unemployment, its hysteresis effect,[18] and c shows elasticity of real wages to changes in unemployment.

[17] On the Phillips curve's history see the review in *Humphrey, T.* (1986a). In modern literature generally exist two versions of the Phillips curve: the relation [wages (inflation) – unemployment] and the relation [inflation (wages) – income produced]. The two types of relations are modified to accommodate the NAIRU gap and the output gap. The first version of the Phillips relation can be called unemployment-based approach and the second one, economic acivity-based approach. Each of these has its strengths and weaknesses. Given the objectives of our study (analysis of the labor market, not inflation), we have chosen the more traditional form of the Phillips curve (the unemployment-based one). We should note that the Phillips curve is used as a tool in forecasting inflation (see the review in *Stock, J., M. Watson*, 1999). In this article, the Phillips curve is generally defined as "the relation between current economic activity and future inflation."

[18] The model of unemployment hysteresis and persistence is conventional (*Blanchard, O., L. Summers*, 1987). This method is linear. According to some authors, linearity cannot capture structural changes in unemployment dynamics. That is why more complex forms of hysteresis modeling are proposed (see *Bianchi, M., G. Zoega*, 1996).

Thus the real wage rigidity index (RWR) is:

$$\text{RWR} = (c\,(1-h))^{-1} = \frac{1}{c(1-h)} \tag{10}$$

The higher the values of c and h, the more rigid the real wages, i. e. RWR increases.

We estimate equation (8) for the period January 1997 – February 2000 (38 monthly observations[19] in total) in the form of type 1 differences (equation 11) because the series are first-order integrated

$$d(w-p)_t = \alpha_0 + \alpha_1 du_t + \alpha_2 du_{t-1} + \varepsilon_t, \tag{11}$$

where

$\alpha_1 = -c$, $\alpha_2 = ch$

The results for equation (11) are as follows (t-statistics are given in brackets):[20]

$$d(w-p)_t = \underset{(8.39)}{0.01} - \underset{(-2.99)}{0.71}\, du_t + \underset{(2.12)}{0.56}\, du_{t-1} + AR(1) + MA \tag{12}$$

$R^2 = 0.60$, $R^2\text{adj} = 0.55$, DW = 1.87, Prob (F) = 0.000

Thus $c = 0.71$, $h = 0.79$ and after substituting in (10) we obtain the real wage rigidity index (RWR)

$$\text{RWR} = \frac{1}{0.71(1-0.79)} = \frac{1}{(0.71)(0.21)} = \frac{1}{0.15} = 6.67$$

The average lag of unemployment response is $\frac{h}{(1-h)} = 3.8$ months.

The value of h showing inertia (hysteresis) can be derived directly from the autoregression equation for unemployment.

$$du_t = \beta_1\, du_{t-1} + \beta_t, \tag{13}$$

where $\beta_1 = h$

The results are as follows:[21]

[19] NSI data.

[20] It is interesting to note that the shortening of the period of observation (from April 1997, i.e. after the hyperinflation in February and March) does not result in changes in the values of the equation and the parameters examined. The dummy variable for January, February and March, which shows the dramatic decline in real wages, is insignificant.

[21] The model does not change if more unemployment lags and a constant ($du_t = \beta_0 + \beta_1 du_{t-1} + \beta_2 du_{t-2} \ldots + \beta_n du_{t-n} + \varepsilon_t$) are included. Unemployment with one lag, i. e. the coefficient β_1 is the only significant value.

$$du_t = \underset{(5.78)}{0.77}\, du_{t-1}$$

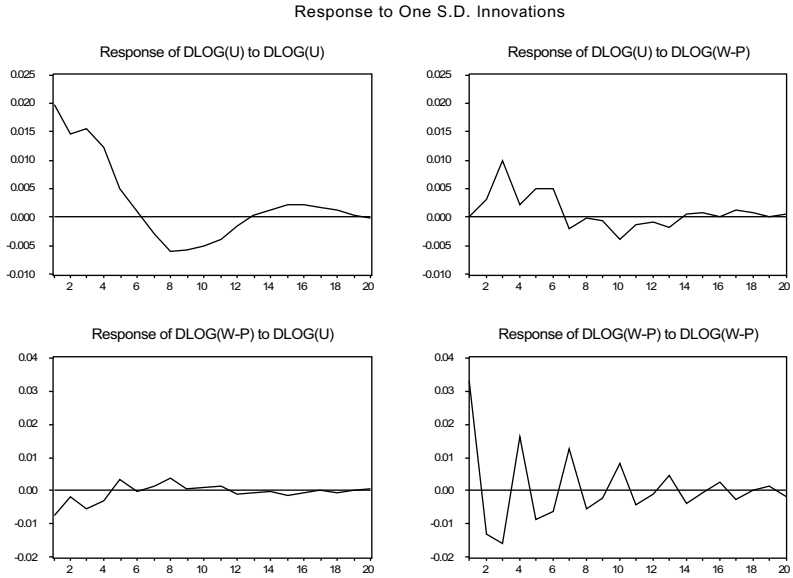
$R^2 = 0.48$, $DW = 1.8$, Prob $(F) = 0.000$

That is, $h = 0.77$, which is close to the above value of $h = 0.79$.

Let's see the results from the BVAR model (*du, d*(*w-p*)) applied for the same period.[22] This model shows combined response to shocks (Chart 4) and the decomposition of real wage and unemployment variances (Chart 5).

Chart 4

COMBINED RESPONSES TO SHOCKS (UNEMPLOYMENT U AND REAL WAGES W-P)



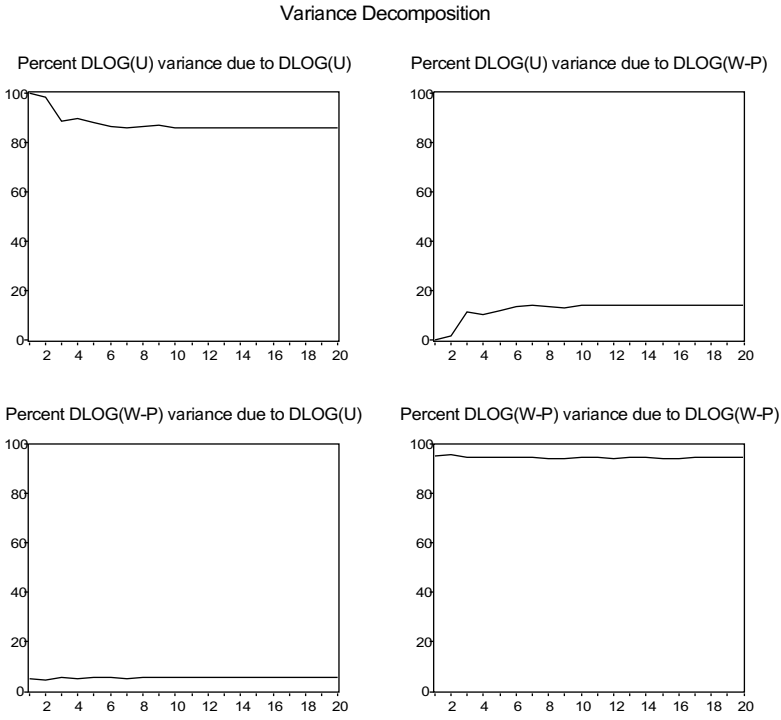
Weak real wage response to shocks on unemployment (lower left part of the chart) and strong unemployment inertia (upper left part of the chart) are evident.

[22] The sequence of the variables in the VAR model is based on the assumption that flexible wages cause a rise in unemployment which, in turn, causes a decline in real wages ($u\uparrow \rightarrow (w-p)\downarrow$). This model can be used to derive the values of c and h, taking into account initial response and calculating the average lag of response. The optimum number of lags is four. It is possible to determine the sequence in the vector through a Granger causality test. We'd rather test a specific *a priori* formulated economic hypothesis, not a purely statistical one.

Decomposing variance (Chart 5) shows that about 80 – 90% of unemployment volatility is attributable to unemployment itself (upper left part of the chart) and an insignificant part of wage variance is due to unemployment dynamics (lower left part of the chart).

Chart 5

VARIANCE DECOMPOSITION OF UNEMPLOYMENT U AND REAL WAGES W-P



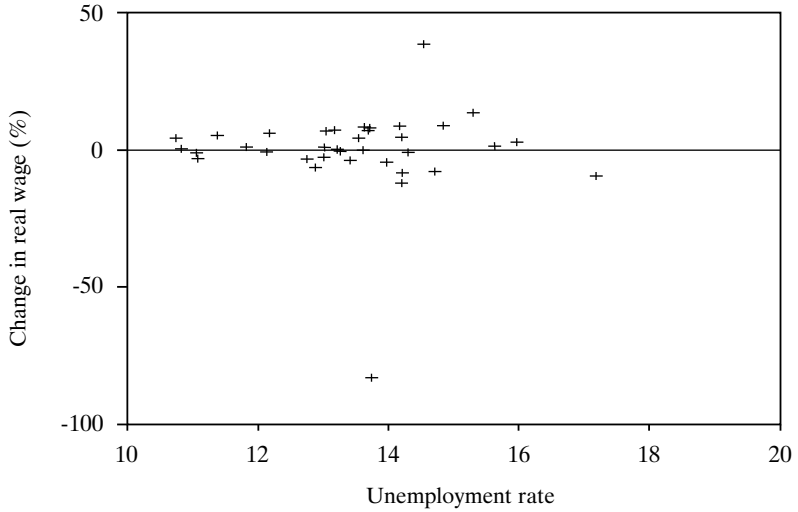
The optimum number of lags in the model is 4, and $\frac{h}{(1-h)} = 4$, then $h = 0.8$.

Overall, the low value of c and the high values of h and RWR and the parameters of the BVAR model suggest *low flexibility* of the LM in Bulgaria (no equilibrium values of real wages and employment are reached). Real wage movement cannot absorb different LM shocks. Rather this is possible through changes in unemployment, which is strongly inertial.

In fact, the lack of arbitrage between real wage growth and unemployment dynamics (modified Phillips curve) is visible graphically (Chart 6).

Chart 6

RELATION BETWEEN REAL WAGE GROWTH AND UNEMPLOYMENT GROWTH FOR THE PERIOD JANUARY 1997 – FEBRUARY 2000



As the share of unemployed grows, real wages do not tend downward but even increase sometimes.

Let's apply the same method for the period before the CB introduction in Bulgaria to compare two radically different monetary regimes (discretion and rule). We apply the same approaches for the period April 1991 – September 1996 (73 monthly observations). The period under review ends with the beginning of the hyperinflationary period of late 1996.[23]

What strikes in the analysis of the discretionary central bank period is the missing relationship between real wages and unemployment. The coefficient c is either with a reversed sign[24] and statistically insignificant in equation (11), or tends to zero ($c \to 0$). It is noteworthy that the

[23] The late 1996 and early 1997 period is of extreme nature as some sustainable trends in the behavior of economic agents reversed. In general, it may be argued that the monetary regime in the review period has not witnessed significant changes and may be determined as discretionary central bank, completely subordinated to the government.

[24] This means that unemployment growth leads to real wage growth.

value of *h* indicating unemployment inertia is almost equal to that prior to CB introduction ($h = 0.73$). In this case the rigidity index RWR is high and in certain cases tends to infinity.

$$\text{RWR} = \lim_{c \to 0} \left(\frac{1}{c(1-h)} \right) \to \infty \qquad (14)$$

The following equation has the best statistical characteristics from those examined:

$$d(w-p)_t = \underset{(12.76)}{0.0001} - \underset{(-1.68)}{0.002} du_t + \underset{(2.12)}{0.0015} du_{t-1} + \text{AR(1)} + \text{AR(2)} + \text{MA(1)}$$

$R^2 = 0.38$, $R^2\text{adj} = 0.34$, DW = 2.02, Prob (F) = 0.000

Direct measuring of unemployment hysteresis (until CB introduction) produces good technical indicators:

$$du_t = \underset{(9.91)}{0.73}\, du_{t-1}$$

$R^2 = 0.58$, DW = 2.12, Prob (F) = 0.000

The results from the BVAR model *(du, d(w – p))* applied for the period before CB introduction show strong real wage rigidity and high unemployment inertia (Charts 7 and 8).

Chart 7

COMBINED RESPONSES TO SHOCKS
(UNEMPLOYMENT U AND REAL WAGES W-P), IV'91 – IX'96

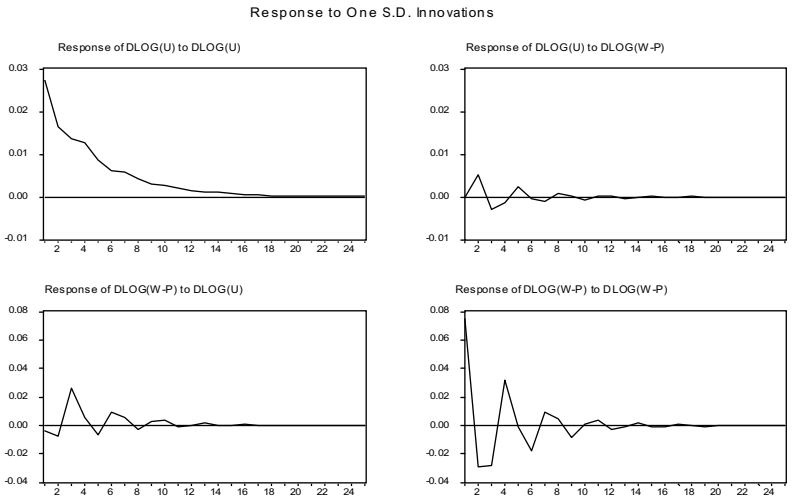
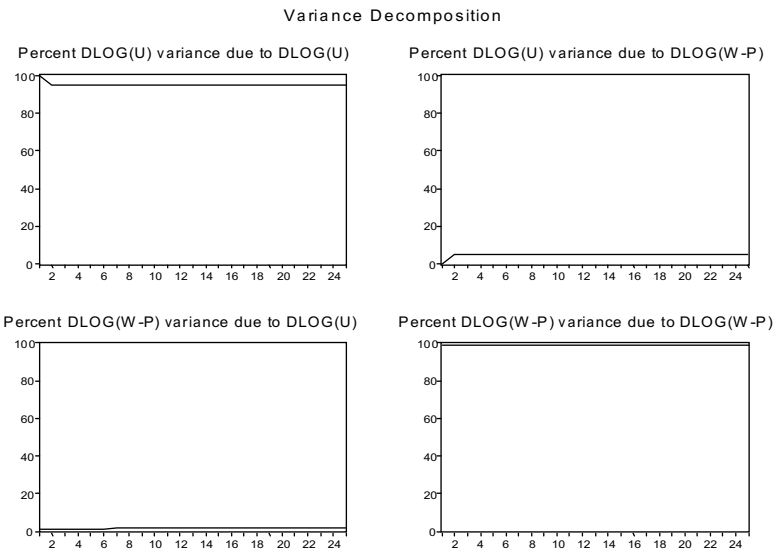


Chart 8

VARIANCE DECOMPOSITION OF UNEMPLOYMENT AND REAL WAGES , IV'91 – IX'96



Therefore, it may be assumed that there was significant LM rigidity in Bulgaria both in the period of discretionary monetary policy and in the period preceding CB introduction. However, *real wage flexibility increased substantially (after CB introduction) in response to employment changes.* This confirms the assumption that a harder monetary regime (entailing lower subsidies from the government and limited possibilities for bank lending) disciplines state-owned enterprises and forces them to accept more flexible wage policies. Notwithstanding improvements, state sector labor redundancies remain the major source of LM adjustment. High inertia in unemployment dynamics confirms the hypothesis that it is first and foremost a structural phenomenon of transition (which is unavoidable) and monetary and fiscal injections have almost no effect on it; moreover, they are an obstacle to overcoming it.

Table 1, which presents the results for real wage rigidity index in the developed countries measured by *Viñals, J., J. Jimeno* (1998) and our results for Bulgaria, provides a basis for comparison. It shows that RWR is considerably higher than that in EU countries and decreases after CB introduction.

Table 1

REAL WAGE RIGIDITY INDEX IN EU, USA, JAPAN, AND BULGARIA (BEFORE AND AFTER CB INTRODUCTION)

	Structural model estimates (wage and price equations)	BVAR model estimates (D(W-P),U) model
Bulgaria	Before CB ($\rightarrow \infty$) After CB (6.67)	Before CB ($\rightarrow \infty$) After CB (17.77)
Belgium	0.25	2.86
Denmark	0.58	3.44
France	0.23	5.13
Germany	0.63	3.76
Ireland	0.27	2.92
Italy	0.06	4.29
Netherlands	0.25	2.11
Spain	0.52	4.20
Great Britain	0.77	3.43
Austria	0.11	4.49
Finland	0.29	9.55
Sweden	0.08	4.92
European Union	0.42	4.09
USA	0.25	2.39
Japan	0.06	2.21

Source: *for Bulgaria (authors' calculations), and for the other countries – Layard, R., S. Nickell, R. Jackman (1991, pp. 406 – 407) – structural model, Viñals, J., J. Jimeno (1998, p. 23) – VAR models.*

VAR Model Estimating the Impact of Unemployment and Real Wage Rigidity on Fiscal Reserves, Reserve Money and Interest Rate Behavior (after CB introduction)

In their research study *Berthold, N., R. Fehn, E. Thode* (1999) make a comparative analysis for EU countries of the relation between unemployment, real wages and major adjustment channels. Fiscal policy is approximated with total government liabilities and monetary policy, with short-term interest rates. The authors' main task is to trace how real wages accommodate unemployment-driven shocks, the government response (fiscal policy), and the central bank response (short-term interest rates).

Table 2

REAL WAGE RIGIDITY INDEX IN EU, USA, JAPAN, AND BULGARIA

	BVAR (D(W-P), DU) model estimates
Bulgaria	Before CB ($\rightarrow \infty$) After CB (14.30)
Belgium	1.42
Denmark	1.10
France	1.58
Germany	1.48
Ireland	1.68
Italy	1.00
Netherlands	1.52
Spain	1.94
Great Britain	1.16
Austria	0.85
Finland	1.71
Sweden	1.41
European Union	1.39
USA	0.73
Japan	0.89

Source: *for Bulgaria (authors' calculations), and for the other countries − Layard, R., S. Nickell, R. Jackman (1991, pp. 406 − 407) − structural model, Viñals, J., J. Jimeno (1998, p. 24) − VAR models.*

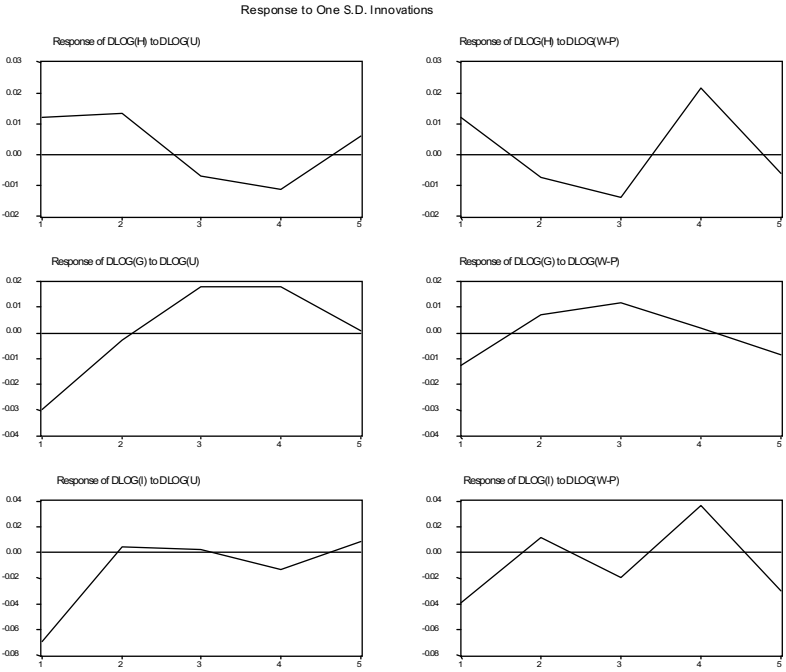
In the case of Bulgaria, we modify this approach by assuming that government fiscal reserves at the BNB Issue Department reflect the state and movements in government revenues and expenditures, which impacts both reserve money and the interbank money market interest rate. In this configuration the model would look as follows:

$$\text{VAR}\,(du,\ d(w\text{-}p),\ dg,\ dh,\ di\,), \tag{15}$$

where u is logarithm of unemployment, w is logarithm of nominal wages, p is logarithm of CPI, g is logarithm of government fiscal reserves, h is logarithm of reserve money, and i is logarithm of interbank interest rate (where it is added to unity to obtain the variable in logarithm) and variables are first-order integrated.

Chart 9

RESPONSES OF FISCAL RESERVES (*G*), RESERVE MONEY (*H*) AND INTEREST RATE (*I*) TO SHOCKS ON LM (*U* AND *W-P*)



As Chart 9 shows, there is no clearly pronounced direction of economic policy response (conscious or unconscious) to unemployment and real wage growth. For instance, unemployment growth (u) initially leads to reduced fiscal reserves (i. e. higher government spending), reserve money growth and lower interest rate. This is a clearly pronounced automatic buffer to absorb shocks on LM. However, g, h and i behaviors change their direction as a result of the CB automatic mechanism. This points to more or less automatic response and unconscious policy rather than result-oriented government response. The responses of g, h and i to real wage growth is similar, though their dynamics should move in the opposite direction to offset the negative impact of real wage growth.

Panel Model Showing Employment Dynamics Response to Real Wage Changes for the Period January 1998 – December 1999 in 38 Industries (Form B40[25])

In this model, we examine the relation between changes in the number of labor force and real wage changes after CB introduction.[26]

The model is:

$$\mathrm{dlog}\left(\dot{N}_{it}+1\right)=\mathrm{B}_{it}+\mathrm{B}_{1i}\,\mathrm{dlog}\left(\left(\frac{\dot{W}}{P}\right)_{it}+1\right)+\mathrm{B}_{2i}\,\mathrm{dlog}\left(\left(\frac{\dot{W}}{P}\right)_{it-1}+1\right)+$$

$$+\mathrm{B}_{3i}\,\mathrm{dlog}\left(\dot{N}_{it-1}+1\right)+\mathrm{e}_{it} \qquad (16)$$

where i denotes industry $i = 1, 2, \ldots, 38$, $\dot{N}$ is the rate of change of the number of employed, and $\dot{W}/P$ is the rate of change of real wages by industry (W are nominal wages and P is CPI).[27]

According to the theoretical hypothesis proposed, LM is flexible when: (a) employment dynamics responds to changes in real wages (β_1 and β_2 are significant) and (b) elasticity between employment growth and real wage growth may be either positive or negative (the signs of β_1 and β_2 may be either negative or positive). In recession and output slump in all industries the signs should be negative and vice versa: in overall upswing, they should be positive. Naturally, individual industries would respond differently depending on economic conditions and on whether these are advanced industries or industries with subsiding functions.

[25] See the Appendix.

[26] According to *Blanchard* (1997), an interesting approach to the analysis of LM flexibility is to examine the elasticity of wages and employment in terms of changes in corporate sales. This theoretical approach assumes that under given hard budget constraints companies face the trade-off to offset changes in their sales either through labor prices (wages) or through labor volume (number of employed). Similar studies were done for Poland and Hungary for the period 1991 – 1992 using panel models. The results from these studies show that companies in Hungary and Poland are inclined to reduce wages as sales decrease (to a much greater extent than developed countries) rather than fire employees. Companies' behavior is asymmetric to decreasing or increasing sales: as sales decrease companies do not discharge employees while as sales increase they rarely employ new personnel. A similar study could be done for Bulgaria to examine whether companies respond through employees or through wages to changes in their sales. Unfortunately, industry breakdowns by employed and wage do not match breakdowns of sales revenues and modeling is impossible.

[27] Adding unity to the rates of change in employed and real wages does not alter the result. This is due to the impossibility to estimate negative values in logarithm.

In Appendices 1 and 2 are presented Panel Models 1 and 2. Their characteristics in general show that employment dynamics is not sensitive to changes in real wages. Model 1 has relatively good characteristics (coefficient β_1 is significant and negative) and $R^2 = 0.14$, the latter being a relatively satisfactory figure for a panel study. According to this model, as real wages grow (due either to nominal wage growth or lower CPI[28]) companies respond by firing personnel.

Model 3 in Appendix 3 presents the relation studied for 38 industries. The results are interesting. LM is elastic (according to our theoretical hypothesis) in the following industries: commerce, hotels and restaurants, construction, paper and printing industries, food and tobacco industries, leather and fur industry, real estate services, financial intermediation, manufacture of chemicals and their products. In these industries the sign of β_1 is negative and the coefficient is significant. This can be interpreted as employment decline as a result of real wage growth.

The following industries are characterized by rigidity: most of the heavy industries, gas and petroleum industries, health care, education, research and development, public administration, etc. It is of note that private companies and entrepreneurship dominate in the more flexible industries while state-owned companies dominate in industries with rigid LM. In these industries the sign of β_1 is positive but in most cases the coefficient is not significant.

Overall, the hypothesis of a flexible LM in the private sector and a rigid one in the state sector is confirmed.[29]

Relation between Private Sector Wages and State Sector Wages

In section three, we presented theoretical assumptions of the relation between LM in the private and state sectors. Here we present some empirical data on the relation between wages in the two sectors.

[28] It may be assumed that real wage dynamics is affected more significantly by price movements than by nominal wages.

[29] Panel modeling of the relation between employment dynamics and wage dynamics separately for private and state sectors (data are available) allows for testing the hypothesis. This could be a subject of a possible further study.

Chart 10

DYNAMICS OF PRIVATE SECTOR WAGES (DECLARED) AND STATE SECTOR WAGES (JANUARY 1998 – JUNE 2000)

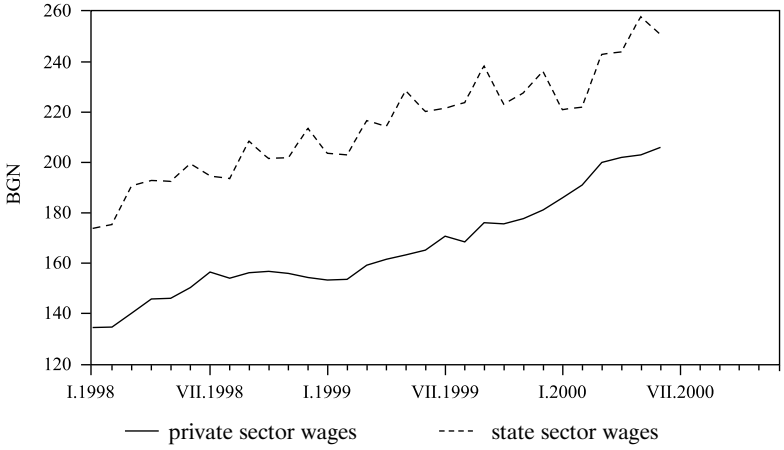
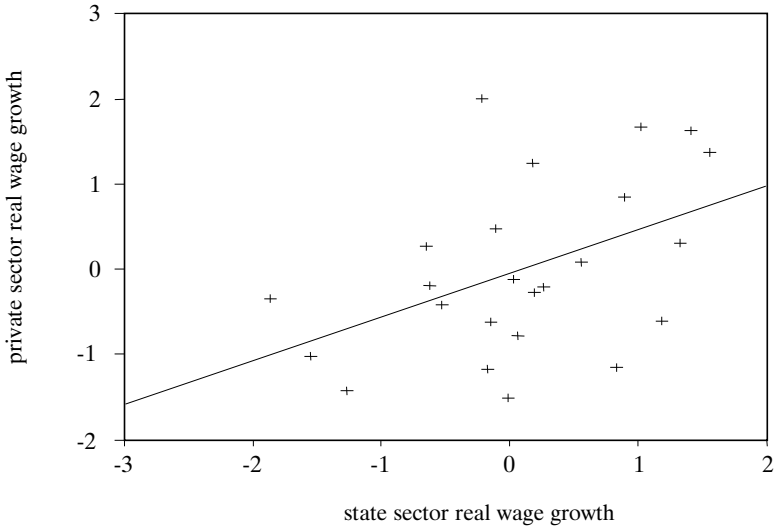


Chart 11

RELATION BETWEEN PRIVATE SECTOR REAL WAGE (DECLARED) GROWTH AND STATE SECTOR REAL WAGE GROWTH (JANUARY 1998 – FEBRUARY 2000) – NORMALIZED SCALE



Charts 10 and 11 show a trend of parallel movement in declared private and state sector real wages (though, as we pointed out, declared wages in the private sector do not reflect actually paid wages). The correlation between wages in the two sectors is 0.9 and the correlation between their growth rates is 0.5.[30]

Additional elements of LM flexibility could come from the dynamics of the undeclared portion of private sector wages, which serve as a buffer to absorb possible shocks on aggregate demand and supply. This could explain the difference between the high correlation between wage levels in the two sectors and the correlation between their growth rates.

Some Institutional Aspects of Wage Setting in Bulgaria

Wage setting in Bulgaria (in both sectors, state and private) reflects directly the legally mandated role of the government in the field of labor relationships. As in the former Labor Code, the new Labor Code (ZIDKT)[31] states: "The government shall regulate labor and labor-related relations, social security relations and issues concerning the standard of living" (Article 2, see the same text in Article 3, para. 1).

Wage setting in both sectors (state and private) is effected within the framework of the so-called Tripartite Cooperation, including representatives from the government, employers and trade unions (representatives of employees or all employees as a whole).[32] Eventual and final solution of the issues is subject to approval by government authorities. ZIDKT provides for the functioning of tripartite cooperation councils at three levels: national, sectoral (industry) and municipal councils. Interestingly enough, these councils are financed from government and municipal budgets, i.e. tripartite cooperation councils are financially dependent on the government (Article 3e, para. 2).

Wage bargaining is conducted at two levels: sector (industry) and company.[33] Collective labor agreements (CLA) can be defined as

[30] The parallel movement of the two types of wages gives a certain ground for common interpretation for both sectors of the already estimated real wage rigidity index in the state sector as well as our LM elasticity panel study (where aggregated data on the two sectors were used).

[31] KNSB (1992), Labor Code; State Gazette (2001), Amendment to Labor Code (ZIDKT). In retrospective, labor regulation was provided for by the Labor Code adopted in 1986, which has been amended repeatedly since 1992.

[32] "The government administers unnecessarily a free and democratic process as social cooperation" (*Georgieva, M*., 2000).

[33] For details, see the analysis in *Georgieva, M*. (2000). The new provisions of ZIDKT introduce the principle of administrative-territorial collective labor bargaining, a positive

asymmetric as they mandate more powers (and less responsibilities) to employees than to employers. This asymmetry is inherited from the past when companies were state-owned and agreed on inflated wages and bonuses. Currently, bonuses still account for 25 to 30% of basic wages.[34] Bulgarian economists also recognize that sectoral collective bargains are inconsistent with modern realities. According to D. Tabeian: "enterprises within an industry display different socioeconomic indicators. We cannot determine a minimum wage for an industry both for a prosperous enterprise and an enterprise facing failure." (*Georgieva, M*., 2000). Moreover, industry and sectoral wage setting in Bulgaria reflects the specifics of 'rough' sectoral formation, for example combining together petrochemists, chemists and pharmaceutists, mechanical and electrical engineers.

A major violation of the principle of voluntary employment is the obligation that all employers are subject to CLA clauses even when they are not members of industrial and sectoral organizations that have signed the agreements. Moreover, if an employer decides to leave a given employer organization, he is obliged to continue fulfilling the obligations undertaken by the organization in compliance with the CLA, according to Article 55, para. 1 of currently effective Labor Code. While employers are obliged to undertake collective bargaining, trade unions have an option to do so. Collective labor agreements could be signed by enterprise, sector, industry, profession and administrative-territorial unit.

Determination of the *minimum wage for the country* and the types of minimum limits for bonuses and compensations under labor contracts are of key importance. The Council of Ministers is empowered to do this, exercising the right within the tripartite cooperation after consulting with trade unions and employer organizations. Conditions under *individual labor contracts* cannot be less favorable than those prescribed in the CLA, and if no such agreement is signed, by the conditions as declared by the Council of Ministers.

Generally, the legal framework of LM in Bulgaria gives a clear idea of the principle of its organization:

(1) Minimum wage bargaining is centralized and the government plays a central role.

step that converges to a certain extent to the European trend in wage setting, which takes account of regional specifics.

[34] See *Georgieva, M., B. Kolev*, 2000.

(2) Through CLA, higher than natural wage levels are negotiated and there is a clearly pronounced trend toward their setting on industry principle. The existing practice of including representatives from different professions and enterprises with different socioeconomic indicators in the CLA for a given industry makes its implementation pointless.
(3) The government interferes implicitly by delegating great power to trade unions. Similarly, the government influences big associations of employers while strengthening its position through the formation of small artificial employer organizations.
(4) The individual labor agreement is of fictitious nature for the employee as he/she is protected sufficiently by the respective industry union and the employer is forced under CLA to pay him/her a wage that is not tied in any way with labor rates and productivity and may be higher than the equilibrium level.
(5) Labor legislation in Bulgaria (CLA in particular) grants more rights to employees than to employers (the theory of the weak partner). Employer participation in collective bargaining has adverse effect on his business, leading to worsened competitiveness (outflow of human capital) and financial position.[35]
(6) Compared with the former Labor Code, the amended Labor Code (ZIDKT) provides for reduced labor market flexibility and enhanced employee role. The attachment to the draft that was brought in for consideration by parliament (National Assembly, 2000) states the need to remove "the vicious practice of chained term labor contracts." According to the currently effective ZIDKT, a term labor contract may be extended only once and for a term of not less than one year (see Article 68, para. 3). The following text is eloquent: "Labor legal relation with a worker or employee shall not be terminated upon: enterprise acquisition, enterprise merger, enterprise split into several enterprises, transfer of an individual part of an enterprise to another enterprise, *change of enterprise ownership* or an individual part thereof, lease of an enterprise or an individual part thereof, rent or concession" (Article 123, para. 1). Then the question arises: what market economy is this that prohibits the new owner to restructure his business? This, in the conditions of a currency board! Moreover,

[35] For a detailed comment on the issues arising from CLA, see *Georgieva, M*. (2000). According to employers polled by the author, clauses agreed on in CLA concerning additional social and other benefits "create conditions for unreasonable spending and financial collapse of the enterprise."

ZIDKT states that employees have "the right to timely, reliable and understandable information on the economic and financial state of the employer" (Article 130, para. 1)![36]

In general, centralized and industry wage setting, to a certain extent, dominate in Bulgaria. Industry wage setting is probably the worst configuration. For if something is certain in the context of wage setting, definitely industry formation does harm the smooth operation of the CB. Within EU framework, modern trends tend toward transition to individual and regional wage setting.[37]

Finally, in section five we examine the euro as a way to solve the CB credibility problem and its impact on CB state.

Bulgaria's Integration into the European Monetary Area and Euro Introduction: A Way to Solve the Problem with CB Credibility and Enhance Labor Market Flexibility

A Brief Recount of the Discussion on Optimum Currency Areas (OCA)

As we pointed out, real exchange rate flexibility needed in the event of asymmetric shocks on aggregate demand and supply was (and still is) considered one of the traditional criteria for OCA formation. When the nominal exchange rate is fixed or a common currency is adopted, adjustments should come through movements in nominal wages and/or price levels in the countries within the area. Otherwise, unemployment in the country affected by a negative shock would grow. The shock could be absorbed if there is strong labor mobility within the area (this is according to Robert Mundell's classical theory of OCA). One of Mundell's basic arguments against fixed exchange rates and common currency formation is restricted labor mobility between the countries participating in the monetary regime.[38] Weak labor mobility within the EU was and still is

[36] And why not vice versa?

[37] Currently, centralized wage setting still exists in the EU, though with subsiding functions, while wage setting by industry is doomed to be finally removed.

[38] For example, Mundell assumes that a negative shock on aggregate demand in a given country would bring about unemployment that cannot be overcome. Therefore, the country should have its own currency in order to devalue it and restore demand. This argument can be reduced to the absurdity that each producer or economic agent could have his own currency to be able to devalue it and improve the relative prices of his products. For example, there would be no logical obstacles for the region of Kardjali, which is relatively isolated from the other regions in the country, to introduce its own money. Robert Mundell himself proposes that the USA be split into two geographic areas with their own currencies.

one of the main arguments against the formation of a common currency and monetary policy centralization (*Feldstein, M*., 1992), underpinned by the famous research in *Blanchard, O., L. Katz* (1992, 1999). According to their research, labor mobility between different US regions is considerably higher than in the EU, and unemployment dispersion is higher in the EU than in the USA.

In 1993, Paul Krugman formulated a new argument against OCA stability. According to him, the common area brings about specialization growth in countries and regions, which, in turn, leads to higher vulnerability to asymmetric shocks. Thus, integration brings about a reverse trend of self-destruction and a return to floating rates and national money. In actual fact, Krugman's approach aims to show the existence of two opposite trends leading to two different equilibria (both unstable), (*Krugman, P*., 1993). Actually, this idea is not Krugman's as it is present already in the *Wealth of Nations*, where Adam Smith emphasizes that division of labor leads to the emergence of common (metallic) money and specialization growth, and hence the desire of different groups of producers to lower the gold content in money and form their own money to boost production (to improve the relative prices of their products). It should be noted that in the late 60's Peter Cannon had already formulated almost the same OCA criterion according to which high trade diversification of a country is a good reason to join a common monetary regime.[39] The approach of *endogenous* formation gained ground in response to criticism regarding difficulties in OCA formation. In our opinion, this approach has two aspects that need be differentiated clearly.

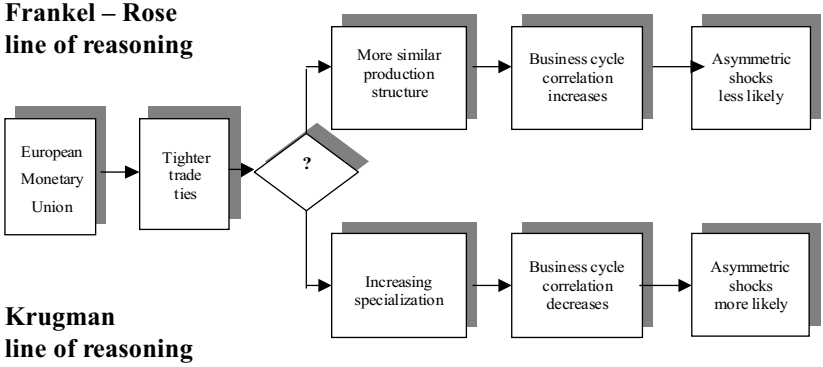
The first is fundamental and purely methodological. The theory of OCA can be viewed as a product of assuming economic theory and policy as a conscious process of constructing a certain reality and a possibility to choose tools in order for the state to aim at multiple targets. 'Optimality' is a category of exact sciences and is wrongfully applied to economic processes. In this line of reasoning, the optimum area cannot be evaluated and measured in advance, for it is not a social engineering product. The formation of a common monetary regime is an endogeneous outcome of economic agents' activity and a spontaneous discovery. Therefore, it may be assumed that OCA-related problems are artificially created to a great extent. This is confirmed by the fact that difficulties in finding its theoretical fundamen-

[39] The third approach to OCA was formulated by Ronald McKinnon and is linked to the requirement for open economy.

tals have existed for over 40 years. In 1984, Niehans voiced his concern (*Niehans, J.*, 1984) and 20 years later progress in the theory of OCA has stalled despite the great number of technical exercises.

Figure 3

INTEGRATION, SPECIALIZATION AND ASYMMETRIC SHOCKS



Source: Soltwedel, Dohse and Krieger-Boden, 1999, p. 49.

The second aspect of the analysis is purely technical. It is an issue of empirical evidence of the reversed causality between 'common' money and integration (money is no longer a consequence but a condition for the formation of a common economic and financial area). An example of this line of reasoning is the article by *Frankel, J., A. Rose* (1996) assuming a reversed logical chain compared with Krugman's, namely: common money —> intensified trade within the area –-> greater convergence between production structures —> synchronization and stronger correlation between business cycles in individual countries and regions —> lower probability of asymmetric shocks.[40] The choice between the two types of 'technical' reasoning is reduced to testing empirically whether specialization within the EU is increasing or decreasing.

Euro Adoption and the Labor Market in Bulgaria[41]

Whether we argue in the context of traditional OCA concepts or in the context of their endogeneity, adoption of the euro in Bulgaria has more advantages than disadvantages in terms of LM.

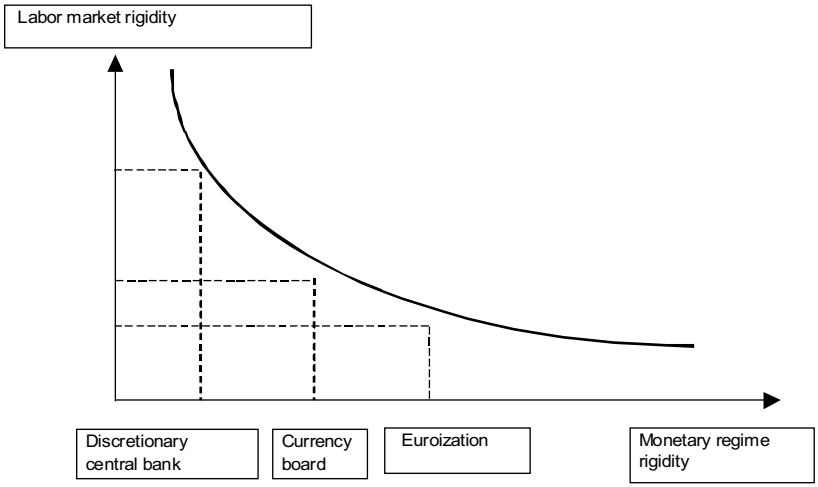
[40] See also *Frankel, J.* (1999).

[41] We are not concerned with the issue of when and how Bulgaria will adopt the euro. We assume that this will happen at a certain point in the future.

(1) As we saw, Bulgarian LM is rigid and lacks the flexibility that is needed in a CB arrangement and fixed exchange rate. Unemployment growth in Bulgaria exacerbates the credibility problem (the temptation to devalue grows). Euroization resolves radically the issue of CB credibility, eliminating the object of a possible attack: the national currency.

Chart 12

HYPOTHETICAL RELATION BETWEEN MONETARY REGIME AND LABOR MARKET



(2) We saw that the real wage rigidity index decreases after CB introduction. A tighter monetary regime and stricter fiscal policy requirements make LM more flexible. In a way, they serve as a constraint. Being an even tighter monetary regime, it may be assumed that euroization would provide the next, needed impulse for higher LM flexibility. In this sense, things are reversed: LM rigidity is not a threat under a rigid monetary regime but vice versa: a rigid monetary regime is a condition for LM liberalization. The relation between monetary regimes and LM flexibility can be presented graphically (see Chart 12).

(3) Euro adoption as legal tender will force decision-makers to change LM institutional fundamentals. Naturally, we should move to decentralized wage setting linked to the principle of

subsidiarity[42] (as is the trend in EU Member States), taking into account regional and enterprise specifics. Importantly, a focus should be placed on wage setting at regional level to ensure better reporting of the labor productivity level (to avoid imitation of richer regions in wage setting).

Probably households would welcome labor legislation liberalization more easily. This will reduce to minimum unemployment benefits and will eliminate the minimum wage[43] and a number of other transfers, which inhibit labor mobility and increase the moral hazard. Pension and social security systems might be reformed. As EU and US experience shows, liberalization in the other markets (especially the real estate market) has an equally strong effect on enhancing LM flexibility.

In general, institutional freedom[44] is needed for the formation of different configurations of labor contracts at all levels, including individual regions and firms. In addition, liberal LM institutional structure (low unemployment benefits, low or no minimum wage, easy layoff procedure) is crucial to faster government sector restructuring and privatization (*Garibaldi, P., Z. Brixiova*, 1997).[45]

(4) There are grounds for assuming that euroization will create more trade flows between Bulgaria and the EU than would divert outside of the EU. The process of trade flow creation, coupled with recent reliefs for Bulgarian citizens traveling abroad, as well as some trends toward encouraging entry of foreign workers and employees (e.g. the recent decision on accepting computer specialists in Germany[46] and the forecast of the European Council

[42] The principle of subsidiarity means that only those problems will be solved at a higher hierarchical level that cannot be solved or it is more expensive to be solved at a lower level.

[43] According to Prof. G. Petrov, the minimum wage has a more important role in hiding taxes and social payments.

[44] Competition between LM institutions may be viewed as a discovery in the spirit of Friederich Hayek and Isreal Kirsner. When there is no institutional freedom in the monetary field, this should be compensated in other parts of the economic system.

[45] It is not by chance that in their proposals for LM liberalization within EU (published by the IMF) the three German economists from the Institute for World Economy in Kill refer explicitly to Hayek's studies (*Soltwedel, R., D. Dohse, C. Krieger-Boden*, 1999). In two consecutive papers *Calmfors, L.* (1998, 1998a) presents a model for EU monetary policy, which besides traditional deviations from inflation and unemployment targets includes an indicator of LM institutional liberalization implementation in the loss function of the government. A similar parameter was used in the ECB function. The author concludes that more serious LM institutional reforms are needed in candidate countries than in eurozone member countries.

[46] A similar proposition is being discussed in Italy.

that 50 – 70 million immigrants to the EU will be needed within the next 40 – 50 years[47]) would enable a great number of Bulgarians to find jobs in EU countries. This would reduce the number of unemployed in Bulgaria both in terms of redundancies and directly through unemployment decline. As we pointed out, it may be expected that educated persons would accept less paid jobs in EU countries. Sociological studies show that Bulgarians possess high potential mobility. According to these studies, the majority of the young generation in Bulgaria rather prefers to emigrate and work abroad, mainly in EU countries.

Let's consider the issue from EU point of view. In a series of studies the German economist *Hans-Werner Sinn* (1996, 1999, 1999a, 2000) argues that the EU and Germany are also interested in importing workers from candidate countries, for this would increase the efficiency and competitiveness of the European economy. Inflow of workers from the new countries would make LM within the EU more flexible in the conditions of common monetary policy and strict fiscal policy community requirements for growth and stability.

According to him, the best solution (fist order optimum, as he calls it) requires not only complete removal of the barriers to labor mobility within the EU but also a significant restriction of transfers to future members to ensure protection against migration waves. According to the *Hans-Werner Sinn* model, after a certain period of time the migration flow would return to the new countries. This is the only market-efficient solution to the issue of optimum distribution of resources within the EU (labor, capital and technology). This is the lesson from the unification of East and West Germany.

Inflow of foreign workers would help overcome the threat to the pension systems in most EU countries, which face challenges associated with changes in the population pyramid.[48]

All this gives ground for assuming that euro adoption in the future would have a positive effect both on real wage flexibility and unemployment dynamics, and problems arising from the rigidity of the Bulgarian LM and its impact on CB stability would be reduced.

[47] *Hargreavs, D*. (2000), Brussels eyes immigration targets, *Financial Times* (22/11/2000).

[48] To maintain the state of the German pension system in 2030 at the same level 11 million immigrants will be needed at that time, provided that present life expectancy is preserved.

Conclusion

The results from the study can be summarized as follows:

(1) LM rigidity poses a serious threat to any rule-based monetary regime. The harder the monetary regime, the more urgent the LM liberalization. In the case of a currency board, the unemployment – devaluation trade-off is at the heart of the problem with monetary authorities credibility.

(2) Real wage flexibility is a major condition for absorbing possible shocks in the economy under a static central bank and a key element in the automatic adjustment mechanism of the currency board.

(3) In the analysis of LM, the dynamics and the relationship between the restructuring state sector and the new, private sector play an important role. There are sufficient empirical grounds for assuming that the private sector segment of LM is flexible while the state sector one abounds in imbalances and restrictions.

(4) A hypothesis may be stated of an illusory, quasi-unemployment in Bulgaria, related to the difference between actual and declared wages in the private sector. The difference is largely due to non-liberal legal framework of labor relations in Bulgaria, providing many rights and few responsibilities to employees and workers and considerable powers to the government to interfere in labor contracts (through the CLA system).

(5) Empirical studies and models show that real wages in Bulgaria are much more rigid than in EU countries. After CB introduction and fixing the exchange rate real wage flexibility increased considerably. Flexibility dynamics confirms the hypothesis that a harder monetary regime serves as a coercion on LM liberalization (i.e. a feedback effect exists).

(6) Real wage rigidity leads to accumulation of imbalances and conscious (or not) absorption of the shocks on unemployment through fiscal reserves, reserve money, money stock, etc.

(7) In the constructed panel model real wages are flexible in the following industries: commerce, hotels and restaurants, construction, paper and printing industries, food and tobacco industries, leather industry, real estate services, financial intermediation, manufacture of chemicals and their products. The following industries are characterized by rigidity: most of the heavy industries, gas and petroleum industries, health care, education, re-

search and development, public administration, etc. It is of note that private companies and entrepreneurship dominate the more flexible industries while state-owned companies dominate industries with rigid LM.

(8) Wage setting in Bulgaria is at variance with modern EU trends. It is necessary to shift toward a decentralized wage setting system. Introduction of the system of term contracts would be an important step in reorienting Bulgarian labor legislation from one providing employee protection to modern liberal legislation where the personal choice of the parties to the labor contract, the employer and the employee, will be dominant. Regretfully, ZIDKT not only does not enhance LM flexibility but in many respects is a step backward in comparison with the former Labor Code.

(9) Finally, Bulgaria's accession to the EU and euro adoption requires liberalization of the LM. On the other hand, accession and euro adoption will serve as a basis for enhancing LM flexibility and will mitigate unemployment and poverty problems. According to a number of studies on free labor mobility between Eastern Europe and EU countries, the latter will also benefit from this, i.e. this is a kind of first order optimum from the point of view of both labor markets.

Appendices

Appendix 1. Panel Model 1

Dependent Variable: DLOG(GN?+1)
Method: Pooled Least Squares
Date: 09/18/00 Time: 16:41
Sample(adjusted): 1998M02 1999M12
Included observations: 23 after adjusting endpoints
Number of cross-sections used: 38
Total panel (balanced) observations: 874

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003758	0.001433	-2.622500	0.0089
DLOG(GRW?+1)	-0.149445	0.012685	-11.78142	0.0000
R-squared	0.137318	Mean dependent var		-0.005157
Adjusted R-squared	0.136329	S.D. dependent var		0.045434
S.E. of regression	0.042224	Sum squared resid		1.554641
F-statistic	138.8017	Durbin-Watson stat		1.701869
Prob(F-statistic)	0.000000			

Appendix 2. Panel Model 2

Dependent Variable: DLOG(GN?+1)
Method: Pooled Least Squares
Date: 09/18/00 Time: 16:37
Sample(adjusted): 1998M03 1999M12
Included observations: 22 after adjusting endpoints
Number of cross-sections used: 38
Total panel (balanced) observations: 836

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000790	0.000795	-0.993795	0.3206
DLOG(GRW?+1)	-0.010474	0.009267	-1.130242	0.2587
DLOG(GRW?(-1)+1)	-0.009847	0.008402	-1.171984	0.2415
DLOG(GN?(-1)+1)	-0.049200	0.019257	-2.554902	0.0108
R-squared	0.008004	Mean dependent var		-0.000633
Adjusted R-squared	0.004428	S.D. dependent var		0.022835
S.E. of regression	0.022784	Sum squared resid		0.431900
F-statistic	2.237823	Durbin-Watson stat		2.379402
Prob(F-statistic)	0.082443			

Appendix 3: Panel Model 3

Dependent Variable: DLOG(GN?+1)
Method: GLS (Cross Section Weights)
Date: 09/18/00 Time: 13:54
Sample: 1998M02 1999M12
Included observations: 23
Number of cross-sections used: 38
Total panel (balanced) observations: 874

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_1–DLOG(GRW_1+1)	0.051106	0.040854	1.250918	0.2113
_11–DLOG(GRW_11+1)	-0.132663	0.028437	-4.665087	0.0000
_10–DLOG(GRW_10+1)	0.587045	0.164554	3.567499	0.0004
_13–DLOG(GRW_13+1)	-0.093153	0.032359	-2.878742	0.0041
_12–DLOG(GRW_12+1)	-0.016594	0.009363	-1.772331	0.0767
_14–DLOG(GRW_14+1)	-0.104485	0.041082	-2.543332	0.0112
_15–DLOG(GRW_15+1)	-0.032961	0.034784	-0.947598	0.3436
_16–DLOG(GRW_16+1)	0.005878	0.020350	0.288845	0.7728
_17–DLOG(GRW_17+1)	-0.256722	0.113131	-2.269238	0.0235
_18–DLOG(GRW_18+1)	-0.060114	0.089040	-0.675139	0.4998
_21–DLOG(GRW_21+1)	-0.000593	0.003161	-0.187576	0.8513
_20–DLOG(GRW_20+1)	-0.269051	0.149340	-1.801602	0.0720
_2–DLOG(GRW_2+1)	0.043061	0.077184	0.557902	0.5771
_19–DLOG(GRW_19+1)	-0.101148	0.075988	-1.331107	0.1835
_22–DLOG(GRW_22+1)	-0.463173	0.073922	-6.265668	0.0000
_23–DLOG(GRW_23+1)	-0.538964	0.029433	-18.31159	0.0000
_24–DLOG(GRW_24+1)	-0.411349	0.124575	-3.302025	0.0010
_25–DLOG(GRW_25+1)	-0.078817	0.040913	-1.926455	0.0544
_26–DLOG(GRW_26+1)	-0.001584	0.015780	-0.100365	0.9201
_27–DLOG(GRW_27+1)	-0.127211	0.038725	-3.284964	0.0011
_28–DLOG(GRW_28+1)	-0.331886	0.117183	-2.832200	0.0047
_29–DLOG(GRW_29+1)	0.091685	0.126032	0.727469	0.4672
_3–DLOG(GRW_3+1)	0.006462	0.024612	0.262565	0.7930
_30–DLOG(GRW_30+1)	-0.522363	0.134566	-3.881832	0.0001
_31–DLOG(GRW_31+1)	-0.055233	0.080598	-0.685292	0.4934
_32–DLOG(GRW_32+1)	-0.003154	0.009540	-0.330661	0.7410
_33–DLOG(GRW_33+1)	-0.027312	0.025634	-1.065426	0.2870
_34–DLOG(GRW_34+1)	0.037692	0.095114	0.396284	0.6920
_35–DLOG(GRW_35+1)	0.141328	0.134587	1.050088	0.2940
_36–DLOG(GRW_36+1)	-0.018491	0.191557	-0.096533	0.9231
_37–DLOG(GRW_37+1)	0.018744	0.050096	0.374167	0.7084
_38–DLOG(GRW_38+1)	-0.000808	0.052641	-0.015358	0.9878
_4–DLOG(GRW_4+1)	-0.053077	0.033170	-1.600155	0.1100
_5–DLOG(GRW_5+1)	-0.006367	0.022865	-0.278479	0.7807
_6–DLOG(GRW_6+1)	-0.179588	0.042067	-4.269134	0.0000
_7–DLOG(GRW_7+1)	0.016667	0.028280	0.589351	0.5558
_8–DLOG(GRW_8+1)	0.225684	0.221646	1.018215	0.3089
_9–DLOG(GRW_9+1)	0.125217	0.083162	1.505695	0.1325

Fixed Effects

_1–C	-0.003418
_11–C	-0.001452
_10–C	-0.005804
_13–C	-0.002417
_12–C	-0.000782
_14–C	-0.004706
_15–C	-0.001741
_16–C	-0.002223
_17–C	-0.005330
_18–C	-0.003162
_21–C	-0.000600
_20–C	-0.005880
_2–C	-0.001485
_19–C	0.000180
_22–C	-0.003779
_23–C	-0.000513
_24–C	-0.009610
_25–C	-0.002544
_26–C	-0.001530
_27–C	-0.001250
_28–C	-0.008193
_29–C	-0.000219
_3–C	-0.000747
_30–C	-0.013497
_31–C	-0.003399
_32–C	-0.000254
_33–C	-0.001252
_34–C	0.005865
_35–C	-0.001347
_36–C	-0.000578
_37–C	-0.003799
_38–C	-0.005215
_4–C	0.001588
_5–C	-0.000612
_6–C	-0.005330
_7–C	-0.000390
_8–C	-0.009665
_9–C	-0.006661

Weighted Statistics

R-squared	0.403214	Mean dependent var	-0.006064
Adjusted R-squared	0.347126	S.D. dependent var	0.043921
S.E. of regression	0.035488	Sum squared resid	1.005026
F-statistic	14.57199	Durbin-Watson stat	2.178377
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.442304	Mean dependent var	-0.005157
Adjusted R-squared	0.389888	S.D. dependent var	0.045434
S.E. of regression	0.035488	Sum squared resid	1.005026
Durbin-Watson stat	2.191680		

Industry Classification:

1. Agriculture; 2 Forestry and fishery; 3. Coal mining, dressing and briquetting, oil and gas extraction; 4. Metal, uranium and thorium mining and dressing; 5. Mineral quarrying and mining; 6. Food, drink and tobacco products; 7. Textiles, textile articles and knitwear; 8. Clothes and allied articles; 9. Leather, fur and footwear industry; 10. Wood processing; 11. Cellulose, paper, printing and publishing industry; 12. Coke, refined petroleum products and nuclear fuel; 13. Chemicals, chemical products, synthetic and artificial fibers; 14. Rubber and plastics; 15. Nonmetal mineral feedstocks; 16. Metallurgy; 17. Metal casting, metal processing, manufacture of machines and equipment; 18. Electrical machinery and equipment, precision instruments and apparatus; 19. Transportation equipment; 20. Other industries; 21. Electricity, gas and water supply; 22. Construction; 23. Trade and repair of motor vehicles and household equipment; 24. Hotels and restaurants; 25. Transportation and travel agencies; 26. Communications; 27. Finance, credit and insurance; 28. Real estate and renting services; 29. Research and development; 30. Business services; 31. Public administration, compulsory social security; 32. Education; 33. Health care; 34. Veterinary care; 35. Other services and NGO activities; 36. Utilities; 37. Culture; 38. Sport and recreation.

Table 3

Employment Distribution by Sector in the European Union and the USA

	1978	1998
EU		
Agriculture	11.8	5.1
Industry	38.8	30.4
Services	49.4	64.5
USA		
Agriculture	2.7	2.7
Industry	31.1	23.6
Services	65.2	73.7

Source: ECB Monthly Bulletin, May 2000.

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The Financial System in the Bulgarian Economy

Jeffrey Miller, Stefan Petranov

Abstract. In this third revised edition the authors chronicle the changes that took place during and following the crisis in 1996 and 1997. This edition has been extensively revised to reflect these changes. The sections on the Bulgarian National Bank and the money supply have been extensively revised to reflect the changes brought about by the establishment of the currency board. New sections have been added on nonbank financial institutions and the currency board. (The section on the Law on the Settlement of Nonperforming Credits has been dropped.) In the conclusion the authors have added a discussion of the impact on the financial system of efforts to join the European Union.

Резюме. В това трето издание авторите отбелязват промените, настъпили по времето на кризата от 1996 г. и 1997 г. Изследването е разширено, за да отрази настъпилите промени. Разделите за Българската народна банка и паричното предлагане също са разширени, за да отразят промените вследствие създаването на паричния съвет. Добавени са и нови раздели относно небанковите финансови институции и паричния съвет. (Разделът за Закона за уреждане на необслужваните кредити е премахнат.) В изводите авторите добавят разглеждане на дискусията относно отражението върху финансовата система на усилията за присъединяване към Европейския съюз.

Contents

Preface

In 1991 the University of Delaware-Bulgaria Coalition, with the support of the United States Agency for International Development, began a program of economics education for Bulgarians. A difficulty in teaching courses in money and banking at that time was the absence of summary materials that captured the specific detail of the Bulgarian economic system. The first edition of this monograph sought to fill that gap.

The intended audience was students of money and banking, who might use the book as a supplement to western textbooks on the subject. No attempt was made to explain standard concepts in money and banking, but rather to place the Bulgarian situation within the standard context and vocabulary.

Research for this project began in the autumn of 1992 as a class exercise for the Advanced Economics Program. The final class assignment for students in the money and banking course was to investigate a specific aspect of the Bulgarian banking system. The original monograph was an integration and embellishment of the papers that resulted from their research. The program participants who contributed to the manuscript were Svetlana Alexandrova, Anna Andonova, Kamen Antanassov, Tzvetan Bonev, Georgi Chalakov, Stoyan Iliev, Roumiana Ilieva, Jordon N. Jordanov, Jordan V. Jordanov, Dimitar Kanev, Hristo Mavrov, Antassia Miteva, Anton Pashov, Nedailka Petkova, Lambrin Shpatov, Valentin Vulov, and Plamen Yossifov. The monograph was published in 1993 by the Bulgarian National Bank.

As the Bulgarian banking system continued to change, the second edition was published in early 1996. It included a more complete description of the activities of the Bulgarian National Bank and a discussion of the Law on the Settlement of Nonperforming Credits which had been passed in the interim period.

After writing the second edition, it had been our intention to write a third edition within the next two years. This would have meant rewriting the monograph during 1996 and 1997. This was the middle of the financial crisis. Events overtook us. We decided that the system was changing so quickly that anything we wrote at that time would be out-of-date before the ink was dry.

In this third revised edition we chronicle the changes that took place during and following the crisis in 1996 and 1997. This edition has been extensively revised to reflect these changes. The sections on the Bulgarian National Bank and the money supply have been extensively revised to reflect the changes brought about by the establishment of the currency board. New sections have been added on nonbank financial institutions and the currency board. (The section on the Law on the Settlement of Nonperforming Credits has been dropped.) In the conclusion we have added a discussion of the impact on the financial system of efforts to join the European Union.

A project of this size could not be successfully completed without the help of many people. Over the years the leadership and staff of the Bulgarian National Bank have provided much needed encouragement and support. Publication of the early editions would not have been possible without Lubomir Christov, formerly Chief Economist, who provided much encouragement and reviewed the entire monographs. Former Deputy Governor Mileti Mladenov, also provided wonderful support during these early years.

The present leadership and staff of the Bulgarian National Bank have also provided great encouragement. We would especially like to thank Roumen Avramov, who read and commented on the entire manuscript, and Martin Zaimov, whose support made the project possible. Members of the research staff Nickolay Nenovsky, Kalin Hristov and Boris Petrov also reviewed the manuscript and gave generously of their time and expertise to help us**.** ***Darina Koleva was very helpful with technical support and assistance.***

Special thanks are due to Virginia Miller and Andrew Kenningham who assisted with the production and provided comments on the first edition**.** Stan Shumway has provided much needed encouragement throughout the many editions of the monograph. Lew Staples ***and Tzvetan Mantchev*** provided helpful comments on the most recent manuscript. ***Sonia Baleva helped us with data processing and technical formatting of the text .***

The United States Agency for International Development (USAID) through their grant to the University of Delaware has provided financial support for all three editions. Most recently this support came through FLAG International LLC, under a management contract with the University of Delaware, a USAID-funded private sector strengthening project in Bulgaria. The second edition would not have been possible without a 'Twinning Grant' from the National Research Council (U.S.A.). The project has also benefited from support from the Bulgarian National Bank which has covered translation and publishing costs for each of the three editions.

As can be seen, this monograph owes much to many. The remaining errors, however, are the sole responsibility of the authors.

I. Monetizing the Bulgarian Economy

If capital is at the heart of capitalism, then well-functioning capital markets are at the heart of a well-functioning capitalist economy.[1] *Joseph Stiglitz*

While all economies must organize production and distribute the output of production among members of society, the institutions which pro-

[1] Stiglitz (1992), p. 161. This chapter draws heavily on Stiglitz's description of the institutional requirements for development of capital markets during the period of transition.

duce and distribute goods and services are very different in centrally-planned economies (CPEs) and capitalist economies. As Bulgaria has transitioned from a CPE to a capitalist economy, many financial arrangements have been dramatically altered.

One essential difference between the two systems is the importance of money in capitalist economies. In a capitalist economy *money buys goods*. When money buys goods, resources are directed towards those economic agents enterprises or consumers who have money. This contrasts sharply with the situation in a CPE where the role of money is much more limited. Inputs to enterprise production are determined not by the money that the enterprise has, but rather by central planners. Even in the area of retail sales where money is more commonly used in a CPE, money is less important than it is in a capitalist economy. Who obtains goods and services is often determined by non-monetary criteria. In a CPE having money does not necessarily mean that an individual can purchase a good.

Prices were released, or freed, in Bulgaria in February 1991. Suddenly money bought goods. The economy was „monetized," although not without creating serious stress as the new role of money was superimposed on old practices. Two transition problems are of special importance. The first has its roots in the different incentives for household saving and consumption that arose when the economy was monetized. Because money had not been particularly useful for purchasing goods in the CPE, many people had saved large sums. When goods could finally be purchased with money, this „monetary overhang" created a large demand for the existing supply of goods. A sharp increase in prices ensued. This along with an inability to control increases in the money supply generated an inflation that was not really brought under control until a currency board was established in 1997. The second problem is in the production sector. Under central planning financial statements, framed in monetary units, were used to account for firm inputs and outputs. Useful as these financial statements might have been for the central planners, they did not play a direct role in allocating resources to firms since money could not be used to purchase goods. If enterprises needed additional credits to account for the goods allocated to them under the plan, the credit was advanced. The difficulty was that this old governmental practice of providing additional credits persisted long after the production sector became monetized. When money was advanced to enterprises in the form of loans, it was used to purchase inputs or pay wages so that scarce resources are being allocated in the process. However, the money was often advanced without doing careful evaluations of the credit worthiness of the enterprises. As a result financial resources were not being directed towards the most productive activities. Valuable resources were wasted.

In part there were important political reasons why the state banks made these loans. Politicians feared that if too many enterprises suddenly

failed because of lack of credit, this would cause serious economic disruption, and there would be political problems. Eventually, too many resources were wasted and the economy could not be brought under control. In 1996 and 1997 there was a financial crisis and the economic disruption led to demonstrations in January 1997. The Videnov government fell, and there were new elections in April 1997.

The new government established a currency board in July 1997. Under a currency board, banks must be much more careful when they make loans. The question now is whether the banks are making enough loans and whether they are making good decisions when they make their loans. We will return to these questions in later sections.

As these examples illustrate, the movement from central planning to market institutions brought with it a big change in the role of money. With this must come a redefinition of the whole set of financial arrangements and practices that support a monetized economy. Stiglitz (1992, p. 163) lists eight functions that must be performed by financial institutions in a market economy:

1) Management of the medium of exchange;
2) Transferring funds from savers to investors in new economic production;
3) Pooling small amounts of savings so that larger projects can be undertaken;
4) Choosing among projects so that the most productive projects receive the most support;
5) Monitoring the use of funds so that they are used in the intended way;
6) Enforcement of loan contracts so that the loans are repaid;
7) Definition of how risks will be shared among borrowers and lenders when new economic projects are undertaken;
8) Lowering of risk by creating methods for diversification of investment risks.

None of these functions was performed by the financial system under central planning. Since money did not buy goods, even the management of the medium of exchange, the first function, was done differently. The other seven functions involve investment decisions, which were made by central planners using very different criteria than the evaluation of risks and profits. In creating its financial system, Bulgaria has been faced with the challenge of creating institutional *structures* that will perform these necessary *functions*.

Although the functions of financial systems are consistent across capitalist countries, their structures vary significantly. For example, German and Japanese banks are tied much more closely to nonfinancial firms than in the United States. This reflects both cultural and historical differences. During each stage of the transition, important choices were made regarding the design and structure of financial institutions but, as has been true in

other places, history does matter. Choices made during the early stages influenced later decisions as the new financial institutions began to take shape. It is important, therefore, to understand how financial institutions have evolved over time.

The development of a financial sector in Bulgaria began with reform of the existing banking system. What was initially a monolithic bank was broken up into two tiers – a central bank and commercial banks. Loans and accounts of state enterprises were distributed among the new commercial banks. Under central planning all savings accounts of individuals were held at the State Savings Bank. This changed so that commercial banks were allowed to accept deposits. While these changes created a structure that superficially looked like the banking systems in capitalist economies, more fundamental changes were required before the system could successfully perform basic financial market functions. Over time progress has been made in improving the functioning the banks, but important questions still remain.

At this point, it is time to retrace our steps. We shall first expand the discussion of the structure of financial institutions to which we have alluded by outlining the two-tier banking system as it is now codified in Bulgaria. In the next three sections we will trace the development of the financial system during the transition period. We begin with commercial banks. From the beginning of the transition they have been the most important financial institutions in the Bulgarian economy. In Section III we look at a broader set of financial institutions. Many of these institutions like the capital market and pension funds played almost no role in the economy before the financial crisis of 1996 and 1997. They still play only a small role, but as we will see, they will be increasingly important as the financial sector becomes more sophisticated. Then in Section IV we analyze the efficiency of the commercial banks. New financial institutions like the currency board were created to prevent further crises. In Section V we describe the functions of the Bulgarian National Bank in its new role as a currency board.

We have said that the Bulgarian economy is monetized, but have not discussed the formal Bulgarian definitions of money, an omission that will be corrected in Section VI. This section also explains how the composition of the money supply has changed over time. Section VII provides a formula for the money supply and shows how various actions will affect the money supply. Section VIII provides an overview of the performance of the currency board and identifies some areas where potential problems could arise. In the concluding section we shall briefly turn once again to Stiglitz's functions of a financial system to assess the progress of Bulgarian financial institutions in performing their new roles in a market economy and discuss whether Bulgarian financial institutions will be able to meet the requirements for entry into the European Union.

II. The Structure of the Commercial Banking Sector

The present section presents an overview of the key characteristics of the banking sector in the Bulgarian economy. In the early transition period financial sector reform began with the reestablishment of commercial banks. Since then commercial banks have been the most important financial institutions in the economy.

1. Post-socialist Restoration, Crisis and Development of Commercial Banks

During most of the communist era, all banking functions were the responsibility of the Bulgarian National Bank (BNB), which had absorbed through the process of nationalization all existing commercial banks. The BNB was under the direct control of the Council of Ministers. Besides the BNB there were only two other banks: the State Savings Bank, which was the only bank permitted to hold the accounts of individuals and the Bulgarian Foreign Trade Bank (now Bulbank), which handled all foreign exchange operations for the country. In 1987 specialized or sector-specific commercial banks were formed, each restricted to lending in a particular area such as the chemical industry or transportation.

At the end of 1989, following the dramatic political changes that year, major institutional reform took place in the banking system as it moved to a two-tier system with a central bank on one tier and many commercial banks on a second tier. The sector-specific banks were then transformed into universal banks which loaned to all sectors of the economy. At the same time, new local commercial banks were created out of the 59 branches of the BNB.

In June 1991 the Law on the Bulgarian National Bank came into effect, altering fundamentally the roles, objectives and functions of Bulgaria's central and commercial banks. In 1992, another key financial act, the Law on Banks and Credit Activity, was passed. This law established the regulatory framework for the activities of banking institutions. Under this law, all banks, even state-owned banks, were given significant autonomy.

These more independent state-owned commercial banks quickly proved to be very inefficient. They lacked lending expertise, and many were very small. To overcome these problems the government established the Bank Consolidation Company (BCC) to encourage the formation of larger state-owned banks through mergers.

Outside this consolidation process, however, many new private banks entered the market. Since only limited regulatory controls were in place at the time, these banks operated in an environment without the regulatory supervision found in developed market economies. In many instances the financial resources needed to open these private banks was borrowed from state-owned banks (or from other undetermined sources). The origins of the private banks would shape their later behavior and contribute to the 1996 – 1997 financial crisis.

Table 2.1 shows the number and type of banks in Bulgaria over the 1991 – 2000 period. The patterns of entry and exit reflect the changing legal and supervisory structure.

There are clearly two distinct periods. The 1991 – 1995 period was dominated by policies that promoted the development of comparatively large state-owned banks while restricting the entry of foreign banks. The total number of banks decreased as the Bank Consolidation Company encouraged small state-owned banks to merge. The total number of state-owned banks fell from 72 in 1991 to 12 in 1995. During this same period, 25 small private Bulgarian banks entered the market. Not a single state-owned bank was privatized.

At the outset of the reforms foreign banks were not allowed to open branches in Bulgaria. Finally, in 1994, two foreign banks, the Greek Xios Bank and the Dutch ING-Bank, set up branches in Sofia.[2] By the end of 1995 two other banks had opened branches and three foreign banks received full licenses from the Bulgarian regulators to open new banks in Bulgaria.[3] Still, these banks were very specialized, limiting their activities to international settlements.[4]

Table 2.1

Number of Commercial Banks by Category

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Large Banks	*3*	*4*	*6*	*9*	*9*	*6*	*6*	*6*	*7*	*8*
Ownership										
State	3	4	6	9	9	6	5	4	4	2
Private	0	0	0	0	0	0	1	2	3	6
Ownership by country										
Bulgarian	3	4	6	9	9	6	5	4	4	2
Foreign	0	0	0	0	0	0	1	2	3	6
Small and Medium Banks	75	76	34	29	28	19	22	20	20	19
Ownership										
State	69	65	19	6	3	1	1	1	2	1
Private	6	11	15	23	25	18	21	19	18	18
Ownership by country										
Bulgarian	75	76	34	29	25	14	14	12	11	10
Foreign	0	0	0	0	3	5	8	8	9	9
Branches of Foreign Banks	0	0	0	2	4	4	5	7	7	8
Savings Banks	1	1	1	1	1	1	1	1	0	0
Total	**79**	**81**	**41**	**41**	**42**	**30**	**34**	**34**	**34**	**35**

Source: BNB

[2] A bank is categorized as a foreign bank if over 50% of the equity capital is owned by a foreign legal entity or individual; otherwise, banks are categorized as Bulgarian.

[3] The National Bank of Greece and the Ionian Bank opened branches. Raiffeisen Bulgaria, BNP-Dresdner Bulgaria, and Bayerishe-Bulgarishe Handelsbank obtained Bulgarian banking licenses.

[4] Formally, there were no legal restrictions on foreign banks to compete in the local market.

Given their comparative advantages in reputation, viability, international contacts and experience, these foreign banks were clearly in a position to put strong competitive pressure on local Bulgarian banks. An important policy issue at that time was how much to restrict the entry of foreign banks into the Bulgarian market. Foreign banks could bring skills and experience. On the other hand, Bulgarian banks needed time to become fully competitive, and uncontrolled entry by foreign banks might have created an environment where Bulgarian banks could not survive. The protectionist policies of the 1991 – 1995 period were a compromise. Foreign banks were allowed to enter, but only if they specialized in a limited range of services.

Inadequate laws, insufficient institutional capacity and limited foreign competition led to a number of problems during the 1991 – 1995 period. Bank managers were able to exploit loopholes in the law for private advantage at the expense of different goups of economic agents. In the case of state owned banks managers exploited depositors, lenders and taxpayers. In the private banks the controlling shareholders and managers often colluded or acted together to prejudice the depositors, lenders, small private shareholders, and taxpayers (by means of government bank rescue mechanisms).

The level of bad loans soared as banks pursued misguided credit policies. Indeed, '[u]ntil 1996, commercial credit was expanded to the nonfinancial sector in Bulgaria to a degree that was unprecedented relative to any other European transition economy' (OECD, 1999, p. 32). As Table 2.2 shows more than 74% of bank loans were nonperforming by 1995.

Many of these loans were unsecured (i. e. either there was no collateral or the assets used as collateral were overvalued on the books).[5] The risk and maturity structure of assets and liabilities was poorly managed by the banks, and internal audit systems were weak or nonexistent.

Table 2.2

Classification of Bank Loans in 1995 by Size of Banks (%)

Banks	Performing	Substandard (30 days overdue)	Doubtful (90 days overdue)	Uncollectable
Large	17.3	64.3	3.9	14.5
Small and Medium	49.0	28.6	4.8	17.6
Total for the Banking System	25.9	54.5	4.2	15.4

Source: BNB, Annual Report, 1995

[5] An additional problem during this period was the absence of a centralized collateral registration office where banks could check to see if there was a lien on the asset. Because banks were unaware of previous loans, borrowers were able to use the same asset as collateral on more than one loan if the loans were from different banks.

While state-owned and private banks shared many of the same deficiencies, there were also some significant differences. State-owned banks had many loans to state-owned enterprises that dated back to the pre-reform period (pre-1989). The government tried to reduce the burden of these loans by replacing these loans with government debt. The program failed, in part however, because the government also continued to pressure the banks to extend further loans to weak enterprises which were unable to repay.[6]

Many private banks were established by entrepreneurs who wanted to finance their other business activities. Even though large loans to bank managers and owners were restricted by law, these laws were not generally enforced. Often these loans to managers and owners of private banks were not repaid.[7]

As the banks grew weaker, the BNB provided more loans (i. e. refinancing) to the banks to keep the larger banks from failing. In the process the BNB lost control over the money supply (as these loans increased the size of the monetary base), and inflation ensued. This led to the crisis in the banking system in the second half of 1996 when the BNB placed 14 commercial banks under special supervision and later demanded that they should be declared bankrupt.

Following the 1996 – 1997 financial crisis, the Parliament passed two new laws; one for the Bulgarian National Bank and another for the commercial banks. These laws are designed to remedy the shortcomings of earlier legislation and provide more resources for bank supervision and regulation. The new Law on the Bulgarian National Bank altered the structure of the BNB so that it was transformed into a currency board. The currency board introduced strict controls over money supply.

Another important institutional change in the post-crisis period was the introduction of the Deposit Insurance Fund (DIF). The Law on Bank Deposit Guaranty, passed in April 1999, insures all commercial bank deposits of individuals and nonfinancial institutions up to BGN 6,900.[8]

All commercial banks must participate and pay insurance premiums into the DIF.[9] Annual premiums are 0.5% of the deposit base on 31 De-

[6] The largest program designed to help the banks was the ZUNK bond program of 1993. For a critical appraisal of this program, see *Miller* and *Petranov* (1996, chapter 8).

[7] In 1997 an attempt was made to encourage delinquent borrowers to pay back old loans. A list of delinquents was published. This list of the so called 'credit millionaires' was full of companies related to bank managers and owners.

[8] The Fund guarantees 95% of deposits up to BGN 2,000. For deposits exceeding BGN 2,000, the Fund guarantees 80% of the deposits on the next BGN 6,250. Thus, the maximum amount a depositor can receive from the Fund is BGN 6,900. This is the maximum regardless of the number of deposit accounts at the bank or whether the deposit accounts are in lev or foreign currency.

[9] Branches of foreign banks are obliged to participate as well unless their mother institutions participate in a system of guarantees in their home country which provides the depositors with the same or better guarantees.

cember of the preceding year. New banks must pay an entry fee within 30 days of the bank's registration equal to 1% of the bank's equity capital but not less than BGN 100,000.

The funds held by the DIF are conservatively invested in high liquidity low risk assets (i.e. government bonds, short-term commercial bank deposits and BNB deposits). Payments from the DIF are made when the Bulgarian National Bank withdraws a banking license, and the bank has insufficient funds to cover its deposit liabilities.[10]

To further strengthen the banking sector, the IMF and the World Bank encouraged the government to initiate a comprehensive program to privatize all state-owned banks. The earlier policy carried out during the 1991 – 1995 period where the Bulgarian banking community was given an opportunity to develop under restrictions on foreign bank entry was deemed a failure. Under the new policy the goal was to privatize the state banks quickly and create foreign competition through extensive foreign ownership of the banks.

With the privatization of Bulbank, the largest bank in Bulgaria, only three banks were still under state control at the end of 2000. These state-owned banks hold less than 20% of total banking system's assets.[11] Foreign banks can now enter the local market in three ways: purchase banks, open branches or establish Bulgarian subsidiaries.[12] All Bulgarian state-owned banks that have been privatized (through 2000), were bought by foreign institutions. The pattern of ownership in the banking sector has changed radically. Once there was no foreign ownership, at the end of 2000 more than 73% of banking system assets were either in foreign owned banks or branches of foreign banks. When Biochim and the State Savings Bank are sold to foreigners, this number will rise to more than 90%.

Many of these foreign banks are well known international banks (i. e. BNP and Unicredito). Others are less prominent institutions or off-shore institutions registered in off-shore zones like Cyprus where disclosure rules make it difficult to identify the owners.

Since most banks were privatized between 1998 – 2000, it is still too early to determine whether this strategy will be successful. If foreign banks

[10] During its first year and half, the DIF made payments to depositors of the Credit Bank and Balkan Universal Bank when the Bulgarian National Bank withdrew their banking licenses.

[11] These banks are: Biochim Commercial Bank for which the government has launched concrete plans for privatization; the State Savings Bank which is being reorganized in preparation for privatization and the Encouragement Bank which was created specifically to support small business.

[12] Normally foreign banks have purchased state banks, but there is already an example where a foreign bank bought a previously privatized bank. National Bank of Greece bought UBB from Oppenhaimer and the European Bank for Reconstruction and Development.

bring experience and new products that foster competition, this will be a successful policy. But if foreign banks do not support Bulgarian enterprises, channel scarce funds abroad, treat foreign companies preferentially and do not develop a full range of banking services, then the economy will continue to suffer from an inadequate financial system.

2. Dynamics and Structure of the Banking Sector

From 1991 to 2000 total bank assets in nominal terms rose from BGN 462.8 million to BGN 9.7 billion.[13] See Table 2.3.

This enormous growth was entirely due to high inflation during this period. If recalculated in dollar terms at the exchange rate effective in the relevant year, total bank assets actually dropped from USD 21.2 billion to USD 4.1 billion.

Table 2.3

Banking Sector Assets, Liabilities and Macroeconomic Indicators (mln BGN, end-of-year)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total Bank Assets	462.8	582.3	809.5	1,071.7	1,088.9	3,300.6	8,076.2	7,588.6	8,223.4	9,773.5
Growth rates (%)		25.8	39.9	32.4	1.6	203.1	144.7	-6.0	8.4	18.8
Funds Attracted from Nonfinancial Insitutions and Clients	114.8	147.1	221.6	405.5	573.6	1425.9	5471.6	4933.9	5470.0	
Growth rates (%)		28.1	50.6	82.0	41.5	148.6	283.7	-9.8	10.9	
Claims on Nonfinancial Institutions	164.4	218.6	281.3	434.5	461.6	1479.9	1843.6	1853.9	2399.4	
Growth rates (%)		32.9	28.7	54.4	6.2	220.6	24.6	0.6	29.4	
BNB Refinancing	18.8	16.3	22.7	36.4	25.0	84.4	0.0	0.0	0.0	
Growth rates (%)		16.7	44.4	60.4	-31.3	237.6	-100.0	0.0	0.0	
Money Supply, M2	108.4	164.7	229.9	409.1	571.3	1,244.6	5,750.7	6,328.8	6,914.0	
Growth rates (%)		51.9	39.6	77.9	39.6	117.9	362.1	10.1	9.2	
Nominal GDP	135.7	200.8	298.9	543.4	880.3	1,748.7	17,055.0	21,570.7	22,776.4	
Growth rates (%)		48.0	48.9	81.8	62.0	98.6	875.3	26.5	5.6	

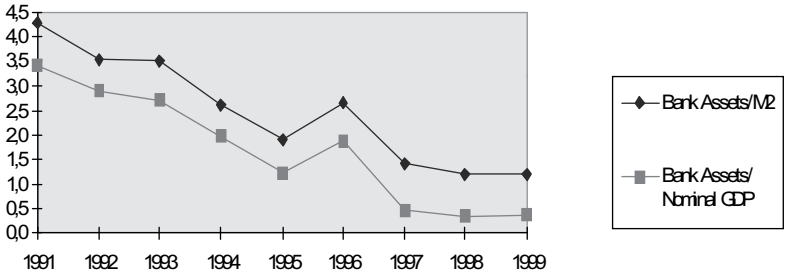
Source: BNB

As shown in Figure 2.1, the ratio of bank assets to the money supply (M2) also fell sharply. A similar downward trend is evident in the ratio of bank assets to nominal GDP. These ratios stabilized after 1998.

[13] These figures include the assets of all commercial banks and the SSB. The SSB had a special status as the only savings bank until 1999.

Figure 2.1

Relative Size of Total Bank Assets



Source: BNB.

A central function for commercial banks is financial intermediation. One way to measure this activity is to look at data on funds attracted from nonfinancial institutions (i. e. savers) and data on bank claims on nonfinancial institutions (i. e. investors) (see Table 2.2). Funds attracted from nonfinancial institutions and other customers are essentially funds in deposit accounts at banks. While these funds rose dramatically in nominal terms between 1991 and 1999, this was again entirely due to inflation. In dollar terms they fell to a little more than half their original level (USD 5.3 billion in 1991; USD 2.7 billion in 1999).

Bank claims on nonfinancial institutions (i.e. bank lending) followed a similar trend. While nominal growth was high, in dollar terms they fell dramatically from USD 7.5 billion in 1991 to USD 1.1 billion in 1999.

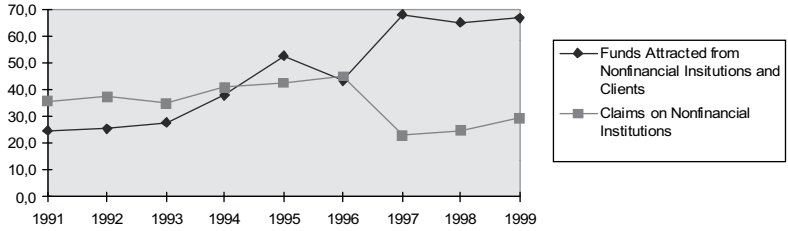
Bank behavior during the pre- and post-crisis period is clearly different. In the 1991 – 1995 period, banks borrowed heavily from the BNB or from one another through the interbank market.[14] As a result the share of funds attracted from nonfinancial institutions was only 25% – 50% of total liabilities. At same time during this period lending policies were lax as banks came under government pressure to extend loans to state-owned enterprises and loans were extended to businesses with a relationship to bank management teams. Bank claims on nonfinancial institutions were in

[14] Much of the activity on the interbank market was money being sold to commercial banks by the State Savings Bank which dominated household deposits market during this period. Ater the crisis the SSB continued to have a large share of this market although its share droped as a result of increased competition. It is difficult to determine precisely SSB's share of total household deposits, but they have probably fallen from about 70 – 80% in 1995 to about 30% in 2000.

the range of 40% – 50% of total bank assets, a relatively high share compared to the post-crisis period and to the experience in other counties in transition.[15]

Figure 2.2

Share of Funds Attracted from Nonfinancial Institutions and Claims on Nonfinancial Institutions as a Percentage of Total Bank Assets



Source: BNB

These ratios have changed since 1996. Under the currency board the BNB cannot make loans to commercial banks, and the interbank money market performs its normal function of providing only short-term and emergency financing. As a result, the share of bank funds attracted from nonfinancial institutions has increased to 65% – 67%. At the same time, banks have implemented new stricter lending requirements. Given the high risk of lending to the real sector of the economy and more conservative bank credit policies, the relative share of bank claims on nonfinancial institutions has declined to 25% – 29%.

Intermediation is a central function of a banking system. An important question is whether the Bulgarian banking system is performing this function well. In retrospect, it is clear that the banking system performed this function very poorly during the pre-crisis period. Money that was deposited with banks was lent to businesses that did not repay the loans. This is a strong indication that savings was not invested properly. While it is better to be careful with money than to waste it, the prospects for economic growth would be far better if the banking system performed its intermediary function well and made good loans to the real sector of the economy. Thus far for a large part of the period 1991 – 1999 the banks have not demonstrated widely that they have both the expertise and the motivation to do this.

[15] This ratio for Hungary is 40%, and is 30% in Poland. Publicly available Czech financial statistics do not distinguish between banks' claims on financial and nonfinancial institutions.

3. Is There Competition in the Banking Sector?

Competition in a sector is often gauged by the degree of concentration, especially among the largest firms in an industry. Competition is considered to be more intense when there are many companies of relatively the same size. The Herfindahl index and the fourfirm-concentration ratio are commonly used indicators of industrial concentration.[16] The smaller the concentration ratio the higher the level of competition. Table 2.4 provides several measures of concentration in the Bulgarian banking sector. The Herfindahl index and the concentration ratio are estimated on the basis of three indicators of bank size: (1) total bank assets; (2) bank claims on nonfinancial institutions, and (3) funds attracted from nonfinancial institutions and other customers.

Table 2.4

Measures of Concentration for the Banking Sector

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Bank Assets										
Herfindahl's Index	0.38	0.33	0.30	0.15	0.11	0.19	0.12	0.11	0.12	
Concentration Coefficient (%)	80.9	77.2	73.4	60.3	53.0	62.1	56.2	56.3	57.0	
Claims on Nonfinancial Insitutions										
Herfindahl's Index	0.18	0.19	0.24	0.24	0.12	0.23	0.13	0.10	0.08	
Concentration Coefficient (%)	69.2	64.5	66.0	63.0	50.1	67.8	56.5	47.7	43.6	
Funds Attracted from Nonfinancial Institutions and Other Clients										
Herfindahl's Index	0.15	0.15	0.15	0.13	0.13	0.15	0.12	0.11	0.13	
Concentration Coefficient (%)	66.2	59.2	57.3	54.7	57.5	62.6	56.3	58.9	61.7	

Source: BNB

In general, the concentration measures followed a similar pattern over the pre-crisis and post-crisis periods. From 1991 to 1995 concentration levels fell. In the immediate post-1995 period concentration increased as insolvent banks were closed. Then concentration decreased again over the 1997 – 1999 period.

With respect to bank assets, the Herfindahl index shows a steady decline between 1991 and 1995. It then rises slightly during the crisis in 1996 before declining again in the post-crisis period. Thus the index shows a tendency towards a more even and balanced distribution of assets among banks. The concentration ratio also declined over time with 57% of bank assets in the four largest banks in 1999.

[16] The Herfindahl index is estimated using the following formula: $H = \sum s_i^2$, where s_i is the share of company i in the sector. The index reaches its maximum value of one if there is a monopolist in the market. The concentration ratio is the sum of the market shares of the four largest companies in the sector.

Claims on nonfinancial institutions show some contradictory trends. The four largest banks lost market share, but the Herfindahl index rose steadily during the 1991 – 1995 period. This suggests that concentration was rising, but this greater concentration was occurring below the level reported by the four largest banks. This phenomenon can be attributed to the ZUNK Law. Enacted in 1994 this act allowed banks to substitute government debt (ZUNK bonds) for state-owned enterprise nonperforming credit, this reduced the level of claims on nonfinancial institutions. Large state-owned banks were the main beneficiaries of this program.

Following 1996, both the concentration ratio and the Herfindahl index based on claims on nonfinancial institutions reported a significant decline, reflecting growing competition in the lending market.

The Herfindahl measure for funds attracted from nonfinancial institutions remained relatively stable over the entire 1991 – 1999 period although it decreased slightly during 1991 – 1994. The four-firm concentration ratio, on the other hand, declined steadily throughout the period. As pointed out above, the amount of funds attracted declined dramatically in real terms over this period. As the amount declined, competition intensified. In the post-crisis period, these competition indicators have changed little as the economy stabilized and inflation fell. These changes also reflect the reorientation of the banks over this period. During the 1991 – 1994 period, many banks began to build their branch networks attempting to attract household deposits in addition to enterprise deposits. As a result, the SSB, which had dominated this market segment, lost much of its market share.

There are many aspects and dimensions of banking sector competition. Over the first decade of transition, bank services have became more diverse. New types of deposits are now offered, credit and debit cards are available and e-banking services are being developed, although on a very limited scale. While these services cannot match the diversity and quality of services in the developed market economies, they are expanding.

While banks competed to supply new financial services, price competition has not been so evident. As Table 2.5 shows, the spread between deposit and loan interest rates has been high throughout the 1990s. In the pre-crisis period this relatively high interest rate spread reflected the financial difficulties of troubled state-owned banks. Interestingly, the new private banks did not opt to compete by offering narrower spreads. Instead, competition was directed towards offering new services and banks made an all out effort to capture new customers. The high spreads in the early 1990s were also a result of the common interest rate policy.[17] During the financial crisis the spreads became very high as inflation volatility threat-

[17] This was a policy coordinated within the Association of Commercial Banks in the 1992 – 1994 period. Under this policy all banks voluntarily set common interest rates on deposits and loans.

ened bank profits. After 1997 with the establishment of the currency board, spreads have fallen but they remain very high at 8% – 9%. These spreads are especially high considering that inflation has stabilized and interest rates on deposits have fallen to the 3% – 4% level.

The reasons for these large spreads deserve further study. Low deposit rates discourage savings and high credit rates discourage investment. Two possible explanations include: (1) a lack of competition and (2) a risky loan environment. The banks have a dominant position from the viewpoint of the saver since the capital market still does not provide a viable alternative. Private sector pension funds are just beginning their operations and investing abroad was forbidden until 2000. It is not easy for most people to invest in government bonds which would give them almost the same rate of return. In short, there are still no alternatives comparable to bank deposits. Furthermore, there is little competition within the banking sector. With the exception of the largest cities, there are only one or two bank branches in a town, which is not enough to generate strong competition.

Table 2.5

Annual Interest Rate Spreads and Deposits Rates

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Interest Rate Spread	18.3	26.3	37.5	36.1	153.8	129.0	11.1	10.3	9.2
Deposit Intersest Rate	55.8	52.0	65.1	43.7	146.4	80.8	3.0	3.3	3.0
Spread/Deposit Rate	0.3	0.5	0.6	0.8	1.1	1.6	3.7	3.1	3.1

Source: BNB, authors' calculations.[18]

On the credit side, high interest rates may reflect high risks related to changing ownership structure, changing management, limited markets, and unstable economic conditions that are still part of the economic landscape in Bulgaria. But lack of competition may also be an important issue here as well. Because the capital markets are still so undeveloped, enterprises that need credit have no other place to go but the banks.

4. Conclusion

The commercial banking sector went through enormous change during the last decade of the 20th century. The early part of the 1990s was a period of extensive institutional reform. These reforms were unsuccessful, and there was a major financial crisis in 1996 – 1997. The period since the crisis has produced greater stability as new institutions have been put into place, but there are still many challenges ahead. The sector is still dominated by large banks. Due to high risk and lack of competition, interest

[18] Calculated by averaging annualized monthly interest rates.

rate spreads are too great. Banks loan too small a part of their funds to the real sector of the economy and channel a lot of scarce funds abroad. The financial services market is still heavily segmented, and the competitive pressure of foreign financial institutions while steadily growing, remains weak. Most of the banking sector has been privatized by foreign investors, but this has yet to bring about a significant change in the quality or in the range of services offered.

III. Nonbank Financial Institutions[19]

The establishment of the currency board, and the financial stabilization that has come with it coincided with the end of the first wave of mass privatization. This first wave was modeled after an earlier Czech program where citizens paid a small fee for vouchers that could be used to bid for shares in state-owned enterprises in national auctions. (Miller and Petranov, 2000a)

Once the mass privatization auctions were concluded, there was increased pressure to develop new capital markets so that the new shares could be traded. New regulations were passed and, unlike the Czechs who did not establish a regulatory agency immediately, a Securities and Stock Exchange Commission (SSEC) was created in Bulgaria.

At about the same time pressures began to build to find better ways to manage the pension system. The value of state pensions had seriously eroded during the early 1990s, and the government turned its attention to creating private institutions that could provide additional channels for retirement savings.

Increased stability and lower inflation since the establishment of the currency board also made it easier for a private insurance market to develop. By passing new laws and making it more difficult to obtain a license, the government was also able to reduce mafia influence that had been very extensive in the insurance industry. The next section presents an overview of recent developments in the capital markets. These markets have gotten off to a rocky start with low volume and poor liquidity. The insurance industry, which is analyzed in Section 2, has experienced the most growth among nonbank financial sectors but is still relatively small. New pension systems are beginning to expand and should show more rapid growth in the future. An analysis of these developments is presented in Section 3.

[19] This section drows heavily on *Miller* and *Petranov* (2000b)

1. Capital Market and Capital Market Institutions

1.1. Laws and Institutions

1.1.1. The Legal Basis for Capital Market Institutions

In June 1995 the Law on Securities, Exchange and Investment Companies (LSSEIC) was passed and actions were undertaken to create a regulatory structure and reorganize the capital market. The Securities and Exchange Commission [now the State Securities Commission (SSC)] was then established (January 1996) and the Central Depository opened (August 1996). Following the last auctions in the first wave of mass privatization, the Sofia Stock Exchange and the Bulgarian Stock Exchange merged and formed the Bulgaria Stock Exchange – Sofia (BSE – Sofia). This new exchange opened in October 1997. The LSSEIC was later amended and in 2000 was supersceded by the Law on the Public Offering of Securities (LPOS). The changes incorporated in LPOS reflect experience gained during the early years of capital market development and bring Bulgarian law into close alignment with the EU *acquis.* While it is too early to judge what the full impact of these changes will be, there already appears to be improvement in general corporate governance procedures.

1.1.2. Bulgarian Stock Exchange – Sofia

The BSE – Sofia operates three separate markets, i. e. an official market, a free market and a bond market. In addition, there is also a separate market where shares of state-owned enterprises are sold as a part of the state's privatization program. The official stock market is subdivided into three segments. The specific listing standards for each segment are given in Table 3.1.

Table 3.1

BSE Official Market Listing Standards

	Segment A	Segment B	Segment C
Completed years with audited financial statements	At least 3	At least 2	At least 1
Market capitalization	At least BGN 20 million	At least BGN 10 million	At least BGN 500,000
Part of the issue owned by minority shareholders (%)	At least 25%	At least 10%	At least 5%
Number of shareholders	At least 400	At least 100	At least 100
Average monthly turnover – number of shares	At least 1,000	At least 1,000	The issue should consist of minimum 50,000 shares

Source: Proceedings Rules of the Sofia Stock Exchange.

Municipal and corporate bonds can also be listed on the bond market. New bond issues must be at least BGN 1 million, and the maturity must be at least 6 months. Issuers of corporate bonds must have completed at least three financial years. Government securities could also be listed on the bond market but are not presently intensively traded because their market is technically organized by the BNB.

Although the barriers to official market listing are very low, there are still very few market participants. For individuals, trading directly in the market is relatively expensive. Few companies have tried to raise additional capital by issuing new bonds and none have tried by issuing shares.

The BSE – Sofia is organized as a joint-stock company, the state has a 37.6% interest, and the remaining shares are owned by financial institutions, i.e. banks, investment intermediaries, financial brokerage houses and insurance companies. BSE – Sofia is managed by a Board of Directors which is responsible for the operations of the exchange. All decisions as to membership, trade in securities and sanctions against stock exchange members are coordinated through a five member *ad hoc* committee with representation from shareholders in the exchange, members of the exchange, stockbrokers and issuers of securities. The BSE – Sofia has also established a court of arbitration and a guarantee fund to guarantee transparency of transactions, equal treatment of traders and strict observance of obligations.

The BSE – Sofia is striving to improve its operation by focusing on the trading system and the clearing and settlement system. It is trying to improve its information technology systems and even create a system where remote trades can take place. Nevertheless declining turnover jeopardizes the viability of the stock exchange as an institution. While the stock exchange reported a profit in 1998, in 1999 it registered losses of BGN 56,000. Losses are even higher for the financial year 2000: BGN 106,000.

1.1.3. The State Securities Commission

The State Securities Commission (SSC) was established to ensure protection of investors' interests and promote the development of the securities market. The seven officers of the Commission are appointed by the Council of Ministers on the recommendation of the Finance Minister. Officers serve for 5 years.

The Commission regulates the issuance of new securities and monitors transactions in securities. It oversees the establishment and operation of stock exchanges, investment intermediaries and investment companies. It also proposes and drafts new legislation. For example, the Commission deserves credit for the important role it played in bringing LPOS, the new securities law, into line with the EU *acquis*.

Licensing and supervision are at the core of the Commission's activity. Institutions regulated by the Commission are required to submit reports to the Commission on a regular basis and notify the Commission of important changes. The Commission can require the disclosure of information and/or carry out on-site inspections. If the Commission finds violations or identifies an investor who needs protection, the Commission can authorize and impose sanctions and administrative penalties directly.

Central Depository

Under LPOS (as well as previously under the LSEIC), all companies that offer their shares publicly have dematerialised shares (i. e. bookkeeping entries only) , and their shareholder registration books are kept by the Central Depository. The Depository is also responsible for the settlement of transactions (i. e. it also acts as a transfer agent).

The Depository was established as a joint-stock company in August 1996. The company's shareholders include the BNB, the Ministry of Finance, commercial banks and investment intermediaries. The Depository has a five member Board of Directors. Two members are representatives of the BNB and the Ministry of Finance. Either the BNB or the Finance Ministry can veto decisions of the General Meeting of Shareholders.

All transactions must take place on the BSE – Sofia and must be recorded by the Depository. Since only Depository members are authorized to carry out registrations, all transactions must be negotiated via investment intermediaries who are also members of the Depository. Clearing and settlement are guaranteed within three days.[20]

The establishment of the Depository has greatly facilitated trade and transactions in securities. In other transition economies where shareholder books are kept by the companies themselves, the accuracy of these records have been questioned, further eroding confidence in the markets. There have only been a few controversies regarding shareholder registrations in Bulgaria, and there is confidence that transactions in securities are timely and accurately filed.

Investment Intermediaries

Under LPOS, all transactions on the BSE – Sofia must be concluded by licensed investment intermediaries. Nonbank investment intermediation licenses are issued by the SSC. When banks obtain their banking licenses from the BNB, they also receive a license as investment intermediaries. Still banks are required to register with the SSC as agents carrying out investment intermediation.

[20] Until the end of 2000, it was possible to carry out off-the-exchange transactions under very limited conditions. This loophole was exploited by some traders and substantial trading actually took place off the exchange. See *Petranov* and *Miller* (1999) for a more extensive discussion of this issue.

To trade on the BSE – Sofia an intermediary must become a member of the exchange, and establish a trading post manned by stockbrokers certified by the SSC. The SSC also reviews the capital adequacy, liquidity, and managerial competence of investment intermediaries. The SSC issues two types of licenses: partial licenses allowing intermediaries to render brokerage services and full licenses which also allow intermediaries to deal on their own account and underwrite new issues.

By mid-2000, there were 101 licensed investment intermediaries of which 29 were commercial banks. For such a small and shrinking market, this is a large number. Seven or eight large investment intermediaries control between 55% – 65% of the BSE – Sofia turnover and the twenty most active intermediaries account for about 80%.

Given this situation, investment intermediaries have opted for reducing operating costs and have turned to trading off-the-exchange instruments like compensatory notes.[21] Table 3.2 shows how the situation has changed. While the number of intermediaries has been increasing slowly, many intermediaries are not members of the BSE – Sofia and do not have trading posts. These firms do not attach great importance to on-the-exchange business and are mostly involved in outside activities like trading in compensatory notes.

Table 3.2

Number of Investment Intermediaries (including commercial banks)

	31.12.1998	30.06.1999	31.12.1999	31.06.2000
Licensed by SSC	78	92	97	101
Deregistered by SSC	0	1	1	2
Members of BSE – Sofia	61	73	76	78

Source: Public Register of SSC.

1.1.4. Investment Companies

An important part of the mass privatization program was the participation of privatization funds. These funds collected vouchers from citizens and then used these vouchers to bid for firms in the privatization auctions. After the first round of the mass privatization program concluded, these funds became investment companies.

Later, however, these companies were required to declare themselves holding companies or continue their status as investment companies. Holding companies can make loans to companies in which they hold 25%

[21] Compensatory notes are notes created as part of the restitution process. These notes have been given to previous owners of property that could not be physically returned. The notes can only be used to bid in privatization auctions, but they can be transferred.

or more of the shares.[22] Investment companies are intended to have more diversified portfolios and are not permitted to hold more than 10% of the shares in any one company.

All but five of the original privatization funds became holding companies.[23] As a result there are only five registered investment companies now. Four became closed-end companies and only one, Zlaten Lev, became an open-end fund. Unfortunately, no special legislation was passed to regulate holding companies so, even though they are really financial institutions, they are operating under the general commercial code. This is a potentially dangerous situation for the financial sector.

1.2. General Conditions of the Capital Market

In spite of establishing extensive market institutions and regulatory agencies, trading has been so light that it threatens the viability of the market and raises important issues regarding the mass privatization program upon which the capital markets were built.

Stocks, as measured by the Warburg 30 Index of the largest market capitalization stocks, performed most successfully in the initial period. The index was set to 100 in December 1997. The index reached its high in May 1998 at 165 but fell to 67 in late 2000. Other market indicators have followed a similar trend. For instance, total market capitalization peaked in the second quarter of 1998 at BGN 3 billion but had fallen to BGN 1 billion by mid-2000.

Market activity has also fallen over the 1999 – 2000 period. The number of listed companies has declined and activity has diminished[24]. Large block trades are an important percentage of overall turnover. During the early months of 1998 there were a large number of block trades as previous agreements made between privatization funds or between foreign investors and privatization funds during the voucher auctions were settled.

After a lull, block trades are again an important part of overall turnover in the market. Block trades, although they are recorded as taking place on the exchange, are not normal trades. These are agreements negotiated off the exchange and reflect attempts by large shareholders to gain more concentrated ownership positions. A better gauge of the liquidity of the BSE – Sofia auction market is turnover and the number of nonblock

[22] In the present environment where the banks are providing little credit and interest rates on loans are high, these loans can benefit both the holding companies and the companies in their portfolios. The loans provide liquidity to the companies, and the holding companies which often have representatives on the board can evaluate the risk.

[23] One company Zlaten Lev split into two parts. One part is a holding company and the other continues to be an investment company.

[24] The new LPOS allowed that small companies (with registered capital less than BGN 200,000) whose shares were initially auctioned in the mass privatization to become closed companies trough a decision of the General Meeting of Shareholders. Many companies used this opportunity.

market transactions. As Table 3.3 shows, liquidity has fallen dramatically based on both of these measures. Transactions in the first two quarters of 2000 were occurring at about half the rate they were in 1998. Turnover has fallen from a high of BGN 52.0 million in the second quarter of 1998 to only BGN 11.1 million during the entire last six months of 2000.[25]

Table 3.3 shows large increases in both regular and block trading in the last quarter of 2000. This increase reflects new rules requiring that all trading take place on the BSE – Sofia. It has been estimated that 82% of all shares were traded off the exchange in 1999. In the last quarter of 2000 the Central Depository started recording transfers of shares only from the stock exchange. Thus the increase in trading in the table probably reflects a shift from off- the-exchange- trading to on- the-exchange trading rather than a true increase in the number of shares traded.[26]

The increase in bond trading in 2000 reflects two changes. Private companies issued two new bonds, and it became technically possible to trade some government securities on the BSE – Sofia.

[25] The total turnover including block trading is BGN 65 million. This compares with turnover on the Prague market of approximately USD 750 million and turnover on the Warsaw exchange of more than USD 2 billion. Some analysts believe that the Prague and Warsaw exchanges are too small to survive.

[26] Off-the-exchange transactions have been a serious problem since the very beginning of the exchange trade. Initially it was intended that all transactions in shares of companies that participated in the mass privatization program have to take place on the stock exchange. This restriction represented an attempt to seek better price integrity and market transparency. Even block trades that are negotiated off the exchange must be registered on the exchange. The only transactions that were allowed to take place off the exchange are swaps and dealings between individuals. In spite of these restrictions off-the-exchange trade far exceeded on the exchange trade.

Table 3.3

Indicators of trade on BSE- Sofia

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Official Market												
No. Companies	1	4	10	19	25	25	25	25	25	25	25	25
No. Shares (million)	0.247	0.444	0.912	1.365	0.546	0.611	0.265	0.928	0.467	3.906	0.260	0.222
No. Transactions	193	166	1,269	1,753	2,047	1,807	808	1,222	1,150	1,340	973	1,448
Turnover (million BGN)	5.2	8.7	3.4	2.7	1.4	7.6	0.6	1.6	0.9	1.5	6.0	0.2
Mkt Capitalization (million BGN)	17.5	48.1	182.4	243.4	268.5	268.2	242.1	219.1	255.6	325.0	277.2	283.5
Free Market												
No. Companies	322	983	983	979	844	844	826	828	811	734	545	478
No. Shares (million)	1.626	5.776	4.236	2.704	1.287	0.624	0.479	2.804	0.810	1.266	0.375	5.908
No. Transactions	277	4,903	6,376	4,141	3,982	2,711	935	1,757	1,494	1,463	809	1,318
Turnover (million BGN)	16.5	43.3	39.3	33.6	11.3	4.1	2.8	14.5	6.6	4.8	1.3	10.9
Mkt Capitalization (million BGN)	1,824	3,094	1,655	1,092	1,452	1,324	1,203	1,154	1,152	1,012	914	1,003
Subtotal												
No. Shares (million)	1.872	6.220	5.148	4.068	1.833	1.235	0.744	3.732	1.277	5.172	0.634	6.131
No. Transactions	470	5 069	7 645	5 894	6 029	4 518	1 743	2 979	2 644	2 803	1 782	2 766
Turnover (million BGN)	21.8	52.0	42.7	36.3	12.8	11.7	3.4	16.0	7.4	6.3	7.3	11.1
Block Trading												
No. Shares (million)	6.629	1.942	0.000	0.336	4.331	1.821	1.603	2.848	2.645	5.817	1.377	18.062
No. Transactions	318	117	0	8	51	42	14	46	46	40	29	157
Turnover (million BGN)	53.7	5.2	0.00	1.8	38.1	16.7	3.7	15.9	14.8	7.9	13.6	54.7
Bond Market												
No. Companies	0	0	0	0	0	0	1	1	1	1	1	2
No. Bonds	0	0	0	0	0	0	3,235	1,007	20	1	1,1449	16,805
No. Transactions	0	0	0	0	0	0	23	12	1	1	17	21
Turnover (million BGN)	0	0	0	0	0	0	0.2	0.2	0.0	0.0	1.2	2.4
Total												
No. Shares (million)	8.5	8.2	5.2	4.4	6.2	3.1	2.4	6.6	3.9	11.0	2.0	24.2
No. Transactions	788	5,186	7,645	5,902	6,080	4,560	1,780	3,037	2,691	2,844	1,828	2,944
Turnover (million BGN)	75.5	57.3	42.7	38.2	50.9	28.5	7.4	32.2	22.3	14.2	22.0	68.3

Source: BSE – Sofia.

In spite of the high cost of borrowing from banks, the capital market has provided only a limited alternative. Investment banking has not really developed. At the end of 2000, there had been only two offerings of corporate bonds and no primary issues of stocks. It is difficult to discern whether

the lack of investment banking is due to a lack of interest in new issues or inadequately trained investment bankers.

Why have the capital markets developed so slowly?[27] There are several factors. Some are external factors like the 1998 crisis in Russia and subsequent withdrawal of international investors from risky emerging markets. Other problems are internal, however. The core problem lies with the very genesis of the Bulgarian capital market in the mass privatization program. Over one thousand companies initially traded on the BSE – Sofia were part of the mass privatization program. Unlike companies in the West that come to the capital market to acquire new financing, these companies were registered as public companies in a purely administrative way without having any economic motivation to become publicly traded companies.[28]

Another important reason for the slow development of the capital market is that the government has failed to take important steps to help the markets expand. While new laws like LPOS should improve market conditions, it is important that efforts be made to ensure that the law is effectively enforced. This is particularly important if good corporate governance is going to be supported and shareholders' rights protected. The government could provide further support for the market if new laws were passed that provided equal tax treatment of all institutional investors and motivation for companies to go public.[29]

Several other transition economies have been successful in creating viable capital markets. Bulgaria has passed good legislation and established appropriate institutions to promote its capital market. Some big issues remain, however. It is important that the government take a more active role in promoting the market by ensuring that new laws are enforced and shareholder rights are protected. It can also help broaden the market by completing the sale of important companies like the telecommunications company.

2. Insurance

Before 1997 there was weak regulation of the insurance industry and few requirements to promote transparency. There were questions about whether insurance companies' capital came from legitimate sources and a number of powerful insurers were mafia-like businesses which often resorted to strong arm tactics.

[27] For a comparison between the capital market performance in other transition economies, see *Johnson* and *Shleifer* (1999), *Pohl*, *et.al.,* (1995), World Bank (1999) and OECD (1998).

[28] For further details on the impact of the genesis of the capital market on its future development, see *Petranov* and *Miller* (1999).

[29] For further information on the possible economic policy measures of the government that may promote capital market development, see *Petranov* and *Miller* (1999).

In 1997 and 1998, the insurance sector in Bulgaria was thoroughly restructured when the Insurance Law was substantially amended. Stricter requirements on insurers were imposed and the National Insurance Council (reporting to the Council of Ministers) and the Insurance Supervision Directorate (under the Ministry of Finance) were created to regulate the industry.

The highest regulatory body is the National Insurance Council. The Council has seven members with representatives from the Minister of Finance, the Minister of Justice, and the Minister of the Interior, and the CEO of the Insurance Supervision Directorate. The Council is chaired by the Finance Minister. It is responsible for licensing, authorization of mergers and divestitures, and bringing insolvency/bankruptcy proceedings.

The Insurance Supervision Directorate is responsible for daily regulatory matters. The CEO is appointed by the Prime Minister on the recommendation of the National Insurance Council. The Insurance Supervision Directorate monitors the overall activities of insurance companies and insurance brokers. These include control over products offered and insurance premiums charged. The Directorate also authorizes the promotion of new insurance products, determines the minimum premium amount on compulsory insurance and approves the annual reinsurance programs of insurers. It may also undertake certain administrative measures to stabilize the financial condition of insurance companies and oversee the sale of insurance portfolios when an insurer is undergoing liquidation.

Since the beginning of 1998 the National Insurance Council has instituted new licensing procedures for insurance companies and mutual insurance societies to bring insurers into compliance with the 1997 amendments to the Insurance Act. Most companies (87 out of 112) failed to meet the new stricter requirements and lost their licenses. Seventeen new joint-stock property insurance companies and another six life insurance companies and four mutual insurance societies were licensed in 1998.

Table 3.4 shows how the structure of the sector changed between 1997 and 1999. The sector is highly concentrated. In 1999 the State Insurance Institute – General Insurance, the largest property insurance company, accounted for nearly 30% of the market. The four largest companies controlled 70.2% of the market. The concentration of life insurance companies was even higher. In 1999, the State Insurance Institute had a market share of 62.4% and the four largest insurance companies 91.7%. Both the Herfindahl index and the four firm concentration ratio provide evidence that the sector is becoming more competitive, but concentration remains high.

In 2000 the largest companies in both segments of the insurance market were state-owned. Two other insurance companies were state-owned, and another company, the Municipal Insurance Company, was indirectly

controlled by the Sofia Municipality. The remaining companies were private, although there was an indirect state interest in some companies e.g. Bulstrad PLC. which was privatized. The gradual increase in the number of new private companies, the privatization of state-owned companies, and the entry into the Bulgarian market of well-established foreign insurance companies are positive signs that the insurance industry will continue to grow.

Table 3.4

Structure of the Insurance Sector

	General Insurance			Life Insurance		
	1997	1998	1999	1997	1998	1999
Number of insurance companies*	na	17	18	na	10	12
State-owned	3	4	3	2	2	1
Private	na	13	15	na	8	11
O/w foreign companies**	0	3	6	0	0	3
O/w mutual insurance societies	na	0	0	na	4	5
Herfindahl index***	0.458	0.421	0.384	0.774	0.756	0.658
Four-Firm Concentration ratio (%)***	84.1	76.4	70.2	97.2	94.1	91.8

* In 1997 the number of insurers (joint-stock companies and mutual insurance societies) totaled 112. Data, however, were not reliable enough to treat them in separate groups.

** Insurance companies with foreign shareholders owning over 50% of their capital.

*** 1997 estimates draw upon the market shares of the insurers licensed to operate in compliance with the amendments to the Insurance Law.

Source: Annual Report of the Insurance Supervision Directorate; Authors' Calculations.

Between 1997 and 1999, general insurance generated 90% of premium income. (Table 3.5) Total income from premiums in both segments, i.e. general insurance and life insurance, grew by almost 88% over two years.

Table 3.5

Total Income from Premiums for the Insurance Sector in Bulgaria (millions of BGN)

	1997	1998	1999
General Insurance	147.3	204.5	278.1
Life Insurance	17.5	28.3	31.6
Shareholding companies	17.5	27.6	30.9
Cooperatives	0.0	0.7	0.7
Total	164.8	232.8	309.7

Source: Annual Report of the Insurance Supervision Directorate.

Despite its impressive growth, the sector remains relatively small. Total

income from insurance premiums was only 1.36% of GDP in 1999 (see Table 3.6). This is far below other countries in transition. For example, in 1997 insurance premiums were 2.89% of GDP in the Czech Republic, 2.74 in Poland and 2.33 in Hungary. The penetration was 6.53% in Germany and 1.74% in Greece which has the smallest insurance sector in the EU.

Table 3.6

Macroeconomic and Insurance Sector Indicators

	1997	1998	1999
GDP (current prices, million BGN)	17,055.2	21,577.0	22,776.0
Gross Income from Premiums (million BGN)	164.8	232.8	309.8
Insurance Penetration (% of GDP)	0.97	1.08	1.36
Population (thousand)	8,283.2	8,230.3	8,190.8
Insurance Density (BGN)	19.9	28.2	37.82
Labor Force (thousand)	4,749.5	4,749.7	4,752.8
No. of Individuals w/ Life Insurance Policies (thousand)	-	1374.1	1,688.9
Percentage of labor force w/ Life Insurance Policies	-	28.9	35.5

Source: National Statistical Institute; Annual Report of the Insurance Supervision Directorate.

Under the Insurance Law, all insurance companies must invest insurance reserves in certain instruments. Furthermore, the structure of the various investment categories within total insurance reserves is also subject to regulation. At least 50% of reserves must be invested in bank deposits or government securities. In addition there are further limitations on other holdings: real estate cannot exceed 10% of total reserves; the share of municipal bonds cannot exceed 5%, and the share of corporate securities cannot surpass 30%.

Because the sector has been expanding, total assets and total insurance reserves have grown quickly. The insurance business, as a whole, is profitable, although some smaller companies have experienced losses in certain years (see Table 3.7).

Presently, insurance companies are pursuing very conservative investment strategies. Very few financial instruments meet their investment needs. The poor liquidity of most shares on the stock exchange has discouraged insurers from actively participating in the capital market. Furthermore, they do not have the expertise, information or experience to invest in risky assets. As a result, they tend to invest their reserves almost exclusively in bank deposits and medium and long-term government securities (see Table 3.7). This is a very low risk strategy, but it also means very low returns on insurance company investments.

Table 3.7

Net Profit, Total Assets and Reserves of the Insurance Sector (million BGN)

	General Insurance			Life Insurance		
	1997	1998	1999	1997	1998	1999
Net Profit	0.31	3.09	5.96	0.28	0.54	0.88
Total Assets	165.0	261.4	355.9	194.0	178.2	188.3
Total Reserves	39.6	86.4	103.2	108.5	86.8	79.0
Distribution of Reserves (%)						
Government Securities	3.7	13.5	40.7	53.2	56.9	75.6
Real Estate	0.0	8.6	5.18	0.7	1.7	8.0
Municipal Bonds	0.0	0.0	0.09	0.0	0.0	0.2
Corporate Securities	0.0	1.2	1.94	0.2	3.5	0.3
Bank Deposits	96.3	76.7	52.08	45.6	37.8	15.7
Loans against Life Insurance	0.0	0.0	0.0	0.3	0.1	0.1

Source: Insurance Supervision Directorate, Annual Report.

3. Pension and Health Insurance Funds

The first private pension funds were established in 1994. They started operating without any specific legal framework or regulation, drawing upon the general provisions of the Law on Commerce. In early 1999 there were 30 registered pension funds, but only a few were operating actually in 2000.

The retirement system now has three pillars. The first pillar is the existing mandatory state operated 'pay-as-you-go' social security system. The second pillar provides additional obligatory pension insurance for certain professions with high risk jobs and for individuals born after 31.12.1960. Employers and employees are required to make insurance contributions to special private pension funds. Employees have a choice of funds. The third pillar embraces the whole system of additional voluntary insurance. This third pillar is defined contribution pension insurance purchased by individuals on the free market from licensed pension insurance companies. In 1999 the Law on Additional Voluntary Pension Insurance (LAVPI) was passed. This Law provides a legal basis for the third pillar. LAVPI provides for state regulation and control of pension insurance companies and pension funds. The State Agency for Social Security Supervision under the Council of Ministers was established under the Law. The Agency is authorized to license and regulate companies selling pension insurance. The Agency is a legal entity funded by government with annual appropriations. The Council of Ministers is responsible for appointing the chairman of the agency and determining the number of staff. The law also establishes a Council for Additional Voluntary Insurance which has seven members

representing various ministries and the SSC. The Council is assisted by a representative of the Association of Companies for Additional Pension Insurance who performs advisory functions. The Council is chaired and convened by the Minister of Labor and Social Policy on a regular basis. It makes decisions regarding licensing and authorizes the merger or divestiture decisions of companies. Under LAVPI, the State Agency for Social Security Supervision began licensing pension insurance companies. Out of thirty original pension insurance companies only nine were able to meet the new stricter requirements and were granted licenses to establish and manage pension funds. It is estimated that at the end of 2000 the licensed pension insurance funds in Bulgaria manage BGN 50 million obtained from contributions from about 500,000 people.

Legally, pension funds are required to meet specific requirements and comply with a number of restrictions in implementing their investment policy. Investments are limited to certain instruments. Pension funds must invest at least 50% of their assets in government securities or bank deposits. There are also other restrictions. For example, no more than 10% of the assets can be invested in real estate and mortgages and no more than 10% of their assets can be invested abroad.

A special feature of the Bulgarian system is that licensed pension insurance companies can also establish funds for which pension premiums can be paid by investment bonds obtained as vouchers in the second wave of mass privatization program. However, most companies privatized so far in the second wave of the privatization program are in poor financial condition so their shares have been very illiquid. For this reason, investment bonds are considered unattractive asset for pension funds.

Indeed there are real potential problems here for the pension funds. If premiums are paid in investment bonds, the assets of pension funds will then consist of highly illiquid securities. At the same time, pension funds must make regular pension payments. This mismatch between the liquidity of assets and liabilities could destabilize the funds. For this reason, no licensed pension insurance company has decided to start such a pension fund.[30]

Pension funds should play an important role as the financial system develops. Because contributions to the 'second pillar' pension funds are mandatory, they should grow rapidly once some technical start-up problems are solved.

Health insurance, as provided for by the Health Insurance Law, and the pension insurance system have similar structures. Besides the mandatory health insurance system implemented by the state, there will also be funds for supplementary health insurance. Companies providing supplementary health insurance must be licensed by the State Agency for Insur-

[30] In the second wave of the mass privatization program using investment bonds as pension payments was supposed to support the mass privatization program. The program so far has been very small and has had little effect on overall privatization efforts.

ance Supervision. As 2000 drew to a close, there were no licensed health insurance funds as the licensing procedure needs further clarification.

4. Other Financial Services

Other financial institutions that are commonly found in countries with more developed financial markets have not made serious inroads in Bulgaria. In part this is due to the breadth of activities in Bulgaria's universal banks. For example, the development of mortgage banks, investment banks, savings banks, savings and loan associations, finance companies, leasing companies and public financial agencies is very limited.

Only four commercial banks extend housing loans backed by real estate as collateral. This activity may expand, however. The Mortgage Bonds Law (admitted in October 2000) details the rules for underwriting and trade in mortgage bonds. The expectation is that banks will be able to attract additional resources by underwriting mortgage bonds, thus giving rise to bond trading. This should foster supply and lead to the expansion of the housing loan market.

The State Savings Bank (SSB) functioned as a savings bank until 1999 when its legal status was changed and it became a commercial bank with broader authority to make loans and offer additional banking products. Still, the SSB has the largest branch network and customer base of any bank. Its business is still oriented towards consumer loans. The ongoing restructuring of the SSB will present a number of challenges since it lacks expertise in risk evaluation and still has a reputation for poor customer service.

Other financial institutions include the Agriculture State Fund which provides financial support to agricultural producers under different programs and the state sponsored Encouragement Bank. Agriculture Fund is also related to the accession process to the EU: it has been accredited as the single Paying Agency in Bulgaria to manage EU SAPARD funds.

Established in 1999 by the government, the Encouragement Bank enjoys a special status and is supposed to provide financing for small- and medium-sized businesses. After a little more than a year of unsuccessful operation, the Small- and Medium-Sized Enterprises Law, under which the bank was established, was amended by Parliament. The amendments have provided for the removal of restrictions on the bank's lending operations.[31]

5. Conclusions

When considering the expansion of nonbank financial institutions, there are important lessons from the early experience with commercial

[31] All state-owned banks except Biochim Commercial Bank and DSK Bank have been privatized. Many analysts argue that the Encouragement Bank was established by the government to again gain control of a commercial bank.

banks in Bulgaria. In the early 1990s, commercial banks were not properly regulated and this led to disastrous results.

Since 1997, real progress has been made in creating the appropriate legal and regulatory framework for the expansion of nonbank financial activities. While these steps are important, it is equally important that these new laws be enforced. Furthermore, regulatory organizations must find the right balance between enforcement that builds confidence in these new financial sectors, and regulation that stifles growth.

As yet, the insurance sector is the only sector that has seen significant expansion, but pension funds should begin to grow. The development of the capital market is less certain, but the expansion of the insurance and pension sectors should assist the development of the capital markets by providing a new demand for shares. An important question, however, is whether this will be enough to create sufficient liquidity in the capital market. If the capital markets remain illiquid, serious consideration should be given to closing the local stock exchange and organizing or participating in a larger regional effort.[32]

Nonbank financial institutions are too small to provide significant competition to the banks. If these nonbank institutions are able to gain public confidence and expand, this could create more competition for the banks and provide more financial resources to the real sector. This could improve the prospects for more sustained economic growth.

IV. Commercial Banks' Activities

Understanding the activities of commercial banks is important for at least two reasons. First, the principal mechanism for passing savings from individuals to investors is through the commercial banking system. This is Stiglitz' second required function of financial institutions in a market economy. Since the other financial institutions still play only a limited role in Bulgaria, the importance of commercial banks in this process of financial intermediation is great. Secondly, the banks play an important role in determining the money supply, a key macroeconomic policy variable. The various money supply definitions discussed in Section VI all include both cash held by the public and deposits at commercial banks. The role of commercial banks in the determination of the money supply is critical, as these deposits are the liabilities of commercial banks. We begin by looking at the items that appear on the balance sheets of commercial banks. Close analysis of the balance sheets provides valuable insights into bank behaviour and efficiency and provides a better understanding of the changes in business conditions and the institutional environment in Bul-

[32] If Bulgarian companies are traded on foreign or regional markets rather than local markets, it is still important that company law is enforced so that potential investors have confidences that their rights will be protected.

garia during the transition period. Then we consider how the commercial banks manage their assets and liabilities.

1. Consolidated Balance Sheet of Commercial Banks

Table 4.1. shows the consolidated balance sheets of the Bulgarian commercial banks in 1995 and 2000.[33] The 1995 figures are indicative of the financial conditions that existed in the 1991 – 1995 pre-crisis period. The period was characterised by dynamic changes in market share among banks, protectionist policies favouring local and state-owned banks, weak bank regulation and supervision, activist monetary policy, poor control over the money supply, bad enterprise debts and rising inflation.

Table 4.1

Consolidated Balance Sheet of Commercial Banks

	1995		2000	
ASSETS	**million BGN**	**%**	**million BGN**	**%**
Vault Cash and Current Accounts with the BNB	70.4	9.4	737.4	7.6
Claims on Banks and Other Financial Institutions	114.2	15.3	3,874.1	39.8
Securities in Trading Portfolio	232.7	31.2	1,065.3	10.9
Securities in Investment Portfolio	6.1	0.8	436.7	4.5
Credits to Nonfinancial Institutions and Other Clients	274.3	36.7	3,014.1	30.9
Other Assets	29.2	3.9	202.8	2.1
Fixed Assets	20.0	2.7	407.1	4.2
TOTAL ASSETS	**746.9**	**100.0**	**9,737.7**	**100.0**
of which pledged assets	**470.8**	**63.0**	**527.7**	**5.4**
LIABILITIES AND CAPITAL				
Deposits by Banks and Other Financial Institutions	178.1	23.9	740.5	7.6
Deposits by Nonfinancial Institutions and Other Clients	425.3	57.0	6,393.8	65.8
TOTAL DEPOSITS	**603.4**	**80.8**	**7,134.3**	**73.4**
Other Liabilities	55.0	7.4	1,114.4	11.4
TOTAL LIABILITIES	**658.4**	**88.2**	**8,248.7**	**84.8**
Capital	59.1	7.8	1,095.4	11.2
Reserves	29.0	3.9	393.5	4.0
OWN CAPITAL (CAPITAL AND RESERVES)	**88.1**	**11.8**	**1,488.9**	**15.2**
TOTAL LIABILITIES AND OWN CAPITAL	**746.5**	**100.0**	**9,737.7**	**100.0**
OFF-BALANCE SHEET LIABILITIES	**470.6**	**63.0**	**1,182.9**	**12.1**

Source: BNB

The 2000 figures reflect the post-crisis behaviour of banks. The 1997 – 2000 period witnessed the stabilisation of the banking sector, accelerated

[33] The balance sheets shown in the table were prepared in compliance with the National Accounting Standards (NAS) as they are currently applied. Over the years there have been several amendments to NAS as well as modifications in their interpretation and implementation rules. As a result, the classification of some assets has undergone important changes. Caution should be exercised in making data comparisons. For purposes of comparison, the 1995 consolidated balance sheet, prepared in compliance with the applicable NAS at that time has been readjusted to bring it into conformity with current standards.

privatization of state-owned banks, the entry of foreign banks into the Bulgarian financial market, passive monetary policies and low inflation under the currency board arrangement.

We now look in more detail at the most important assets and liabilities on the consolidated balance sheet.

1.1. Assets

Vault cash and current accounts with the BNB. This category includes all banknotes (cash) in the bank's vaults, required reserves at the Bulgarian National Bank, and transaction deposits at banks.

Banks keep cash funds to service the demands of their customers. Cash is widely used as a means of payment in Bulgaria. As a result the level of cash held by banks needs to be higher than in other countries where other means of payment are more common.

By law, commercial banks must meet required minimum reserve requirements established by the BNB. Under Article 41 para. 1 of the Law on the BNB 'the BNB shall lay down certain minimum reserve requirements commercial banks are required to meet, the methodology of calculation as well as the terms and conditions of paying interest on them.' At first (1991) the required minimal reserves were 7% of the total attracted deposits, but this ratio was raised in a series of steps during 1994 and 1995 until it reached a record high of 12% in April 1995. Later the requirement was stepped down to 8.5% as the BNB attempted in increase the amount of money outstanding. In the post-crisis period, the ratio was raised to 11% to maintain stability in the system. In mid-2000 it has been lowered to 8% as the performance of Bulgarian banks improved.

The BNB is allowed to set the interest rate on the minimum required reserves of commercial banks. Before August 1994, no interest was paid on these reserves. Between 1994 and 1999, the interest rate varied depending on economic conditions. In mid-1996 the interest rate was 36% as the BNB attempted to alleviate liquidity problems in the commercial banks. Currently, no interest is paid on minimum required reserves.

If banks provide services to customers holding foreign currency deposits, part of the reserves with the BNB may be kept in foreign currency. [34] Required reserves at the BNB are also used as settlement accounts, i.e.

[34] When the BNB introduced minimum reserve requirements in 1990, commercial banks were allowed to use foreign currency deposits to meet reserve requirements. The ratio of foreign currency reserves to lev reserves had to correspond to the ratio between the foreign currency liabilities and lev liabilities. This element of the monetary policy underwent a number of changes. There was a decision to remove foreign currency reserves by end-1993. At a later stage foreign currency reserves were once again introduced. In 1994, the relative share of foreign exchange reserves changed several times. Thus for instance in August 1994 alone monetary policies underwent two modifications (BNB, Monthly Bulletin, No. 8, pp. 42-43). Frequent amendments impeded bank planning and assets management. Presently, commercial banks can keep their reserves in foreign currency, but the ratio of foreign currency to lev reserves cannot exceed the ratio of foreign currency to lev liabilities.

clearing accounts.[35] When one enterprise makes a payment in levs to another enterprise and they are customers of different banks, the transfer of funds is cleared through accounts the commercial banks have at the BNB.[36]

The clearing system through the Central Bank is only applied to transactions in levs. Foreign currency transactions are settled by commercial banks themselves and to make settlements easier banks are required to hold foreign currency accounts with other banks. [37]

Claims on banks and other financial institutions. In this general category there are two types of claims: deposits at other banks and financial institutions, and loans to other banks and financial institutions. At the end of 2000, claims on banks and other financial institutions accounted for 39.8% of total bank assets, more than 2.5 times increase from 1995.

The percentage of claims on banks and other financial institutions has been relatively high in Bulgaria (when compared with international standards.) The reasons behind the high shares in 1995 and 1999 were radically different, however. In 1995 the high share was due to lending to emerging private banks and the special role of the State Savings Bank (SSB). State banks often loaned money to friends at emerging private banks. Also in 1995 the SSB was the largest deposit-taker. Other banks mostly borrowed from the SSB through the interbank money market.

By 2000 the picture was completely different. The banking system was largely privatized by foreign banks. Other banks besides SSB became also important deposit takers and did not have to borrow as much on the interbank money markets. Private banks were much less willing to loan to risky new emerging banks. Indeed banks were very conservative in their lending practices. Because there were still problems associated with lending to the real sector, banks began to rechannel a large portion of their money abroad, mostly as deposits to their mother companies. As a result, the relative share of these assets grew significantly.

Securities in trading portfolio and securities in investment portfolio. This item covers shares, bonds, other securities and transferable claims. These may be short-term instruments with maturities less than one year or long-term securities with maturities greater than one year. Short-term securities are used for hedging or speculation. Long-term securities not only pay interest and dividends they also provide the possibility of exercising control over other banks.[38]

[35] During part of the reviewed period commercial banks kept separate accounts with the BNB for required reserves and clearing transactions. This practice was abandoned in 1998.

[36] For more details see Section VII.

[37] Over the years several suggestions have been made to clear foreign currency transactions through the BNB. (BNB Regulation BUS 1092, Settlement in BNB, p. 2.1; 2.2.6).

[38] Banks are restricted to buy equity in companies other than banks. The total amount of bank's investments in real estate, tangible fixed assets and equity shall not exeed bank's own funds. (Article 30 para. 1, Law on Banks).

Due to the limited range of financial instruments in the underdeveloped capital market, banks hold mainly government securities. Indeed, close to 80% of outstanding government securities are held by banks. There are two types of government securities: securities issued for budget financing purposes and special-purpose securities. The bulk of special-purpose securities were issued under the Law on Settlement of Nonperforming Credits (ZUNK). These bonds were issued to cover the bad debts of state-owned enterprises.[39]

Between 1995 and 2000 the ratio of securities to total bank assets declined from 32.0% to 15.4%. The decline was entirely due to the lower volume of government securities issues as the overall government budget stabilized.

Credits to nonfinancial institutions and other customers. This category includes loans extended to both corporate and individual customers. Interest rates on these loans are freely negotiable between the lending bank and the borrower. One of the most important functions of commercial banking is lending to support the operations of companies. Legally, banks may extend loans in levs or foreign currency. More than half of corporate loans (between 50% and 60%) are in foreign currency.

Housing loans are the most important type of loans to individuals. Housing loans are normally extended by the SSB, which has traditionally provided services to this segment of the market. Recently three other banks, besides SSB, have begun offering mortgage loans.

The relative share of credits to nonfinancial institutions and other customers within total bank assets decreased in the post-crisis period from 36.7% in 1995 to 30.9% at the end of 2000. This compares with ratios of 50% – 60% in well-developed banking systems.

Several factors contribute to the low level of lending activity in Bulgaria. Banks are trying to avoid past mistakes made during the 1996 – 1997 crisis. In addition there are new legal requirements to provision for bad loans and stricter bank supervision. Risk associated with lending in the real sector is still high and is reflected in the large spreads between deposit and lending rates. On the other hand, some institutional changes are lowering risks. A public registry of collateral has made lending more secure.

Other assets and fixed assets: In addition to the income-bearing assets described above there are other assets that are not immediately income-bearing. Also there are fixed assets that help to support bank operations. It is noteworthy that banks are not allowed to invest in real estate, equipment and equity (with the exception of equity in other banks) that exceeds their own capital. This restriction has important implications for the role of banks in the management of companies in the real sector. It means that

[39] For a detailed description of the program and its implications see *Miller* and *Petranov*, 1996.

Bulgarian banks cannot play a role similar to German or Japanese banks which support, direct and help govern companies in the real sector.

1.2. Liabilities

Deposits of banks and other financial institutions. Commercial banks can borrow funds from other commercial banks, nonbanking financial institutions or from the BNB. In the early 1990s banks often deposited funds in other commercial banks. This was mostly state-owned banks placing deposits in private banks. As part of its monetary policy, the BNB also placed deposits in commercial banks. These deposits were unsecured loans being made by the BNB to commercial banks. The amount of these BNB deposits grew dramatically in the last two years before the crisis.

In the post-crisis period, the privatization of banks, amendments to bank legislation, and tough restrictions on the BNB under the currency board arrangement have caused the level of these deposits to fall from 23.9% of total bank liabilities in 1995 to 7.6% in 2000.

Deposits of nonfinancial institutions and other clients. This item includes all current accounts and savings and time deposits of individuals, companies and organisations in both levs and foreign currency. Since the SSB was the only bank used by individuals before the transition, the majority of these accounts were still at the SSB during 1990s. Over time, however, with banks expanding their activities and establishing regional branches, there has been a progressive movement away from the SSB as other banks compete for these funds. The relative share of funds attracted from nonfinancial institutions within total liabilities had followed a steady upward trend, reaching 65.8% in 2000 versus 57.0% in 1995. This increase is an indication of the growing competition among banks in attracting funds from primary depositors.

Other Liabilities. This category includes loans from other banks, interest payments due on these loans as well as other liabilities and deferred expenditures.

Banks can borrow from other commercial banks through the interbank money market, or from the BNB. Funds borrowed from other banks are recorded here. Deposits of commercial banks or the BNB are entered under 'deposits of banks and other financial institutions'. At the outset of the bank reforms in Bulgaria, interbank auctions were used as the major mechanism for transferring funds to banks. At a later stage, the BNB switched to other forms of collateralised bank lending such as Lombard credits. Any form of commercial bank refinancing, lending included, by the BNB has stopped with the establishment of the currency board.

A comparison between 2000 and 1995 data shows that the share of *other liabilities* has increased from 7.4% to 11.4%. Although BNB refinancing has been removed, the interbank money market has expanded.

Own capital. This item covers the equity capital of banks and includes authorized capital, profit and reserves. Authorised capital is determined by the nominal value of shares in the bank. The current banking legislation requires that banks' authorized capital should be at least BGN 10 million.

Own capital also includes operating profit in the current financial year and undistributed profit, if any, from past years. The relative share of capital, the combination of authorized capital and profits, in total liabilities rose from 7.8% in 1995 to 11.2% in 2000. This is due to both rising profits and higher capital requirements.

There are two types of reserves: legal provisions for bad loans and reserve funds. Under the Law on Banks, banks must set aside provisions for bad loans from their pre-tax profits. The BNB regulates the classification of credits and provisions against them. If delinquencies are expected, banks must reduce their dividends and create a pool of reserve funds to meet any future loss. Under Article 24 of the Law on Banks, banks must set aside at least one-fifth of their post-tax profit for a reserve fund until the reserve fund reaches 1.25% of total assets. Amounts above these levels can be paid out in dividents. In accordance with the Basle arrangements, BNB regulations state that the capital base must be at least 12% of the risk component of banks' assets.[40]

2. Issues of Asset Management

In managing their asset portfolios private banks pursue three often contradictory objectives: profitability, liquidity, and solvency. For banks to be liquid they must hold assets that are easily converted into transferable assets. To ensure solvency the banks must be cautious about the riskiness of loans. To be profitable, they must put financial resources to work, seeking the highest yields on assets. But none of these can be pursued independently of the others. High yields can mean not only higher profits but also greater risk of insolvency. Liquidity can be at the expense of profitability as money sits idle. When banks manage their assets, they are pursuing strategies that will fulfill each objective without seriously impairing the others.

There are several features of the Bulgarian financial environment which further complicate the already difficult task of bank asset management. We shall focus on four major issues: the paucity of secondary markets in most assets, high risk, the burden of bad loans of SOEs, and the need to finance the emerging private sector. Each impacts liquidity, solvency or profitability of Bulgarian commercial banks.

[40] The Basle arrangements provide for different risk categories and capital adequacy requirements vary for the different categories. The precise definition of capital base and the risk component of the assets is given in Regulation No. 8 of the BNB. Since 1997 the average capital adequacy ratio of the banks has been far above the requirement with ratios in the range of 30%.

Bad debts. One aspect of the reform of the banking system was the distribution of loans or credits of SOEs to the newly formed commercial banks. The unfortunate legacy of these state enterprise loans created a severe challenge for the banking system. The 'original loans' to many SOEs were not really loans in the normal sense at all. The money was extended under the previous system of central planning where the risks of default on repayment were not evaluated. Once these loans appeared on the accounts of the newly established commercial banks, they became assets of these banks. As bank assets, the loans had value only if they were repaid. Unfortunately, many SOEs were suffering from severe financial problems, especially following the collapse of the CMEA markets, and were therefore not able to repay these loans. They could not simply be written off as the banks holding them would be seriously threatened with insolvency.

These problems were exacerbated by two other problems. The first was high interest rates. When prices were freed in February 1991, nominal interest rates rose sharply to reflect the high inflation. Even SOEs that might have been able to repay existing loans were faced with high interest payments on the loans. The banks were fearful that if the loans went into default, they might be threatened with bankruptcy themselves. The banks, therefore, did not want to declare the loans to be in default.

The second problem was that many of these enterprise loans were in convertible currency. Bulgaria borrowed large sums of money from foreign banks in the late 1980's. Even though the central planning system determined how the money would be spent, it was recorded in the banking system as if these were convertible currency loans being made by the central bank to enterprises. When the banking system was reorganized, these became real loans which the enterprises were now obligated to repay. If these loans had been denominated in levs, the high inflation in 1991 would have greatly reduced their real value, but the sharp depreciation of the lev more than offset this effect.[41]

As time passed the problem became worse because enterprises paid neither the interest nor the principal on these loans. During the 1991 – 1996 period there was also government complicity in all of this. The government feared high unemployment and social unrest. SOEs were in bad financial difficulty, but they were still functioning at some level. If the bad debts forced liquidation of SOEs, unemployment would rise even higher. The banks understood this and recognized that the government would bail them out if state enterprise loans were not repaid.[42] Thus the banks knew

[41] Inflation reduces the problem of repaying a fixed loan. If the value of a loan was fixed at BGL 500,000, it would have been much easier to repay it after prices had increased five fold in 1991. When the loans were denominated in dollar amounts, however, the BGL 500,000 loan became a BGL 5,000,000 loan. See *Dobrinsky* (1994) for a more complete explanation of these problems.

[42] Ironically enough there were cases when the Minister of Industry issued official ordinances to state-owned enterprises to suspend debt repayment.

the risks associated with extending further credits to the SOEs.

Government protection created an atmosphere where there was little incentive to improve efficiency. Management of companies was poor and in many instances managers just siphoned off profits into their own pockets. More bad debts were generated by commercial banks themselves. Weak regulation and poor supervision created an atmosphere where the criteria for new loans was side payments to bank officials rather than evaluation of actual risks. This created more loans that were never repaid.

All this led to the adoption of the ZUNK Law at the end of 1993. Under this law, ZUNK (government) bonds were substituted for bad loans to SOEs on bank balance sheets. By removing the bad debt from the balance sheet of the commercial banks, it was hoped that the financial condition of both the banks and the SOEs will improve. Unfortunately, the results fell well short of expectations. Even after a grace period, most debt was never repaid to the government. Soon the government was faced with the same dilemma as before: launch bankruptcy procedures against the debtors and trigger a chain of enterprises failures and higher unemployment or write off even more debt and let the problems in the SOEs continue to fester.

High risk. Lending to SOEs throughout this period was very risky. On top of the usual business risks, a number of transition-specific circumstances made it difficult to anticipate future problems. Sweeping institutional changes, radical shifts in the government's economic and trade policies, political pressure on state-run enterprises, insecure markets, the short-term horizon of management teams, all contributed to these problems in the pre-crisis period. In the post-crisis period, the macroeconomic situation stabilized, but the fast pace of privatization created new uncertainties. Enterprise restructuring and privatization by management-employee-buy-outs (MEBOs), sometimes with 'behind the scene' investors are sources of greater risk for creditors. As a result banks are still making few loans to the real sector of the economy. In an effort to place their funds in less risky assets they are investing a substantial part of their portfolio in foreign bonds. It is estimated that in 2000, banks had approximately USD 1.5 billion invested abroad. This means that a substantial part of the savings accumulated by Bulgarian citizens in Bulgarian banks is not being invested in the Bulgarian economy.[43]

Secondary markets: The paucity of secondary markets in most financial assets limits the strategies that Bulgarian commercial banks can pursue to maintain liquidity. Secondary markets are valuable to banks because these markets make it possible for banks to manage unanticipated or extraordinary needs for cash. At the beginning of the transition, the only liquid assets were cash and deposits at the BNB. Banks could also acquire cash by

[43] The impact on the economy of this outflow of funds is offset by the inflow of foreign investment in Bulgaria. The improved stability of the Bulgarian economy in the post-crisis period has encouraged greater foreign investment.

borrowing from other banks in the interbank money market. With the opening of secondary markets in government securities in January 1993, banks were able to hold these securities and sell them when they needed extra funds. The emergence of the stock market in late 1997 made it possible for banks to maintain portfolios of corporate and municipal securities as well, but the sluggish development of this market and the low liquidity of most assets limits its usefulness.

Throughout the 1990s the government securities market improved steadily. By 1997, the BNB was pursuing an active monetary policy and trading heavily in repos.[44] Under the currency board arrangement the BNB is not allowed to trade in the government securities market and the liquidity of government bonds has decreased. The market in government securities is rather narrow and cannot be compared with stock markets or government security markets in the US, for instance, where tremendous volume of bonds are traded on a daily basis.

The low return on government securities since the financial crisis ended in Bulgaria has been another problem for banks. Small government budget deficits has reduced the flow of new government securities. Banks have been reluctant to lend to the real sector, increasing the demand for government securities. Smaller supply of bonds and higher demand for bonds has reduced nominal interest rates. Real interest rates have even been negative at times.

Improvements in these markets should be possible. The Ministry of Finance could become a market-maker in the government security market, thereby increasing liquidity and stabilizing prices in the secondary markets. Presently the Ministry provides some services for individuals, but these are for specific purposes and are a tiny part of the market. Another possibility would be to develop a resale market in loans. An extensive resale market in mortgage loans exists in the US, for example. Currently this market cannot develop in Bulgaria because bank secrecy regulations in the Law on Banks limit the dissemination of information to potential buyers of loans. Careful amendment to the Law would open opportunities for developing such a market. Then banks could manage their assets better.

Lending to the private sector: The principal function of commercial banks should be to make loans to the business community. However, loans to the private sector have been limited so far. In the pre-crisis period, banks preferred to loan to the SOEs, private sector loans were only 12.4% of total credit in 1993 and 13.9% in 1994. This compares with 50% and 45% to the government sector and 37% and 41% to SOEs. Given that the

[44] When the BNB sold government securities to banks, a repurchase agreement (repo) was usually part of the contract. Under the repurchase agreement, the BNB would agree to repurchase these securities at a specified time and at an agreed price within a short period of time. This would make the security more liquid from the point of view of bank since the bank knew that the BNB would buy the security back.

private sector was somewhere between one-quarter to one-third of the economy at that time, there was a clear bias towards lending to the public rather than the private sector.[45] As late as 1996 there had been little change, private-sector loans were 20.7% (private sector share 40% of the economy) while loans to SOEs and the government were 14.8% and 64.4%, respectively. Throughout this period the banking sector was dominated by state-run banks and new emerging private banks sought out large SOEs to gain market share.

In the post-crisis period, bank lending shifted dramatically. By 2000, government loans were only 10.5% of total domestic credit and SOEs loans 9.1%; private sector loans ballooned to 80.4% of total domestic credit (67% claims on private enterprises and 13% claims on public) as the importance of the private sector expanded to 69.3% of the economy. While the private sector share of loans has grown, the overall volume of loans has decreased so much that the actual level of private sector credit has increased for four years by only 20% in dollar terms (USD 1,599 million in 2000 vs. USD 1,327 in 1996). If improvements are measured in terms of credit extended to the private sector, private sector loans are still low relative to other transition economies. Even Belarus had a higher percentage of loans to the private sector. While private sector loans in Bulgaria are about 12% of GDP, in the Czech Republic it is more than 60%. (EBRD, Transition Report, 1999, p. 94)

There are several reasons why the financial system has failed to successfully transfer funds from savers to investors in this new economic situation. *First*, as mentioned above, there is great risk in the private sector. The economy has been going through enormous change. Future developments are difficult to predict. Most prospective business people and most bank personnel are very inexperienced. Furthermore, bank personnel and business people were not always driven by the proper incentives to help their organizations prosper. All these factors increase the likelihood that mistakes will be made and increase the riskiness of loans. The result is that the most productive projects do not necessarily receive the most support, and loans are not effectively monitored (Stiglitz' points 4 and 5).[46]

Secondly, there is a differential in the risk that banks incur when they loan to the private sector. As the ZUNK Law demonstrated, there is some probability that the government will protect the banks when loans to SOEs go into default. There is no similar guarantee for loans to the private sector.

Third, the laws regarding the bank's right to seize collateralized assets in the event of default are still cumbersome. This is part of the more gen-

[45] The data provided draw upon BNB's Annual Reports in the relevant year. Due to accounting problems during this period, these figures probably understate the relative size of the private sector.

[46] For a more detailed discussion of the problems of making loans in an economy in transition, see *Miller* (1995).

eral problem of relatively weak legal protection of lenders. Without such protection, banks cannot use collateral to protect against future risk.[47] Despite the fact that the Bankruptcy Law has been in place for some time, there are still obstacles and impediments in its implementation. Court procedures are slow and inefficient, and debtors can throw up many barriers, which further prolong the process.

Even with these problems, banks remain the main source for financing private activity. Presently, much small-scale business is self-financed. To help the private sector grow two serious problems must be addressed: (1) lack of incentives for banks to lend money to the private sector, and (2) resolving information related problems in an uncertain environment. From 1998 to 2000 a large part of the Bulgarian banking sector was privatized by foreign banks. This may prove to be helpful. Foreign banks can bring in valuable experience in risk evaluation and marketing. This may help banks build longer-term relationships with their customers. In the process this can breakdown some of the information barriers that presently exist. Backed by the stability and experience of their new institutions, bank officers should be able to evaluate private-sector needs and risks. At the same time private enterprises should be prepared to submit realistic business plans and information. These changes should improve overall lending practices.

3. Issues of Liabilities Management

The liability side of the balance sheet describes how bankers acquire funds that can be loaned out. Banks prefer to acquire funds, which require low interest payments and remain in the bank for long periods of time. Commercial bankers are far from powerless in managing the liabilities side of the balance sheet. By varying the interest rates they pay and the types of deposits they offer, banks can influence the deposits they receive. Furthermore, banks can obtain funds by borrowing money from other banks or the central bank (if the central bank acts as a 'lender of last resort').

In most countries deposits are a significant share of bank liabilities. To attract deposits customers must have confidence in the bank. In many countries, bank deposits are insured by some form of guarantee. If a bank fails, its customer deposits are protected.

In Bulgaria, the Deposit Insurance Fund protects depositors.[48] Prior to its establishment, the only bank providing explicit deposit guarantee was the SSB. This gave a comparative advantage to Bulgaria's biggest deposit-taker, but few customers were aware of the important difference between

[47] As risk is very difficult to evaluate in the extraordinary conditions of a transition to a market economy, banks are heavily reliant on collateral as a way to provide security against risk even though they are aware that acquiring the collateralized assets after default will be a long and painstaking exercise.

[48] The characteristics of the Fund are described in Section II.

the SSB and the other banks. Most people believed that the government was responsible for all money deposited with banks, be they state-run or private. These expectations were later confirmed when the first bankruptcy (Jambol Bank) occurred and the government protected depositors. Later, the governments stepped in again during the financial crisis and protected depositors when seventeen commercial banks failed. No distinction was made between state-run and private banks.

The dimensions of the problem of implicit guarantees became clear as the financial crisis unfolded. Either explicit guarantees were needed or there should be no guarantees at all.[49] The problem was resolved by establishing the DIF. The DIF insures all depositors up to a certain limit. Commercial banks pay insurance premiums into the Fund that are used when banks fail. With the transformation of the SSB into a commercial bank (i. e. abolishing its special status of a savings institution), the SSB no longer enjoys a special status and now all banks have the same deposit guarantee.

Building confidence in financial institutions is important if funds are to be transferred from savers to investors. During the early transition when most banks were state-owned, their viability was not seriously questioned. This confidence was completely shattered during the crisis. In the post-crisis period, restoring confidence has become a top priority. Some progress has been made, but it is slow. Funds attracted from nonfinancial enterprises and other customers rose 16.8% between 1997 and 2000 while nominal GDP rose 49.2% over the same period. Public opinion polls have shown that confidence, four years after the crisis, is still far from being fully restored.[50]

If people had greater awareness and understanding of the deposit insurance provided by the DIF, this would probabily increase confidence in the banking system. Raising the deposit limit above current BGN 6,900 would also help. To protect the DIF the banks must be properly supervized so that any abuse of deposit insurance is avoided, and government guarantees should be made explicit and enforced. Without strict supervision, deposit insurance is like a time bomb that could trigger another financial crisis.

Beyond deposits another important bank liability during the pre-crisis period was refinancing provided by the BNB. Central banks in developed

[49] Bulgaria was not alone in facing such problems. The dangers of associated with deposit insurance were clearly visible from the events that took place in the US economy in the 1980's when deposit insurance helped destabilize the savings and loan banks. (See *Mishkin*, pp. 254 – 256). On the other hand, deposit insurance had provided stability to the US banking system for more than 40 years after the Great Depression.

[50] Asked about their confidence in the banking system over the last few years 7% of those responding said they had never lost confidence; 35% said that their confidence had been restored and 55% answered that their confidence had not been restored. See 'The Lessons Paid for the Big Bank Robbery', Kapital Newspaper, #5, 2001.

market economies often use refinancing to provide additional funds to banks. In the pre-crisis period, refinancing by the BNB in various forms was a significant source of funds for commercial banks. Unfortunately, refinancing lead to high unsustainable money supply growth. Loss of control over the money supply was an important contributor to the crisis. BNB refinancing was suspended when the currency board was established.

The interbank market is another credit market. This market provides a mechanism where banks can lend funds they do not need on a short-term basis to other banks. The establishment of the interbank money market in 1991 improved the efficiency of the banking system and made it possible for funds to be rechannelled to banks that could make better use of them. The interest rate varies with supply and demand for funds.[51] Higher interest rates are an indication of more restrictive lending conditions in the economy as a whole and result from fierce competition among banks to attract scarce financial resources.

4. Efficiency of the Bulgarian Banking System

Because it is difficult to define exactly what product banks produce, it is hard to identify a single indicator of overall banking efficiency. Table 4.2. presents information on three common indicators of bank efficiency: (1) return on assets, (2) return on equity and (3) leverage. The data has been drawn from the consolidated balance sheets and the income statements of two groups: (a) large banks and (b) small and medium-sized banks.[52]

As shown in the table, ROA in the banking system as a whole over the period surveyed varied between -0.3% and 5.0% whereas ROE ranged from -3.7% to 115.5%. The high values for ROE in 1996 and 1997 was due to hyperinflation. High interest rates for these years led to high nominal returns. ROA values did not rise because the nominal value of the assets also rose with inflation. On the hand, capital was not revalued along with inflation, so higher nominal interest income raised the ROE ratio. Profits created by inflation were taxed as a normal corporate profit at the same time that banks were losing business in the crisis. Post-tax returns were significantly lower than the inflation rate, which decapitalized the banks in real terms.

[51] See *Petrov* (2000) for an in-depth analysis of the supply and demand for bank reserves in the interbank market during the 1998 – 2000 period.

[52] This grouping draws upon BNB's classification system that was applied until 1998. In 1999 the BNB introduced a more detailed classification into five bank groups. To make comparisons easier the authors have aggregated 1999 and 2000 data into two groups. The indicators used are calculated as follows: ROA= Net Profit/Total Assets; ROE=Net Profit/Capital; Leverage=Attracted Funds/Capital

Table 4.2

Banks' Efficiency Ratios

		Large Banks	Small and Medium Banks	Total	Inflation (CPI,%)
1995	ROA (%)	-0,1	-1,3	-0,3	
	ROE (%)	-2,6	-6,7	-3,7	32,9
	Leverage	16,2	4,1	12,8	
1996	ROA	3,3	2,0	3,2	
	ROE	86,2	13,2	65,2	310,8
	Leverage	25,0	5,8	19,5	
1997	ROA	6,8	-0,6	5,0	
	ROE	303,1	-6,0	115,5	578,0
	Leverage	43,7	8,3	22,2	
1998	ROA	2,0	0,9	1,7	
	ROE	36,5	6,9	21,5	1,0
	Leverage	17,0	6,4	11,7	
1999	ROA	3,0	1,4	2,5	
	ROE	30,2	10,5	23,1	6,2
	Leverage	9,0	6,6	8,2	
2000	ROA	3,7	0,6	2,8	
	ROE	34,3	5,1	25,0	11,4
	Leverage	8,3	7,0	7,9	

Source: BNB, Banks' Annual Reports.

Following the crisis, inflation was low as the macroeconomic situation stabilized. Banks reported positive real ROE, i. e. higher than inflation.[53] Large banks reported higher efficiency ratios than small and medium-size banks throughout the period. Sometimes the ROA and ROE values for large banks were several times larger than the ratios for small and medium-size banks. Even in 'hyperinflationary' 1997, small and medium banks experienced losses while large banks registered profits. The higher efficiency of large banks is not surprising given the economies of scale in banking. Also, large banks reported a higher leverage indicating that they were able to attract more money per unit of capital. Until 1998 the funds, borrowed by large banks per unit of capital was 3 to 4 times higher than small and medium-size banks. After that the difference is not so significant as a result of increased competition but still remains in favour of large banks.

This supports the contention of some analysts that there are too many banks in Bulgaria. Many banks are too small and inefficient. While further

[53] Comparisons in a dynamic perspective should be cautiously handled, for the inflation rate in the different years followed a largely different dynamics. The period also witnessed sweeping and all-embracing institutional reforms, constant changes in bank accounting and the accounting practices of individual banks, changes in the capital structure, minimum reserves requirements as well as changes in the scope and mix of the bank services offered.

consolidation can be encouraged by government policy, the long-term stability of the banking would be enhanced if further consolidation is left to the market.

5. The Role of Commercial Banks

Commercial banks perform two important functions in the Bulgarian economy. First, deposits of the banks are part of the money supply. Secondly, banks are financial intermediaries, which pass funds from savers to investors. Until other financial institutions develop, banks will have tremendous influence on future investment in Bulgaria and the development of the Bulgarian economy. Important improvements in the banking system have been made since the transition to a market economy began, but there are still very serious problems, which must be solved. We have noted the ways in which the current financial system is unable to meet many of Stiglitz's requirements for a market economy. Because the key to future economic prosperity lies with rational investment decisions, further development of the banking system have a significant impact on the growth path of the Bulgarian economy.

V. The Bulgarian National Bank

The Bulgarian National Bank (BNB) has a central role in the financial system. During the early 1990s the BNB underwent major reform. In June 1991 the Law on the Bulgarian National Bank was passed. This law provided a legal basis for the BNB to function in a market economy. Under this law the BNB functioned as a traditional central bank with discretion to carry out monetary policy. This changed dramatically with the introduction of the currency board in July 1997. A new Law on the BNB was passed. Under this new law, the power of the BNB to influence monetary policy is much more limited.

This section will look at the responsibilities of the BNB and compare and contrast its present organization with the structure of the BNB when it was a more traditional central bank in the early 1990s. First, however, we will outline the basic responsibilities of the BNB and describe its basic organizational structure. As we will see, the responsibilities and goals of the BNB have not changed very much, but under the currency board arrangement the methods used to achieve these goals have changed radically.

1. The Responsibilities of the Central Bank

Presently, the role of the Bulgarian National Bank is limited to central banking and supervision functions. The BNB has been given three mandates:[54]

[54] Article 2, Section I, Law on the Bulgarian National Bank.

(1) The main task of the Bulgarian National Bank shall be to contribute to the maintenance of the stability of the national currency through implementation of monetary and credit policy and to assist in the establishment and maintenance of efficient payment mechanisms.

(2) The Bulgarian National Bank shall have the exclusive right of issuing banknotes in this country.

(3) The Bulgarian National Bank shall regulate and supervise other banks' activities in this country for the purpose of ensuring the stability of the banking system and protecting depositors.

Maintaining a Stable Currency: In the first statement, the BNB is given its most important and most difficult charge. Because the sections which follow will discuss in detail the mechanisms used by the central bank to manage the money supply and to clear and collect payments, our comments here will be brief. It is useful, however, to highlight at this point the emphasis given in the Law on the Bulgarian National Bank on the maintenance of stability. Stability means both internal and external stability. These are related but independent tasks. They are the prerequisite for Stiglitz' first function, management of the medium of exchange, that must be performed by financial institutions in a market economy.

Internal stability is typically achieved when inflation is controlled by manipulation of credit and the money supply and when the currency is accepted as the medium-of-exchange. In a move to support the lev as the internal medium of exchange, the Council of Ministers passed in February 1991 Ordinance No. 15, which prohibited the use of foreign currency in internal transactions.[55] More important to the viability of the lev for internal transactions, however, has been the smooth functioning of the foreign exchange markets. This eliminated the incentive to transact in foreign currencies. In the early 1990s the lev quickly became accepted in spite of the high inflation that ensued. This was a major accomplishment during the early years of the transition.

External stability depends on the establishment of foreign exchange rate convertibility. During the early phases of the transition, this was a major objective of the central bank. Here also the bank met with considerable early success, but this was not sustainable. When prices were released in February 1991, the convertibility of the lev was established for many types of transactions. During 1991 the floating exchange rate fluctuated between 15 and 22 levs per dollar. From early 1992 until the autumn of 1994 the fluctuations of the lev were moderate and its nominal value fell from 22 to about 26 levs per dollar. In the spring of 1994 the first sharp adjustment in the lev occurred. By the summer of 1994 the exchange rate was 54 lev per dollar, less than half the value of a year earlier.

[55] This restriction was removed in 1999 as confidence in the lev improved.

Over the next two years the lev depreciated further in fits and starts and fell to 74 levs to the dollar by the spring of 1996. At this point a real financial crisis erupted. At one point in early 1997 the exchange rate was over 3,000 levs to the dollar before falling back into the range of 1,800 levs to the dollar.[56] The failure to maintain external stability was a major reason for the reform of the BNB and the establishment of the currency board.

Issuing Currency: The second statement requires the central bank to decide on the issuance and withdrawal of banknotes. By the end of 2000 there were more than 2 billion levs in banknotes in circulation.

As this mandate is discussed, bear in mind the distinction between money and currency. The **money supply** includes both currency and other liquid funds. Attention is often directed at the money supply when analyzing national macroeconomic objectives such as limiting inflation, maintaining stable foreign exchange rates and spurring economic growth. In **issuing currency**, the BNB's objective is more limited. Decisions can be guided by public preferences, as to both quantity and denomination of banknotes and coins so long as the central bank controls the overall quantity of money and credit.

The rapid inflation during the transition years has prompted many changes in the banknotes used by the public. As prices rose small notes were no longer adequate and larger notes were introduced. In 1999 a redenomination occurred and the new lev was introduced. Each new lev is equal to 1,000 old levs. This created a need to change all the banknotes. It also led to the reintroduction of stotinka coins. These coins had become practically worthless during the inflationary period of the 1990s.

The redenomination of the lev did not have any significant economic impact. It did not change the real value of the money supply. The purpose was to make it easier for people to use the lev. Prices can now be stated in smaller numbers. This makes it easier to use the money.[57] The redenomination also made it easier to compare the lev to the Deutschemark since the exchange rate became one Deutschemark to one lev.

In addition to these changes in the demand for banknotes, there are times when a need develops for relatively more currency and relatively fewer bank deposits. The BNB can respond to these seasonal needs by expanding the amount of banknotes in circulation. These peaks may correspond to the public's increased needs for currency during holiday periods.

[56] The exchange rates describing the movements of the lev were the actual exchange rates during this period. Since that time there has been a redenomination of the lev. 1,000 old (nonredenominated) levs is now equal to 1 new (redenominated) lev.

[57] Monetary units can be very unwieldy. In spite of very high inflation Turkey has not chosen to redenominate its currency. Bus tickets can be 200,000 lira. A car can cost 6,000,000,000. With such large numbers it can be difficult to keep track of all the zeros.

Commercial Bank Regulation: Finally, to the BNB has also been given responsibility as the State's regulator of commercial banks. Throughout the world, governments typically set rules and monitor the performance of banks to a much greater extent than they do other businesses. Underlying this caution is first the fact that banks operate primarily with other people's money. Depositors who place their money in banks require protection against mismanagement of their funds. Secondly, given the central role of commercial banks in the allocation of financial resources, the disturbing effects of bank failure can resound throughout the economy as happened during the financial crisis of 1996 – 1997.

Central banks need not be supervision agencies. Indeed the alternative of an independent supervision agency outside of the BNB was considered, but because of the limited number of skilled bank staff and the possibility of overlapping control issues, a decision was made to keep supervision within the BNB (Stratev, 1992).

In the massive changes that took place during the early 1990s, bank supervision did not receive very high priority. Supervisory staff were not well trained, and the accounting systems were deficient. It was not until June 1995 that better accounting requirements were finally put into place. It was then that the severe problems in the banking system became more obvious. Regulators were not able to solve these problems before they exploded on the economy in the financial crisis in 1996.

The broad outline of the BNB's regulatory responsibilities regarding commercial banks are found in the Law on the Bulgarian National Bank. At the beginning of the transition these general obligations were further elaborated in the Law on Banks and Credit Activity (1992). This latter law specified the power of the BNB to grant and revoke licenses for conducting banking operations. It also provided for both off-site and on-site inspections of commercial banks.

The inadequacies of the Law on Banks and Credit Activity became obvious as time passed. In June 1997 along with the establishment of the currency board a new 'Law on Banks' was passed. This new law expanded the supervisory authority of the BNB. In particular it made it easier for the BNB to close failing banks. Under the earlier law, court delays made it difficult for BNB to take control of banks before they were stripped of their assets.

The new law is a considerable improvement over the old law, but problems still remain. Once bankruptcy is declared, the courts control the process and the BNB has only a secondary role. This has not been totally satisfactory so there have been proposals to amend the law to give the supervision department more input into the process of selling off assets and paying off creditors as part of the bankruptcy procedures.

Other amendments to the 1997 banking law were also made during the three years following the passage of the act. These changes reflected ef-

forts by the BNB to bring Bulgarian law into conformity with EU directives and IMF proposals. There is also an increasing understanding that passing new laws is not sufficient. It is important that the new laws be enforced.

2. BNB Organization

When the currency board was established in 1997, the BNB was reorganized to reflect its new function. The BNB is administered by a Governor and a Managing Board. The Managing Board has seven members: the Governor, three Deputy Governors and three additional members who do not work in another capacity at the BNB or in the banking sector. The Governor and the Deputy Governors are elected by the National Assembly to six-year terms. The three outside members of the Managing Board are appointed by the President also to six-year terms. All major policy and regulatory decisions must be adopted by the Board. To protect the BNB from political influence, the Law on the BNB specifically states that Board members can be dismissed only when there is dereliction of duty or serious misconduct.

The Governor is the BNB's chief executive officer, responsible for organizing, directing and supervising the activities of the Bank, and representing it at home and abroad. The Governor is the chairman of the Managing Board. Each Deputy Governor heads a major department established when the BNB became a currency board.

The three major departments within the BNB are the Issue Department, the Banking Department and the Banking Supervision Department. The heart of the currency board is the Issue Department. Most financial transactions affecting foreign currency holding, the exchange rate and the money supply pass through the Issue Department.

The Banking Department was established to give policymakers flexibility in the event of financial crisis. The Banking Department has monetary reserves that can be used in a crisis situation to help banks, but these funds are not to be used as part of the normal operations of the BNB.

The third major division is the Banking Supervision Department. The Banking Supervision Department is the regulator of commercial banks. As outlined in the preceding section, these responsibilities were greatly expanded when the currency board was established.

3. What Is Special about a Currency Board?

A currency board is at bottom an arrangement that legislates a particular monetary rule: a rule that changes in the monetary base will be equal to the country's overall balance of payments surplus or deficit (Williamson, 1995, p. 1).

There are several important aspects to this definition of a currency board. A monetary rule is a statement about how the monetary authority

will conduct monetary policy. With a currency board policymakers have no control over movements in the monetary base, an important tool for controlling the money supply (see Section VI). The monetary base changes automatically when there are balance of payments surpluses or deficits so policymakers have no direct control over the money supply.

A currency board also fixes the exchange rate to a reserve currency. When the Bulgarian currency board was established a decision was made to fix the lev price to the Deutschemark (DEM). The price was set at 1 DEM = 1000 levs. When new levs replaced old levs during redomination, the price became 1 DEM = 1 lev. In January 1999 the euro was adopted and the exchange rate is now fixed to the euro at 1 e = 1.9558 levs.

The price is fixed because the BNB promises to buy or sell as many levs as anyone wishes to exchange at the established exchange rate. When the BNB buys or sells levs, the monetary base automatically adjusts (see Section VI). In order to make good on the promise to buy levs with DEMs, the BNB must have sufficient foreign currency reserves to meet the demand for DEMs (euros). During the first three years of the currency board, the BNB has easily met this criterion.

To further guarantee that the monetary base will change automatically with balance of payment surpluses and deficits, a currency board does *not* hold domestic assets. This means that it cannot loan to the government or commercial banks. Since buying government securities is a way of loaning money to the government, a currency board is also prohibited from holding government securities.

Traditional currency boards operate on automatic pilot. Their key responsibility is to keep the exchange rate fixed. If there is a crisis in the banking system and people withdraw funds from the banks in mass (i. e. there is a 'run on the banks'), there is nothing that a currency board can do.

The Bulgarian currency board was created during a time of crisis. The problems created by a financial crisis were very real. A decision was made to move away from a traditional currency board and create a Banking Department, which could act as a lender of last resort in a time of crisis. Since there were sufficient foreign currency reserves to put aside for this purpose, these reserves were placed in the Banking Department.[58]

To protect the integrity of the currency board, the Banking Department is permitted to lend only under very restrictive conditions. BNB's Regulation No. 6 states that BNB may extend loans in levs to commercial banks only when a bank is illiquid and then only if the stability of the banking system is at risk. Even then only solvent banks experiencing acute

[58] Most currency boards are not traditional currency boards. The structure is usually adapted in some way to local conditions. For example, in Argentina the reserve currency is the US dollar, and the currency board does hold some dollar denominated government debt.

needs for liquidity that cannot be provided from other sources can receive loans and the loans have to be collaterized with liquid assets and their repayment term shall not exceed three months.

Furthermore, the Banking Department can provide only limited help in a time of crisis. Regulation No. 6 further restricts the amount of loans that the BNB can provide to the amount of funds the Banking Department has on deposit at the Issue Department (see Table 5.2 below).

To understand the difference between a currency board a standard central bank, it is useful to compare the present structure of the BNB with its previous organization. This can be done by analyzing the key elements of the balance sheets of the BNB before and after the establishment of the currency board.

3.1. The BNB before the Establishment of the Currency Board

Before the establishment of the currency board, the BNB was not divided into departments, and there was only one balance sheet. Table 5.1 shows this BNB balance sheet at the end of 1994, about two and half years before the establishment of the currency board. The key elements of this balance sheet are written in bold and are discussed below.

Table 5.1

Balance Sheet of Bulgarian National Bank, December 1994

(million BGL)

ASSETS		LIABILITIES	
Bulgarian coins	342	Statutory fund	200
Foreign currency	***109***	Reserve and other funds	91,094
Participation in international organizations	12,075	***Currency in circulation***	***45,935***
Foreign securities	***50,391***	***Current and deposit accounts***	***86,361***
Deposits and loans extended to commercial banks	**89,946**	Other liabilities	17,734
Loans to the government	**40,087**		
Government securities	**14,767**		
Other assets	33,606		
TOTAL ASSETS	241,324	TOTAL LIABILITIES	241,324

Source: BNB Annual Report, 1994.

Assets:

Holdings in foreign currency: These were cash holdings of foreign currency. When combined with holdings of foreign securities, these holdings represented the foreign currency reserves of the BNB.

Holdings in foreign securities: The BNB held most of its foreign currency reserves in securities in order to earn interest on its foreign currency

balances. The BNB accumulated foreign currency reserves when it sold levs and purchased foreign currency on the foreign exchange market. Another important source of foreign currency reserves during this period was loans from international organizations including the International Monetary Fund (IMF) and the World Bank. This continues to be the case in the currency board period.

During the period leading up to the establishment of the currency board, Bulgaria had a floating exchange rate. When a country has a floating exchange rate, the central bank does not buy or sell foreign currency. However, it was recognized by policymakers that movements in the exchange rate could affect prices in Bulgaria and the competitiveness of Bulgarian products in foreign markets. There were several periods during the pre-currency board period when the BNB did buy and sell foreign currency. For example, during the sharp exchange rate movements in late 1993 and the spring of 1994, the BNB sold foreign currency in an attempt to keep the lev from depreciating too dramatically. Later the BNB attempted to smooth movements in the lev and prevent large fluctuations.[59] These efforts failed when speculators began to sell levs in the spring of 1996. The BNB tried to buy levs, the BNB had to use its foreign currency reserves to purchase the levs. Soon BNB reserves fell to such low levels that the BNB could not buy sufficient levs to prevent the lev from depreciating.

Loans to the government: When the government operates with a deficit, expenditures exceed revenues. The government must borrow. The government has operated with a budget deficit in almost every year since the transition began. Before the establishment of the currency board, there were two ways that the government could borrow. The first was to borrow directly from the BNB. This entry in the 1994 balance sheet is the amount of loans to the government at the end of 1994. This transaction is almost equivalent to having the BNB print money for the government to use to pay its expenses.

Government securities: The government can also borrow money by issuing government securities. These securities were purchased by commercial banks, the State Insurance Institute and the BNB. A very small part was purchased by individuals. The BNB's holding of these securities was recorded here in the BNB accounts.

When the government issued government securities and they were purchased by the BNB, the end result was the same as having the government borrow directly from the BNB. The BNB essentially printed money that the government spent.

[59] Bulgaria was not unusual in this regard. In many other countries that officially have a floating exchange rate the central bank, in fact, intervenes extensively in the foreign exchange market to manage the movements of the exchange rate. See *Calvo* and *Reinhart* (2000) for a discussion of the 'fear of floating.'

As mentioned above, an important difference between a typical central banking arrangement and a currency board is that a currency board is not allowed to make direct loans to the government or purchase government securities. This prohibition is a significant constraint and makes it more difficult for a currency board to print money. It means that the BNB has more limited discretion in carrying out monetary policy.

Deposits and loans extended to commercial banks: The largest single category of BNB assets in 1994 was deposits and loans to commercial banks. Following the ZUNK bond recapitalization of the banks in 1994, two large banks (Mineralbank and Economic Bank) found themselves in great financial difficulty. The BNB extended them large loans to keep them from failing. This is referred to as 'refinancing.' This increase in loans to the banking system also caused the money supply to expand.

Under the currency board arrangement, the BNB is not permitted to make loans to commercial banks under normal economic conditions. Thus under present institutional arrangements the BNB is not be permitted to make the type of loans that were being extended to banks in 1994.

Liabilities:

Only brief explanations will be given here of the liabilities on the 1994 balance sheet since corresponding entries exist on the currency board balance sheets.

Currency in circulation: This entry reflects the role of the BNB as the issuer of currency.

Current and deposit accounts: These accounts fall into two basic categories. As we will see these are broken into separate categories in the currency board balance sheet. First, the Ministry of Finance uses its account at the BNB in the same way that an individual or enterprise would use a commercial bank account. Secondly, commercial banks hold deposits at the BNB. Two important types of commercial bank deposit accounts are settlement accounts and reserve accounts. Settlement accounts are used by the commercial banks to facilitate the transfer of funds between banks when, for example, payments are made between enterprises, which have accounts at different banks. Commercial banks also place funds in reserve accounts to satisfy minimum reserve requirements.

Reserve and other funds: This entry in the balance sheet contains more than one important component. The first component is the net worth of the BNB. Like other banks the net worth of the BNB must be positive to remain solvent. The second component is borrowings from the IMF. Throughout the transition period support from the IMF has been important in maintaining economic stability. Indeed, the failure to reach agreement with the IMF during the financial crisis prolonged the crisis.

3.2. The BNB after the Establishment of the Currency Board

When the currency board was established in July 1997, separate balance sheets were created for the Issue Department and the Banking Department. Because the functions of the BNB were divided between these two departments, the entries in the 1994 balance sheet were divided between the two balance sheets. Since the Issue Department is so central to the operation of the currency board, we analyze its balance sheet first.

Table 5.2

Balance Sheet of the Issue Department, 29 December 2000

(thousand BGN)

ASSETS		LIABILITIES	
Cash and nostro accounts in foreign currency	**1,944,085**	**Currency in circulation**	**2,504,693**
Monetary gold	**641,768**	**Bank deposits and current accounts**	**515,938**
Foreign securities	**4,625,328**	**Government deposits and accounts**	**2,608,609**
Accrued interest receivable	61,973	Other depositors' accounts	675,213
		Accrued interest payable	4,949
		Banking Department deposit	**963,752**
Total Assets	7,273,154	Total Liabilities	7,273,154

Source: BNB.

Table 5.2 is the complete balance sheet. We will focus only on the most important elements (**in bold**) in the balance sheet.

Assets:

Perhaps what is most significant about the asset side of this balance sheet is what is missing. Unlike the 1994 balance sheet there are no entries for loans to the government or loans to commercial banks. Under the currency board arrangement, these are not permitted.

The other entries are similar to those found on the 1994 balance sheet. *Cash in foreign currency accounts and monetary gold* are part of the foreign reserves of the BNB. *Foreign securities* are holdings, which earn higher interest for the foreign currency reserve so most foreign currency holdings are placed there. As can be seen in the balance sheet, these three entries make up almost all the assets of the BNB Issue Department.

While the currency board limits the discretion of the policymakers at the BNB, the board does have important decisions to make regarding the choice of foreign currency assets to hold. The 1997 Law on the Bulgarian National Bank (LBNB) provides very explicit guidelines on how these assets should be invested. The risks here are very similar to those of any investor. It is important that credit risk, exchange rate risk, and interest rate risk be considered.

The Law on the BNB states that the BNB must place its foreign reserves in very safe foreign banks and bonds. The banks must be highly rated by international credit rating agencies (Article 28). To protect the BNB from exchange rate risk, the foreign reserves must be in currencies that reflect the balance of foreign currency liabilities (Article 31, para. 3). To minimize interest rate risks the majority of the reserves must be invested in short-term instruments. It is important that the reserves be invested in liquid assets so that the BNB can satisfy the demands of any citizen to exchange levs for DEMs (or euros).

During the first six months of 2000, 84% – 88% of foreign reserves were in euros and 7% – 11% in dollars. Dollar holdings are important to protect against exchange rate risk because most of Bulgaria's foreign debt is in dollars and the payments for servicing this debt come from the foreign reserve accounts at the BNB. To minimize the interest rate risk, 60% or more of the foreign reserves were in instruments with less than a year before maturity.

Liabilities:

On the liability side of this balance sheet we see some elements that were on the 1994 balance sheet. For example, *currency in circulation,* which measures the amount of coin and banknotes outstanding, appears on both balance sheets. On this sheet *bank deposits and current accounts* and *government deposits and accounts* appear as separate categories. In the 1994 balance sheet these were grouped together. This separation is useful because it is now easier to see the level of commercial bank reserves at the BNB. We will see in Section VI that these commercial bank reserves are important in determining the size of the money supply.[60]

A new entry on this balance sheet is the *Banking Department deposit*. This entry connects the activities of the Banking Department to the activities of the Issue Department. The Banking Department balance sheet is below.

[60] Another large entry is *Other depositors account.* In October 2000 Bulbank was sold. These 'Other depositors' are almost all deposits of the Bank Consolidation Company which received the money from the sale.

Table 5.3

Banking Department Balance Sheet, 29 December 2000

(thousand BGN)

ASSETS		LIABILITIES	
Nonmonetary gold and other precious metals	89,498	**Borrowings from IMF**	**2,778,646**
Investments in securities	167,695	**Liabilities to other financial institutions**	**1,664,287**
Loans and advances to banks, net of provisions	17	Accrued interest payable	1,995
Receivables from Government	**2,560,928**	Other liabilities	6,798
Bulgaria's IMF quota and holdings in other international financial institutions	1,664,086	Total obligations	4,451,726
Accrued interest receivable	1	Capital	20,000
Equity investments in domestic entities	2,294	Reserves	940,374
Fixed assets	141,382	Retained profit	230,235
Other assets	52,682	Equity	1,190,609
Deposit with Issue Department	**963,752**		
Total Assets	5,642,335	Total Liabilites	5,642,335

Source: BNB.

The entire operation of the BNB should be looked at as a combination of these two sheets. (Indeed, the BNB also publishes a consolidated balance sheet as well as these separate balance sheets.) The Banking Department balance sheet really has three parts. On the liability side of the balance sheet there are two parts: Total Obligations and Equity. Equity is the net worth of the BNB. In the 1994 balance sheet this was included under 'Statutory fund' and 'Reserves and other funds.'

Because the BNB earns money on its foreign securities but pays no interest on its banknotes or commercial bank reserve deposits, the BNB is expected to be profitable. 25% of its profits are added each year to its reserves. The remaining 75% are returned to the government. In 2000 the BNB added to its reserves and made a payment to the government of BGN 178 million. These payments are a form of seignorage.[61]

Under 'Total Obligations' there are two large liabilities: *Borrowings from the IMF* and *Liabilities to other financial institutions.* 'Borrowings from the IMF' are loans that Bulgaria has received from the IMF. As a member of the IMF, Bulgaria has an IMF quota. 'Liabilities to other finan-

[61] Seignorage is earnings that the government receives from its monopoly to print money. In an economy without inflation, the government earns seignorage because people will demand more money when the economy expands. The government can print money at little cost to itself and then spend it.

cial institutions' is borrowing against this quota and unpaid parts of this quota. This entry will shrink as Bulgaria pays off this obligation. (This is closely matched on the balance sheet by the entry on the asset side: *Bulgaria's IMF quota and holdings in other international financial institutions.*)

Under a currency board arrangement, inflows of foreign currency reserves normally cause the money supply to increase; outflows cause the money supply to contract. In designing the currency board in Bulgaria, care was taken to organize the accounts so that flows surrounding foreign debt payments would have a minimal influence on the money supply.

To minimize the impact of these flows involving the foreign debt, two entries also appear on the asset side of the Banking Department balance sheet: *Receivables from Government,* and *Deposits with the Issue Department.* Deposits with the Issue Department correspond to the entry on the Issue Department balance sheet *Banking Department deposit.*

Suppose that Bulgaria receives an additional loan from the IMF of BGN 100 million. Bulgaria now has more foreign currency reserves, and its liabilities to the IMF are now greater. The accounting, however, is a little more complex than this. At first there will be entries on both the Issue Department and the Banking Department T-accounts. These are shown in Tables 5.4a and 5.4b.

Table 5.4a

Issue Department

ASSETS	LIABILITIES
Cash in foreign currency +100 mln.	Banking Department deposits +100 mln.

Table 5.4b

Banking Department

ASSETS	LIABILITIES
Deposit with Issue Department +100 mln.	Borrowing from the IMF +100 mln.

Note that with this transaction the foreign reserve position of the BNB has increased, but this transaction has not affected either the amount of *Currency in circulation* or the amount of *Bank deposits and current accounts.* When these entries are not affected, the money supply will not change.[62]

Following this transaction, the Government then has 90 days to determine if it wants this money to be transferred to its account. If the funds are

[62] The sum of Currency in circulation and Bank deposits and current accounts is the monetary base. Changes in the monetary base will affect the money supply. For a more complete explanation see Section VI.

transferred to the Government, then the following changes will be made to the balance sheets of the Issue Department and the Banking Department:

Table 5.5a

Issue Department

ASSETS	LIABILITIES
	Banking Department deposit -100 mln. Government deposits and accounts +100 mln.

Table 5.5b

Banking Department

ASSETS	LIABILITIES
Deposit with Issue Department -100 mln. Receivables from Government +100 mln.	

This new transaction does not affect money in circulation or commercial bank reserves so there is still no effect on the money supply.[63] It is important, however, that this money is passed to a Government account **at the BNB.** If the money were passed to a Government account at a commercial bank, then commercial bank reserves at the BNB would change and so would the money supply.[64]

3.3. Using the Banking Department's Reserves

We have seen that the Banking Department was established to provide resources to commercial banks in the event there are severe problems in the banking system. If such a situation were to arise, the Banking Department can use its resources to make lev-denominated loans to solvent commercial banks. These loans must be fully collateralized and must mature within three months. The balance sheet entries for the Issue and Banking Departments would be the following.

In this case 'Bank deposits and current accounts' increase. This is part of the monetary base so the money supply will also increase.

Table 5.6a

Issue Department

ASSETS	LIABILITIES	
	Bank deposits and current accounts	+100
	Banking Department deposit	-100

[63] Since this is effectively a loan from the BNB to the government and the BNB, under the currency board arrangement is not allowed to make loans to the government a special provision had to be written into the law specifically for these transactions.

[64] For a further discussion of the decision to place government deposits at the BNB see Section VIII.

Table 5.6b

Banking Department

ASSETS		LIABILITIES
Loans to banks	+100	
Deposits at the Issue Department	-100	

This raises serious questions about how this will operate in a time of crisis. If commercial banks get into difficulty and the BNB extends loans, the money supply will increase. As long as these loans do not exceed the reserves held at the Banking Department, the monetary base should still be smaller than the level of foreign reserves at the BNB.

As long as foreign reserves are greater than the monetary base, the BNB should be able to guarantee a fixed exchange rate. But if people begin withdrawing money from the commercial banks to exchange levs for DEMs (euros), the commercial banks will lose reserves and will have to contract. This could cause further economic disruption.

Thus the Banking Department provides some security in that the BNB will be able to provide loans in its capacity as a 'lender of last resort,' but it should also be recognized that this is not a panacea for financial disruptions. A better protection against financial panics is good bank regulation and prudent lending practices so that financial disruptions do not occur.

4. The Independence of the Bulgarian National Bank and Political Support for the Currency Board

The BNB is an important economic institution. Ever since the founding of the Bulgarian National Bank in 1879, there has been controversy about the appropriate nature and extent of the BNB's independence from the government. A period of increased independence from government in the 1920's, for example, was followed by increasing government control in the 1930's (Avramov, 1999).

The relationship between the government and the BNB was a contentious issue during the period immediately before the establishment of the currency board. The issue was who should control monetary policy: an independent agency headed by an appointed official who in theory is protected by law from removal from office or the government selected by the citizenry? Independence is sought by those who wish to preserve the ability of a central bank to make needed but unpopular decisions on policy matters. Greater control by government is sought by those who value responsiveness to a governmental policy course.

While the law provided support for independence, independence is also a matter of actual practice. Christov (1997) makes a strong case that during the early 1990s the BNB had little independence from the government.

A currency board provides little discretion for monetary policy. The key political issue, therefore, is not independence, but government support for the currency board. Support for the currency board is, in effect, support for the monetary policy that the currency board represents.

Good macroeconomic policy requires good coordination between monetary and fiscal policy. The existence of a currency board and the monetary policy it represents does not change this requirement. A currency board disciplines the government because it is no longer able to borrow from the central bank. This may make it more difficult for the government to carry out expensive programs if it has difficulty borrowing from the private sector.

The mechanisms for stabilization under a currency board work better if wages and prices are flexible. In most economies there are institutional constraints that prevent wages and prices from moving freely in response to supply and demand shifts. For this reason there can be large swings in output as the economy slowly stabilizes. It is important the government recognize these problems and refrains from carrying out policies that further constrain wage and price movements.

Fixed exchange rate systems are always subject to possible speculation when people anticipate there will be a decision to change the exchange rate or abandon the fixed exchange rate regime. Even if financial support in the form of foreign currency reserves at the BNB is strong and the fixed rate can be maintained, speculative attacks on the fixed exchange rate can be very economically disruptive. It is, therefore, important that the government expresses strong support for the currency board to minimize the chances of these speculative attacks.

5. Concluding Remarks

In this section we have seen the BNB has the responsibility for issuing currency, maintaining the stability of the lev, and managing the total supply of money and credit. While the BNB was successful in the early transition years in establishing the lev as the medium of exchange, it failed to maintain stability and manage the supply of money and credit. The result was a financial crisis in 1996 – 1997.

The crisis created pressure for institutional changes. The currency board came into being in July 1997. This was a major change. The currency board took discretion for monetary policy away from the Managing Board of the BNB and substituted a strict monetary rule where the money supply expands and contracts with changes in the balance of payments. Since the creation of the currency board, the exchange rate has remained fixed to the DEM (euro). The supply of money and credit has been more controlled.

A question that remains is whether the currency board is sustainable. To be sustainable the currency board needs political support and good

government policies. In Section VIII these issues are discussed in more detail in the context of advantages and disadvantages of a currency board.

VI. Defining the Money Supply

The functions of money in a market economy are to act as a medium of exchange, a unit of account, and a store of value. Under central planning, however, money did not necessarily function as either a medium of exchange or as a store of value. Rather there were two types of money in Bulgaria. One type was used to pay wages and circulated among individuals. This money was used to purchase goods and services on the market. The second type, in state enterprise bank accounts, was used to describe the transactions, which took place among state enterprises. There were constraints on converting the second type of money into the first type. When the Bulgarian economy was 'monetized' the distinctions between these two types of money disappeared. Now that the Bulgarian lev performs the functions of money as they are understood in market economies, Bulgaria faces the same issues of definition and measurement of money that exist in market economies. Arriving at good definitions of the money supply in Bulgaria is especially challenging, however, because financial institutions are constantly changing.

Different definitions of money are used depending on the purpose for which they are employed. Utilization of the proper measure of money is particularly important in the analysis of macroeconomic issues, where using the wrong measure can result in poor policy choices. Traditionally the most narrow definition of money is called M1 and successively broader definitions are referred to as M2, M3 and so on. M1 refers to assets that function as a medium of exchange. M2 includes all these assets as well as those, which are extremely liquid, that is, easily converted into alternative assets, which can be used as medium of exchange. M3, M4 include progressively less liquid assets.

The determination of what to include in each of these definitions can change over time depending on institutional arrangements and common practice. If mechanisms are established which enable economic agents to make payment with certain assets then these assets **could** be included in M1. They **should** be included in M1 if economic agents actually use them to make payments. For example, money market accounts in the United States pay interest rates competitive with savings accounts. A limited number of checks can be written on these accounts each month. Even though the funds in these accounts can be used to make payments, individuals rarely do so. In other words, individuals could treat these accounts as a medium of exchange but in fact they do not. So the decision was made to include them in M2, not in M1.

In Bulgaria, the BNB reports three measures of the money supply: M1, M2, and M3 (or broad money). The Bulgarian M1 corresponds to the standard formulations. M2 includes the assets in M1 plus foreign currency

deposits and time and savings deposits, which together constitute 'quasi-money.' Broad money is the sum of M2, money market instruments, import and restricted deposits, and deposits in non-operating banks.

Currently the definitions of the money supply, M1, quasi-money, and broad money are:

M1 = C + DD (lev) QM = FCD + S + T

M2 = M1 + QM BM = M2 + RMN

where C is cash not in banks, DD(lev) is demand deposits in lev, FCD is foreign currency deposits,[65] S is savings deposits and T is time deposits of all maturity levels. RMN is restricted accounts, which include funds deposited for purposes such as the registration of business licenses, money market instruments and deposits in non-operating banks.

We shall shortly discuss each of these components, but first it may be useful to get an overall sense of the magnitude and movements of the different measures. Table 6.1 gives BNB's calculation of the money supply from 1991 until 2000. The table shows that all elements of the money supply have grown rapidly over the 1990s. This growth is misleading because prices have also been rising rapidly over this period. The first row in the table shows the lev/dollar exchange rate (expressed in new lev). The exchange rate changes are an indication of the price level change that has taken place during this period. As can be seen in this row, it took almost 100 times more lev to buy a dollar in 2000 than it did in 1991.

Table 6.1

Money Supply

(millions of new levs)

	Dec. 1991	Dec. 1992	Dec. 1993	Dec. 1994	Dec. 1995	Dec. 1996	Dec. 1997	Dec. 1998	Dec. 1999	Dec. 2000
Exchange rate BGN/USD	0.02181	0.02449	0.03271	0.06602	0.0707	0.48735	1.7765	1.6751	1.9469	2.1019
Broad money	112.02	158.57	234.07	418.01	583.66	1310.28	6018.59	6597.17	7351.11	9304.00
M2	108.43	154.98	229.92	409.11	571.31	1244.57	5538.77	6180.59	6914.02	8920.21
M1	26.89	37.83	48.30	75.13	107.89	236.63	2266.89	2755.60	2996.64	3640.28
Cash	11.87	18.27	25.15	38.50	61.62	126.46	1314.11	1742.03	1957.35	2372.38
Demand deposits	15.02	19.57	23.15	36.63	46.27	110.17	952.78	1013.57	1039.29	1267.90
Quasi-money	81.54	117.15	181.62	333.98	463.42	1007.94	3271.89	3424.99	3917.39	5279.93
Time deposits	25.87	59.41	109.97	164.95	255.57	326.15	796.15	776.38	924.78	962.70
Savings deposits	15.95	20.22	28.05	40.85	57.82	81.61	224.83	292.29	387.86	450.20
Foreign currency deposits	39.73	37.52	43.60	128.17	150.03	600.18	2250.91	2356.32	2604.73	3867.03
Money market+Import and Restricted +Dep. Non-operating banks	3.59	3.59	4.15	8.90	12.36	65.66	479.81	416.58	437.09	383.80

Source: BNB.

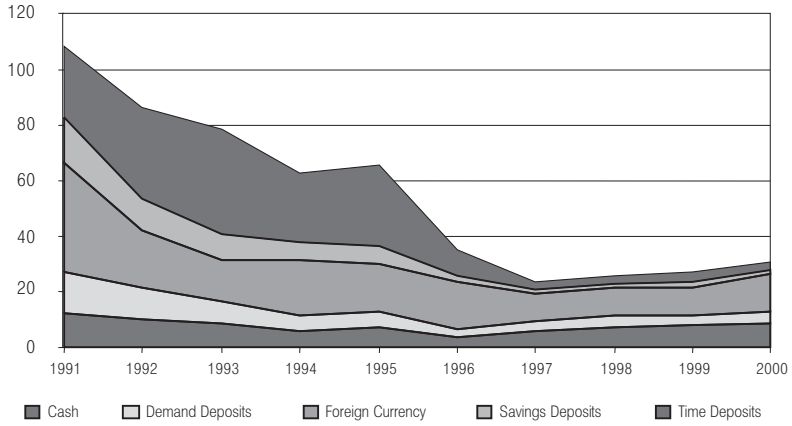
[65] Until October 1992 both lev and foreign currency deposits were included in the definition of M1. In November foreign currency deposits were moved out of M1, but were still included in the calculation of quasi-money.

It is possible to get a better understanding of the movements in the money supply if the nominal values of the money supply are deflated by the Consumer Price Index. Figure 6.1 shows the movement of the various money supply components deflated by the Consumer Price Index so that the movement in real money can be seen. The graph shows all the elements of M2. Since the top line is the vertical sum of all the elements in the graph, the movements of the top line in the graph shows movements in M2.

Figure 6.1

Real Money Supply Components

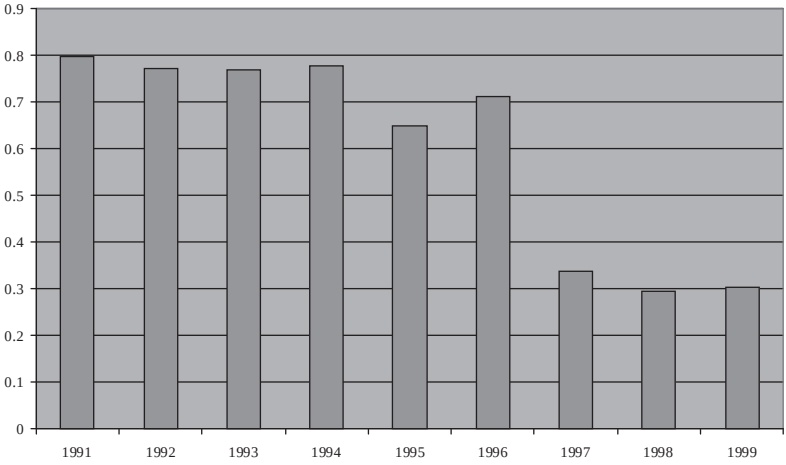
(millions of levs)



Source: BNB.

Figure 6.2

Ratio of M2 to GDP in Bulgaria



Source: BNB.

Real M2 fell over the entire period 1991 to 1997, but the fall was particularly dramatic during the financial crisis in 1996 and 1997. By the end of 1997 real M2 was less than one-quarter its 1991 level. This was really a startling change. Since money did not play as big a role in the economy under central planning, the expectation has been that transition economies would become increasingly monetized over time; not less. Since 1997 the money supply has grown, but it is still less than one-third the level of 1991.

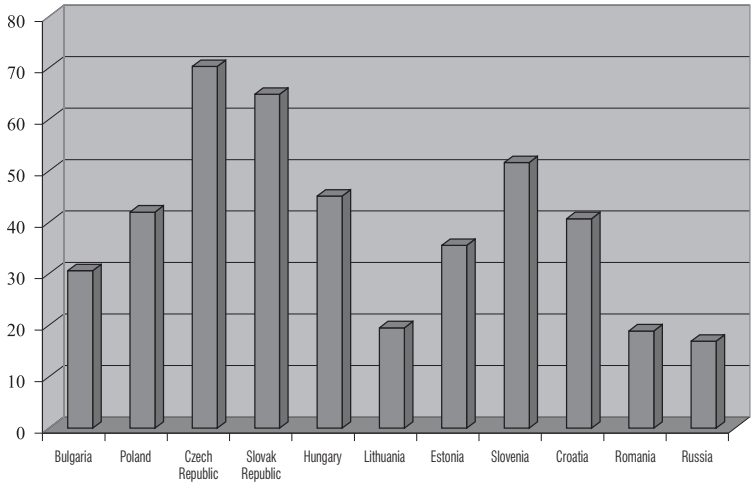
Another way of measuring the degree of monetization is to compare the movements in M2 to changes in GDP. Figure 6.2 graphs the ratio of M2 to GDP. The graph shows that the fall in the money supply was not simply a reflection of the decline in GDP that occurred in the 1990s. The money supply fell even faster than GDP.

What does this mean for the Bulgarian economy? One way of viewing these changes is to compare money to GDP ratios across transition economies. Figure 6.3 shows the broad money to nominal GDP ratios across several transition economies in 1998. The range is vast. The ratio of broad money to GDP varies from 70.2 for the Czech Republic to 16.9 for Russia. Bulgaria's ratio of 30.6 in 1998 is considerably lower than the ratio for most of the more advanced transition economies (i.e. Poland, Hungary, Slovak Republic and Slovenia). On the other hand, the ratio is much higher than the ratio for slower transitioning economies like Russia and Romania. The comparison with the Baltic countries is particularly relevant

since both Estonia and Lithuania have currency boards and had severe banking crises.[66] As the graph shows, Estonia has a somewhat higher ratio, but Lithuania has a much lower ratio than Bulgaria.

Figure 6.3

Comparison of Broad Money to GDP Ratio in Transition Economies



Source: EBRD Transition Report 1999.

It is difficult to conclude too much from these comparisons, especially given the range of ratios among the other countries. It would appear that Bulgaria's present ratio is approximately what should be expected at this point in the transition. This suggests that the earlier M2/GDP ratios were unusually high and reflected the lack of monetary control. If the economy expands and confidence grows in the banking system, then this ratio should move upwards.

1. Definition of M1: M1 = C + DD (lev)

Analysis of the various components of the money supply provides a revealing picture of the financial changes taking place in the Bulgarian

[66] As might be expected countries that have had financial crises, in general, have lower ratios of broad money to GDP. The decline in the ratio of money to GDP was particularly large in Bulgaria, however. Tang, *et. al. (*2000) present a table (Table 1) showing the movement of M2/GDP ratios for twelve countries that have had banking crises. With the exception of Macedonia, the fall in the ratio was largest for Bulgaria. In part this was because the ratio was so high in Bulgaria before the crisis. The cost to the government of bank restructuring was also highest in Bulgaria (26% of GDP).

economy. We begin with M1, which contains only the most liquid assets: cash and demand deposits. Both of these assets can be used as a means of payment. More sophisticated financial systems provide a variety of ways that payments can be made. Reliance on cash as a medium of exchange is an indication that many of these alternative systems are still undeveloped. Reliance on cash is particularly strong in Bulgaria and has remained so throughout the 1990s. The widespread use of cash is related to several factors: the mechanisms of payment, the evasion of taxes and general concerns about the banking system following the financial crisis.

What does not show up in the data is cash held in foreign currencies. Other form of money are easier to monitor. Commercial banks are required to file reports describing their deposit balances so these numbers can be calculated. Cash in levs can be measured because these notes are issued by the BNB. The holding of foreign currency outside of banks is very difficult to measure, however. People and businesses can acquire foreign currency by exchanging levs in Bulgaria or bringing banknotes from abroad. Because it is not possible to calculate foreign currency cash balances, they are not reported in official statistics.[67]

Economists know that these foreign currency balances are important, however. When people become nervous about the potential depreciation of the lev, they will buy dollars and DEMs. Sometimes they will leave this money as foreign currency deposits in the banks, but if they concerned that the banks may fail or they want to hide these balances away from government authorities, they will hold them as cash in foreign currencies. This is what happened in 1996 in the middle of the financial crisis. People withdrew money from the banks and held this money as cash in foreign currency.[68]

The use of banking services for making payment is largely restricted to firms. In part this is a carry over from the central planning period when banks were used by state enterprises to manage their financial transactions. Demand deposits are now being used by both state firms and private firms (some of which are former state firms that have been privatized). A factor which has contributed to the wider use of demand deposit accounts by firms is the development of **B**ank **I**ntegrated **S**ystem of **E**lectronic **Tra**nsfers (BISERA). This clearing system is operated by the BNB. Before the development of this system it could take a very long time before a pay-

[67] It might be noted that $100 bills are much more visible in Bulgaria than they are in the United States. The main reason for this is that cash is not used for most transactions of any size in the United States. Credit cards or checks are the preferred method of payment.

[68] A recent study by BNB has estimated that the public holds cash balances of about 400 million in euro currencies. A study by the U.S. Treasury Department (2000) estimated that Bulgarians were holding about USD 1 billion in 1997 during the financial crisis. For comparison this is more than 40% of all bank deposits by nonfinancial institutions and other clients and more than one third of total reserves of the currency board.

ment was cleared through the banking system. BISERA operated well even during the financial crisis when banks were failing. Recently further improvements have been made to the system.

Demand deposits are not used extensively by individuals. An important reason why individuals rely on cash rather than demand deposits is that it is still difficult for individuals to make payments from their demand deposit accounts. Although settlement deposits, which are accounts held by individuals, can be used directly for payment, their use is limited to the payment of utility bills. For this reason most individuals keep their liquid assets in time deposit accounts rather than demand deposit accounts. This contrasts sharply with the United States and most West European countries where other forms of payment are widely used.

This may change in the future as new services are introduced. For example, banks are trying to convince companies to pay salaries through banks. Employees could then withdraw their money using debit cards at ATM machines. If the payrolls are deposited in demand deposit accounts, then the use of demand deposit accounts would increase.

2. Definition of Quasi-Money: QM = FCD + S + T

Quasi-money contains assets that are very liquid but are not normally used directly for making payments.

Demand deposits in foreign currency: Until September 1992 approximately 60% of demand deposits at commercial banks were in foreign currency deposits. Until November 1992 these accounts were included in M1. They were moved to quasi-money because they were used to store value and make payments for imported goods but could not be used in domestic transactions. In 1999 the law was changed and foreign currency can now be used in domestic transactions, but it is more difficult to use foreign currency because foreign currency transactions cannot be processed through the BISERA system, and there are special reporting requirements for large transactions in foreign currency. For this reason the use of foreign currency in domestic transactions is limited.

Until foreign currency is more widely used in domestic transactions, it is logical that foreign currency deposits remain in the quasi-money category. The reasoning behind the decision is similar to the example of money market accounts in the United States given earlier. That is, since these accounts are not in fact used very much for making domestic payments, they should not be included in M1.

S*avings deposits:* Although savings deposits (i. e. accounts) are reasonably liquid, they are included in the calculation of quasi-money rather than M1 because they are not widely used for transactional purposes. These accounts are held by households. At one time this was the only type of account available to individuals and only at the State Savings Bank. Now all commercial banks may offer these accounts. Unlike the past, individuals

can now negotiate with the State Savings Bank (renamed DSK Bank) to issue checks on these accounts. However, the usefulness of the checks is constrained by the small number of payments that can be executed with them, causing their inclusion in quasi-money rather than M1.

Time deposits: The remaining category, time deposits, consists of deposits held at a bank for specified periods of one month to a year, with penalties for early withdrawal of funds. These are similar to certificates of deposit in the United States. Penalties differ among banks.

The interest rates on these accounts vary with interest rates in the economy. While the rates tend to adjust with the central bank base rate, normally there is no enforceable contractual agreement between the customer and the bank as to exactly how the interest rates will be set over time.[69] The inability of consumers to get a clear contractual agreement regarding interest rate adjustments on these accounts is an indication that the banks still enjoy a powerful position relative to their customers. In general, interest rates on longer-term deposits are higher to encourage customers to place their money in longer-term time deposits. While time deposits are not used directly for making payment, they are now being used by individuals as a highly liquid asset, which can be easily converted into cash for making payments.

3. Defining M2 and Broad Money

M2 is simply the sum of quasi-money and M1. Thus, M2 contains all the assets that we have described so far. Broad money contains all these assets and money market accounts, import and restricted deposits and deposits at non-operating banks.

Import and restricted deposits: Import and restricted deposits include funds deposited for purposes such as the registration of business licenses and money put aside for the purposes of capitalization of companies. Deposits restricted by courts to secure legal claims would also fall into this category.

Deposits at non-operating banks: A number of banks failed during the financial crisis, but the liquidation of these banks took some time. Depositors in these banks received their deposits, but there were restrictions placed on the accounts and depositors were not permitted to withdraw all their funds immediately. In 1999 the methodology for accounting for these deposits was changed, and these deposits were included with restricted deposits in M3 until the banks were fully liquidated.

Money market accounts: These accounts include instruments that are supposed to be tradable on the money market. They include instruments like certificates of deposits. At present only First Investment Bank issues these certificates of deposits, so there is very little money in these accounts.

[69] Some banks include a statement that the interest rate is adjustable and dependent on the central bank rate, but then they do not necessarily abide by these statements.

4. The Changing Structure of the Money Supply

Figure 6.1 shows the movements of the various components of M2 over the 1990s. Not only have there been dramatic movements of the M2 aggregate, there have also been shifting relationships between the various components of M2. The changes in the relative size of the components of M2 reflect changes in how money is being used by different agents in the economy.

As suggested earlier in this section, if the transition process proceeded smoothly, banks would develop many new services, which would make the process of completing transactions easier. This should reduce the need for cash and increase the value of deposits. There have been some new services, which have led to improvements in the payment system. For example, the BISERA system for clearing transactions is a vast improvement over earlier arrangements. Automatic Teller Machines did not exist in the early 1990s. These machines make it easier for people to withdraw money from their accounts.

There are several important developments in the components of M2 in the 1990s. In the early period time deposits grew dramatically. The level of these deposits collapsed in the financial crisis of 1996 and have never really recovered from this experience. A similar but less dramatic pattern is observable with respect to savings deposits. All savings accounts and almost 73% of time deposits were held by individuals in 2000. The sharp decline in time and savings deposits is, therefore, a household phenomenon.

A recent study by GfK Bulgaria (Pari, 9.3.2000) found that only 27% of the Bulgarian households had bank accounts in 2000. By way of comparison 98% of Austrian, 85% of Slovak, 83% of Czech, 65% of Hungarian and 62% of Polish households had bank accounts. The study also found that 11% of Bulgarian households had time deposit accounts and 10% had savings deposit accounts.

These figures illustrate how households lost faith in the banking system during the financial crisis, and the banks have not offered sufficient incentives for individuals to return. While lack of confidence in the banking system is surely an important factor, low interest rates on time and savings accounts are another. Indeed for much of the recent period real interest rates on deposits accounts have been negative.[70]

Demand deposits and foreign currency deposits show a different pattern. In 2000, 85% of demand deposits were held by either state or private businesses. Along with other elements of the money supply foreign cur-

[70] With low inflation, the opportunity cost of holding cash has also declined dramatically. When nominal interest rates are 25% – 40%, the opportunity cost of holding cash is very high even when real interest rates are negative, as they were during some periods in the early 1990s. When nominal interest rates are 4% or 5%, the opportunity cost of holding cash is much lower.

rency deposits and demand deposits fell in 1996. While the levels of foreign currency deposits and demand deposits are still below pre-crisis levels, the recovery is far better than the improvement in time and savings deposits. Banks have done a better job in servicing business customers than they have households. Total real business deposits have fallen only 21% whereas total household accounts have fallen 86% between 1995 and 2000.[71] Many of these business accounts are transactions accounts and probably reflect the growing confidence in the BISERA system.

The level of real lev cash holding has actually grown and is actually 15% higher now than it was at the end of 1995. This is quite astonishing given the expectation that other means of payment would replace cash as the financial system improved. The growth in cash holdings reflects two economic forces. First, with the establishment of the currency board, people are more confident that the lev will not be devalued. Since we do not have data on foreign currency cash holdings, we cannot measure the trends in these holdings directly. However, these figures on lev cash holdings would suggest that people have moved some of their cash holdings from foreign currency cash holdings to lev cash holdings. Secondly, confidence in the banks is still low so people are holding levs, but have not put this money into the banks. Cash remains the alternative to bank deposits.

While the banking system is much stronger than it was in the pre-crisis period, these trends highlight some continuing difficulties in the financial system. The loss of faith in the banking system is significant because the banks are still the principal financial intermediary in Bulgaria. When households withdraw funds from the banking system, it is more difficult to direct household savings towards investment opportunities. Without intermediation, funds for investment purposes are harder for firms to acquire, and the economy then grows more slowly.

5. Conclusions

The money supply in Bulgaria has experienced dramatic swings in the 1990s. While economists expected that a transition economy would become more monetized as time passed, the financial crisis of 1996/7 caused the real money supply to fall significantly. By 2000 the banking system had only partially recovered. The money supply in 2000 was still far smaller than it was before the crisis. This is an indication that the banking system has only partially recovered from the crisis. Further evidence that these problems are continuing is the high dependency on cash in the economy in spite of a growing array of new banking services.

[71] Households also hold foreign currency accounts. Balances in household foreign currency accounts have recovered much more than time and savings accounts. In 2000 the level of household foreign currency balances had recovered to about 82% the 1995 level. Because time and savings accounts have fallen so precipitously, household foreign currency accounts were 57% of household accounts in 2000 versus only 15 % in 1995.

The difficulties with restoring confidence in the banking system have important economic implications. Banks are still the dominant financial intermediaries in the Bulgarian economy. Until confidence is restored, there will be less intermediation and future growth in the economy will be slower.

Until October 1992 both lev and foreign currency deposits were included in the definition of M1. In November foreign currency deposits were moved out of M1, but were still included in the calculation of quasi-money.

VII. Money Supply Determination

The supply of money and credit in the economy is determined by an interaction between commercial banks and the BNB. In this section we describe this interaction and develop a formula which describes how the money supply is determined in Bulgaria. We begin with a description of the transaction settlement system that is now being used in Bulgaria. This is followed by a discussion of the relationship between the BNB and the commercial banks as defined by the law on commercial banking. Then, a modified version of the standard money supply formula is derived. The final section shows how the money supply will change under the currency board arrangement.

1. Transaction Settlement System

Before the movement towards a market economy, there was no need to quickly clear transactions through the banking system. The banks performed the accounting procedures used by the central planning system, but not the type of transaction service essential in a market system. It was not uncommon for transactions to take several weeks to clear. To meet the demands of the changed environment, the BNB created the BISERA electronic gross settlement system which is designed to provide clearance of lev transactions within the banking system within three days. BISERA does not encompass transactions in foreign currency. If companies wish to carry out transactions in foreign currency through banks, banks must use their 'nostro accounts.' These are accounts that banks have at other banks.

To understand how transactions are recorded through the BISERA system we describe a series of examples. In each case the payer is Company X and the payee is the Company Y. What changes in each example is where these two firms hold their accounts.

Payee and Payer at the Same Bank: The simplest situation arises when the payee and the payer have accounts at the same bank. Suppose that both Company X and the Company Y have accounts at Bank A. Company X makes a payment to the Company Y of 1000 levs. Money must be deducted from the Company X account and credited to the Com-

pany Y account. This transaction can be described on the T-account of Bank A as:

BANK A

Assets	Liabilities
	Company X BGN -1000 Company Y BGN +1000

The responsibility for transferring these funds from one account to the other is totally the responsibility of Bank A. No other bank is involved in this process.

Payee and Payer at Different Banks: When Company X and the Company Y have accounts at different banks, transaction clearance becomes more complicated. The BISERA system is used and the banks utilize their settlement accounts at the BNB to clear the transaction. Suppose instead of banking at Bank A, the Company Y has an account at Bank B.[72]

Since Company X still has an account at Bank A, the payment will still have to be made from this account. The transaction begins when Company X gives Bank A an instruction to make payment to the Company Y. Under the BISERA system the account of Company X is reduced by 1,000 levs and the Bank A account at the BNB is reduced by 1,000 levs. These entries should be made at the end of the first day or Bank A will be penalized.

BANK A

Assets		Liabilities	
Dep. at BNB	BGN -1000	Company X	BGN -1000

On the second day it is BNB's responsibility to make the next two entries. First, on its own balance sheet it records the corresponding entry to Bank A's entry showing that Bank A's account at the BNB has been reduced by 1,000 levs. Since the Company Y has an account at Bank B, the levs are transferred to Bank B.

BNB

Assets	Liabilities	
	Bank A Bank B	BGN -1000 BGN +1000

Bank B now records the increase in its account at the BNB and credits the account of the Company Y.

[72] There are several methods of clearing transactions under the BISERA system. We describe direct transfers. A detailed description of BISERA can be found in the operations manual.

BANK B

Assets		Liabilities	
Dep. at BNB	BGN +1000	Company Y	BGN + 1000

The money has now been transferred from Company X to the Company Y. Under the BISERA system each stage takes no more than one day so the whole process should take no more than three days. This was a great improvement over the previous system, where the process of clearing a transaction could be very lengthy.[73]

2. A Money Supply Formula for Bulgaria

The money supply in Bulgaria is determined by the interaction of the commercial banks and the BNB. The process is essentially the same as any country that uses a reserve system. Once a commercial bank acquires reserves, the bank can loan this money to nonfinancial borrowers and create additional deposits at the bank. This adds to the money supply. A description of how additional bank reserves will cause the money supply to grow can be found in any standard money and banking textbook.

A special feature of the Bulgarian system is that, under a currency board, the money supply is determined by foreign exchange transactions and the decisions of commercial banks. The purpose here is to describe the special features of the Bulgarian banking system and show how these features alter the way in which the money supply is determined. First, a formula for the money supply is presented. Then this formula is used to analyze how the money supply changes.

Over time there have been improvements in the way that the money supply has been controlled in Bulgaria. At the beginning of the transition, credit ceilings were used to control the money supply. Credit ceilings were abandoned in July 1994.[74] Under later arrangements there were tensions between the BNB and the commercial banks regarding foreign deposits. Because of concerns over money supply control, the BNB limited the use of foreign currency as reserves. This created problems for the commercial banks that had foreign currency deposit liabilities. If the commercial banks had assets in levs to satisfy the reserve requirements, they had exchange rate risk.[75] Under present regulations commercial banks are allowed to keep their reserves in foreign currency in the same ratio as their foreign currency liabilities. So if half a bank's deposits are foreign currency deposits, the bank can keep up to half its reserves in foreign currency.

[73] It might be noted that this procedure is the opposite of the check clearing system used in the United States. In the United States the first entries are made at the bank receiving payment since the check is deposited by the payee.

[74] See the first edition for an analysis of the effectiveness of credit ceilings. It was argued there that credit ceilings were inadequate for controlling the money supply.

[75] See the second edition for a discussion of these problems.

The issue of exchange rate risk for the commercial banks has also changed. Because the currency board fixes the exchange rate between the euro and the lev, there is no fluctuation between the lev and the currencies in Euroland. Thus there is no currency risk as long as the currency board is maintained, and the exchange rate remains fixed. On the other hand, holding US dollars or other non-Euroland currencies does create potential exchange rate risk. For example, if the value of US dollar deposit liabilities rise because the dollar strengthens relative to the euro (as it did during 2000), a commercial bank has to increase (the lev value of) its reserves. If the commercial bank is holding dollar reserves, it will not have to increase its actual reserves since the value of its reserves will also rise. However, if a bank holds its reserves in levs, then reserves must be increased to meet the minimum reserve requirement.[76]

Given the present treatment of foreign currency deposits and reserves, there is no reason to distinguish between deposits in lev and deposits in foreign currency when deriving a money supply formula. The reserve requirement ratio used to determine the reserves that must be held against lev and foreign currency deposits is the same. Foreign currency can be deposited at the BNB to satisfy the minimum reserve requirement. The only distinction between the use of foreign currency and levs is that commercial banks cannot use foreign currency cash in the vault when determining their reserve position.[77] Commercial banks can include a percentage, presently 60%, of their cash position in levs when calculating their reserves.

In constructing a money supply formula, we derive a formula for $M2$. Let D^{DE} be the sum of all demand deposits, savings deposits, and time deposits in lev, and all deposits in euros. If foreign currency deposits in US dollar terms are D^F, then the total money supply will be:

$$M2 = C_p + D^{DE} + \varepsilon D^F = C_p + D \qquad (1)$$

where C_p is the amount of cash in the hands of the public, ε is the US dollar exchange rate and D is all deposits at commercial banks. Consistent with the definition of $M2$ used by the BNB, cash holding does *not* include foreign currency held by Bulgarian citizens.

In the standard construction of the money supply formula, movements in the money supply occur when there are changes in the monetary base MB.[78] The monetary base is the sum of two liabilities of the central

[76] See the section *Changes in exchange rates* later in the text for a more detailed explanation of these changes.

[77] Even though commercial banks cannot use foreign cash to satisfy the minimum reserve requirement, they will need to hold some foreign currency cash to satisfy potential requests for foreign currency withdrawals by customers. Any cash holding by commercial banks will constrain money supply expansion because it will leave less money available to lend.

[78] When a central bank has discretionary control over the money supply, the central bank controls the money supply by manipulating the level of the monetary base. With a

bank: cash C and commercial bank deposits at the central bank D_C. The central bank controls the monetary base and the commercial banks determine whether they wish to hold cash or deposits at the central bank. In other words, the commercial banks are free to deposit or withdraw cash from the central bank at any time. From the definition of the monetary base we have:

$$MB = C + D_C \tag{2}$$

All cash (in lev) issued by the BNB will also be cash in the hands of the public C_p or be vault cash C_v held by commercial banks. So

$$C = C_p + C_v \tag{3}$$

Let *r* represent the percentage of demand, savings, time and foreign currency deposits that banks are required to keep in their reserve accounts at the BNB. Then the relationship between required reserves, RR, and total deposits, D, will be:

$$RR = rD \tag{4}$$

There are two assets that banks can use to satisfy this requirement. First, there are reserve deposits at the BNB, D_C. Secondly, there is vault cash. Only part of vault cash can be counted towards meeting the minimum reserve requirement. Let k_v be the percentage of vault cash, C_v, that banks are allowed to use to satisfy the reserve requirement. Then $k_v C_v$ will be the share of vault cash included as required reserves. Also let k_f be the percentage of foreign vault cash C_f that banks are allowed to use to satisfy the reserve requirements.[79] Then $k_f C_f$ will be the share of banks' foreign cash holdings included as required reserves. Total reserves of the banking system, R, will then be:

$$R = C_v + C_f + D_c \tag{5}$$

Required reserves will be part of total reserves since not all of the vault cash can be counted to meet the reserve requirements.

$$RR = k_v C_v + k_f C_f + D_c \tag{6}$$

Combining equations (4) and (6), we have

$$D_c = rD - k_v C_v - k_f C_f \tag{7}$$

currency board the monetary base changes automatically when levs are bought and sold on the foreign exchange market.

[79] At the present moment a bank's foreign cash holdings cannot be used to satisfy reserves requirements. So in this case $k_f = 0$. But we derive the formula in a more general format in order to trace the implications of changing this regulation.

Substituting equations (3) and (7) into equation (2) we have:

$$MB = rD + C_p + (1 - k_v)C_v - k_f C_f \quad (8)$$

Let ρ_v and ρ_f be the desired ratios of banks' vault cash holdings to lev and foreign currency deposits respectively. They reflect the desire of banks to serve their customers' cash needs. Then using the definition of these ratios equation (8) becomes:

$$MB = rD + C_p + (1 - k_v)\rho_v D^{DE} - k_f \rho_f \varepsilon D^F \quad (9)$$

If we factor D from the right side of equation (9), we obtain

$$MB = \left[r + cp + (1 - k_v)\rho_v (1 - d) - k_f \rho_f d\right]D \quad (10)$$

where $cp = C_p / D$ and $d = \varepsilon D^F / D$.

The cp ratio depends on economic agents' behavior. It reflects the public's desire to hold cash in levs rather than deposits. At present cash is the principal method of payment for transaction conducted by individuals in Bulgaria. The cp ratio depends in general on four factors: (1) ease of withdrawal from the banks and usefulness of deposits in transactions, (2) nominal interest rates on bank deposits, (3) the size of the shadow economy, and (4) the preference for hoarding cash in the form of lev rather than foreign currency.[80] Cash pays no interest so people holding cash are foregoing the interest payments they would otherwise receive on their money. The deposit ratio d reflects the preferences of depositors for lev versus holdings of foreign currency. These preferences may differ for individuals and institutions.

The ratios ρ_v and ρ_f relate to bank behavior. Banks need to retain cash in the vault to service the demands of their depositors for withdrawals. Since banks earn no interest on the cash in their vaults, they have the incentive to keep these balances at low levels so they can loan out as much money as they can at higher interest rates. The need to service depositors withdrawals imposes limits on the minimum level of vault cash they will hold.

Finally, the ratios k_v, k_f and r are policy variables determined by the BNB.

The level of total deposits, D, can be found by rewriting equation (10):

$$D = MB / \left[r + cp + (1 - k_v)\rho_v (1 - d) - k_f \rho_f d\right] \quad (11)$$

[80] The level of cash outstanding has risen dramatically since the introduction of the currency board. For an extensive study of the implication of the rise in cash holdings in lev see *Nenovsky and Hristov* (2000b).

The total money supply can then be found by noting that equation (1) can be adjusted

$$M2 = (C_p / D)D + D = (cp + 1)D \quad (12)$$

so that the money supply formula is

$$M2 = MB(cp+1)/\left[r + cp + (1-k_v)\rho_v(1-d) - k_f \rho_f d\right] \quad (13)$$

With some modifications, this formula is similar to the one used in the United States. The basic differences are two. (1) Banks offer both lev and foreign exchange deposits which is reflected in the deposit ratio and in the foreign exchange vault cash. (2) Only part of the vault cash can be counted to meet the required reserves. If there were not foreign exchange deposits and all vault cash counted as required reserves then $d = 0, k_f = 0, k_v = 1$ and the formula becomes the standard money multiplier formula.

Equation (13) illustrates that as long as there are certain regularities in these ratios, changes in the money supply will be a function of changes in the monetary base. On the other hand, the BNB has no direct control over the behavioral variables cp, d, ρ_v and ρ_f, and so changes in these ratios may also affect the money supply.

The above formula gives us the opportunity to trace the impact of changes in different variables on the money multiplier and the money supply. Since k_v and k_f appear in the formula with minus signs larger values will increase the money multiplier. When k_v and k_f are larger, banks need to keep fewer reserves with the BNB. Banks can then extend more credit and the money supply will be larger. A smaller r will have the same effect. If the public withdraws cash in lev from the banks (as occurred during the financial crisis period) the money supply will decrease because cp will rise reducing the money multiplier.[81] When depositors change the distribution of their deposits between levs and foreign currency this will change the d ratio. If the k's and ρ's differ, then this could affect the multiplier.

3. Changes in the Monetary Base

Analysis of the money supply formula shows that the money supply is most directly affected by changes in the monetary base. Before the establishment of the currency board the BNB was, in theory, able to exercise considerable control over the monetary base through changes in its refinancing policies and its purchases and sales of foreign currency or of government securities. In fact the BNB was under heavy pressure to finance

[81] The negative relationship between the cash to total deposits ratio and the money multiplier can be proven by using derivatives.

government deficit spending. When the BNB loaned money to the government, this increased the monetary base.

During the financial crisis in 1996 – 1997, the BNB also tried to support the banking system by providing loans to the banks. These loans also increased the monetary base and in turn the money supply. This expansion was offset by foreign currency trading by the BNB. When the BNB entered the foreign currency market and tried to keep the lev from depreciating, it had to buy levs, this decreased the monetary base.

Under the currency board arrangement the BNB cannot lend to the government or the banks so the monetary base now increases or decreases when levs are (i) exchanged for foreign currencies, (ii) the government collects taxes or makes payments, or (iii) the value of foreign currency deposits at banks increase or decrease. We look at each in turn.

3.1. Foreign Currency Operations of the BNB

When the BNB fixes the exchange rate, it is promising to buy all the levs that anyone wishes to sell at that price or, alternatively, promising to sell all the levs anyone wishes to buy. When the BNB buys levs, it pays for the levs in foreign currency. This reduces the amount of levs outstanding. The monetary base declines, causing the money supply to decrease.

For example, if someone comes to the BNB and buys DEMs with lev currency notes, this will be recorded on the BNB's T-account as:

BNB

Assets		Liabilities	
Foreign currency reserves	DEM - 1,000	Currency in circulation	BGN - 1,000

Since currency in circulation is part of the monetary base, the monetary base falls by BGN 1,000. This fall in the monetary base will create a further contraction of the money supply. The size of this decline in the money supply can be calculated using the money supply formula. Conversely, foreign currency transactions can increase the money supply if people use their foreign currency to buy levs.

3.2. Government Operations

When the currency board was established, a decision was made to place the government accounts at the BNB (see the Issue Department balance sheet in Table 5.2.).

Thus, the BNB serves as the bank for the government and all financial transactions for the government pass through this account at the BNB. *Money in this account is not part of the monetary base.* When the government interacts with the public, either currency in circulation or accounts at commercial banks are affected.

For example, suppose that Company X has an account at Bank A, and

Company X pays its taxes from this account. The T- account transactions would be the following:

BANK A

	Assets		Liabilities
Deposits at BNB	BGN - 10,000	Deposit of Company X	BGN - 10,000

BNB (Issue Department)

	Assets		Liabilities
		Deposits of Bank A	BGN - 10,000
		Government deposits	BGN +10,000

Bank A's deposits at the BNB are part of the monetary base. Since these deposits have fallen by BGN 10,000, the monetary base has decreased by BGN 10,000. The money supply formula will determine how much the money supply will then fall.[82, 83]

This points to two problems with a currency board. First, tax collections and government expenditures in the economy will cause the money supply to rise and fall unless they happen to be timed in such a way as to offset each other. A central bank with discretionary authority can offset these changes caused by government activity by increasing or decreasing bank reserves (perhaps through open market operations).[84] A currency board cannot do this because it cannot engage in discretionary activities that will affect the size of the money supply.

Secondly, when the government deficits spends its expenditures exceed its income. More money is being put into the economy than is being withdrawn so the monetary base will expand and so will the money supply. Fortunately, during the years following the establishment of the currency board, government deficits have been very small and this has had very little effect on the money supply.

[82] When the Banking Department becomes a lender of last resort and loans money to a bank, the monetary base increases in the same way. This is described in Section V, Tables 5.6a and 5.6b.

[83] See *Nenovsky and Hristov* (1998, pp. 16 – 18), *Dobrev* (1999, pp. 20 – 21) and *Manchev* (2001, VI.8.2) for a more detailed description of the impact of government actions on the money supply. Dobrev also discusses this issue in the context of holding domestic and foreign assets as backing for government deposits.

[84] Indeed, most of the open market operations in the US are various forms of repurchase agreements. These are temporary sales and purchases of government securities and they are designed to counter the impact of actions that have a temporary effect on the money supply.

3.3. Change in Exchange Rates

Since foreign currency deposits of commercial banks at the BNB are part of the monetary base, the *lev valuation* of these deposits will change with changes in exchange rates even if there is *no change* in the actual amount of foreign currency on deposit. Since the lev value of these deposits changes, the monetary base valued in levs will change. This will make it possible for the *lev value* of the money supply to change.

To see this, let's focus on the foreign currency deposits that the Bank A might have at the BNB. First, note that foreign currency deposits in euros (or Euroland currencies) should not create problems since the exchange rate is fixed between levs and euros. On the other hand, if the deposits are in dollars, changes in the exchange rate can affect the position of the banks. Let's assume that the deposits are in dollars. We will ignore the other assets and liabilities of the Bank A and BNB. (Note these are balance sheets, not T-accounts.)

BANK A

Assets		Liabilities	
Deposits at BNB in dollars	BGN 100,000	Deposits in dollars	BGN 1,000,000
All other assets		All other liabilities and net worth	

Example 1: This example assumes that the reserve requirement ratio, r, is 10%. Even though the deposits are in dollars they appear on the balance sheets in levs since the balance sheet accounting is in lev. In this instance, Bank A is holding dollar balances at the BNB which match the dollar deposits that it has in customer accounts on the liability side of its balance sheet.

Suppose that the dollar appreciates by 5% relative to the euro and the lev. On the balance sheet of the Bank A, the lev valuation of both the customer accounts and the deposits it has at the BNB will change:

BANK A

Assets		Liabilities	
Deposits at BNB in dollars	BGN 105,000	Deposits in dollars	BGN 1,050,000
All other assets		All other liabilities and net worth	

In this instance, Bank A's deposits at the BNB have increased by BGN 5,000 levs and the money supply has increased by BGN 50,000 levs.

These changes occur automatically when the exchange rate changes, but the process does not stop there. Other changes can be expected to occur to keep behavioral ratios in balance. For instance, with a higher level of bank deposits, the public will want to keep higher cash balances (so that cp is constant.) The money supply formula calculates the eventual change in the money supply that results when all these other changes have taken place.

Example 2: Suppose the reserve requirement is still 10%, but Bank A decides to keep half its reserves in dollars and half in levs.

BANK A

Assets		Liabilities	
Deposits at BNB in dollars	BGN 50,000	Deposits in dollars	BGN 1,000,000
Deposits at BNB in levs	BGN 50,000		
All other assets		All other liabilities and net worth	

Suppose the dollar appreciates by 5%:

BANK A

Assets		Liabilities	
Deposits at BNB in dollars	BGN 52,500	Deposits in dollars	BGN 1,050,000
Deposits at BNB in levs	BGN 50,000		
All other assets		All other liabilities and net worth	

With this change Bank A does not have sufficient reserves. It needs BGN 5,000 in additional reserves, but the change in the dollar exchange rate has increased its deposits at the BNB by only BGN 2,500. Bank A will have to sell securities or take other actions to increase its deposit position at the BNB. In the end the 5% increase in the value of the dollar will cause the money supply to increase (the monetary base increased by BGN 2,500), but the increase will be half the size of the increase in the first example.

This example also illustrates that when banks hold their reserves (and their assets) in currencies different from their liabilities, they will have exchange risk. When exchange rates change, they will have to adjust their portfolios.[85]

4. Summary

In this section we have seen how the standard money supply formula can be used to describe the relationship between the money supply and the monetary base. Under the currency board arrangement, the BNB has a legal obligation to buy and sell foreign currency under exchange rate fixed at 1 BGN = 1 DEM. When the BNB buys foreign currency, the monetary base increases. Other changes that will cause the monetary base to increase are purchases made by the government and appreciation of non-euro currencies against the lev. When the monetary base increases, the money supply increases.

[85] While we have not shown it here, the BNB must also be conscious of exchange rate risk. If commercial banks hold foreign currency deposits at the BNB, the BNB will want to hold assets in the same currencies to avoid exchange rate risks.

VIII. The Currency Board Advantages and Disadvantages[86]

When Bulgaria established a currency board in July 1997, it was following the lead of two other small transition economies: Estonia, 1992 and Lithuania, 1994. Later, Bosnia-Herzegovina also established a currency board.[87] In many respects the Bulgarian currency board has been a great success. From hyperinflationary levels in February 1997, inflation fell to single-digit levels in 1998 and 1999. Even with a large increase in world oil prices inflation was only 11.4% in 2000. A dramatic fall in nominal interest rates made it possible for the government to reduce large government deficits. The economy also began to grow, albeit more slowly than might be hoped during a recovery period.

In part this success is due to the discipline that has been created throughout the economy. Not only has the discretion of policymakers been severely circumscribed, limitations on central bank lending to commercial banks has greatly reduced bank lending to state enterprises. State enterprises have been forced to restructure. In addition, fiscal policy has been more disciplined because the government cannot borrow from the BNB.

What distinguishes currency boards from other fixed-exchange-rate regimes is the credibility of the exchange rate fix. Credibility depends on both economic and political factors. To sustain confidence, a currency board must have sufficient foreign currency reserves to honor the pledge to exchange local currency for reserve currency. Politically, the government must be prepared to maintain the fixed exchange rate when adverse circumstances arise. To build confidence in the currency board and make it difficult to change the exchange rate, the exchange rate was written into the law establishing the Bulgarian currency board. Whether there is the political will to sustain the board will not really be known, however, until there is a real test. Thus far the Bulgarian currency board has not been confronted with a real challenge, but growing current account imbalances may create problems in the near future.

When considering the future, two issues are of special concern. The first is Bulgaria's large foreign debt. Bulgaria has been able to service this

[86] This chapter draws heavily on Miller (2001).

[87] See *Bennett* (1992) for a discussion of the Estonian currency board. Proposals have also been put forward to establish a currency board in Russia (see *Hanke, Jonung and Schuler* (1993)). Hanke also proposed a currency board for Bulgaria in 1991.

Since the Asian crisis and the success of the Argentine currency board, there has been extensive debate about the viability of currency boards. For some earlier discussion of currency boards see *Liviatan* (1993), *Schwartz* (1993) *Williamson* (1995). *Schuler* maintains a web site with references to papers about currency boards. It can be found at www.dollarization.org. Some earlier discussions of the Bulgarian currency board include *Hanke* (1997), *Minnasian* (1998), *Yotzov*, *et. al.* (1998), *Nenovsky and Hristov* (1998), *Avramov* (1999), *Dobrev* (1999).

debt since the crisis ended in 1997, but the debt issue could become more serious if current account deficits persist. The second concern is whether the automatic adjustment mechanisms which maintain balance-of-payments (BOP) equilibrium under a currency board arrangement will create so much economic pain that they will not be politically sustainable. Without political support the credibility of the currency board will be undermined and the currency board will not be sustainable.

To analyze these issues we begin by describing some of the special features of the Bulgarian currency board and discuss some problems associated with Bulgaria's situation. Then we utilize a framework provided by Williamson (1995). He presents a list of advantages and disadvantages of currency boards. We analyze whether advantages Williamson identifies with currency boards have indeed brought about the improvements in Bulgaria that would be anticipated. Then we analyze whether the Williamson list of disadvantages to currency boards foretells serious future problems for the Bulgarian economy.

1. Special Features of the Bulgarian Currency Board

In Section V we presented a description of the basic organization of the Bulgarian currency board. There we described the separation of the Issue Department and the Banking Department.

The currency board was organized this way because this structure has important advantages for a country that has an ongoing IMF program and large foreign debt service obligations. With a currency board changes in foreign reserves will normally affect the size of the money supply. With this structure IMF tranches and payments of foreign debt obligations do not affect the monetary base. This arrangement reduces the volatility of the money supply that would otherwise be affected by large movements in the BNB's holding of foreign currency reserves. We will not show here how this will affect the balance sheet of the BNB since we have already used this example in Section V (see Tables 5.4a – 5.5b and the discussion there). It is important to emphasize, however, that reducing volatility in the money supply that otherwise would have resulted from these transactions was an important reason why the currency board was structured the way it was.

This arrangement has some additional consequences, however. Under a currency board arrangement a BOP surplus or deficit should generate an equivalent change in the monetary base. However, the Bulgarian currency board is structured so that government transactions involving international financial flows do not affect the monetary base.

To see this suppose that through the privatization of a major company to a foreign purchaser, the government receives a payment of BGN 20 million. This would be recorded on the Issue Department T-account as:

Table 8.1

Issue Department

ASSETS	LIABILITIES
Cash in foreign currency BGN +20 million	Government deposits BGN +20 million

Neither currency in circulation nor commercial bank deposits at the BNB are affected. So while foreign currency reserves have increased, the monetary base has not changed. In effect these international activities of the government have been 'spontaneously sterilized.'[88]

Another interesting aspect of the present structure of the currency board is the impact that government expenditures has on the money supply. As we saw in Section VII tax collections of BGN 10,000 will decrease the monetary base by BGN 10,000. As the money multiplier formula shows, the money supply will then decrease by a multiple of BGN 10,000. When normal government receipts and payments affect the size of the monetary base in this way, there is substantial money supply volatility. To reduce this volatility, Nenovsky and Hristov (1998) have argued that government deposits should be held at a commercial bank instead of the currency board. There are several tradeoffs to be considered here. Government deposits were originally placed at the currency board because the banking system was considered to be too weak (Enoch and Gulde, 1997). If deposits were placed at a commercial bank, IMF tranches and debt service payments would create more money supply volatility than the present arrangements. Another alternative would be for the government to keep deposits at both the currency board and commercial banks. The deposits at the currency board could be used for IMF tranches and debt service, and the deposits at commercial banks could be used for normal government operations. A possible disadvantage of this arrangement is that the government could influence the size of the monetary base by moving deposits from one account to another.[89]

From the viewpoint of a purist, none of these arrangements is ideal.[90] Since the government's deposits and its international transactions are large, government activities will influence the size of the monetary base. Under ideal conditions, money supply adjustments under a currency board system should reflect only imbalances in the balance of payments.

[88] The term 'sterilization' is normally used to describe a situation where a central bank (not a currency board) engages in an expansionary policy action (i.e. buys government bonds) to offset the contractionary effect of buying local currency in the foreign exchange market. (These purchases are usually undertaken to support the value of the local currency.) Many economists believe that such sterilization efforts are futile. The situation here is different since there is no discretionary policy action being taken. The effect is the same, however, since there is no change in the monetary base.

[89] For example, a decision of the government to move money from the BNB to UBB would cause UBB's deposits at the BNB to rise, increasing the monetary base.

[90] This is one of the reasons why Hanke refers to the Bulgarian system as a 'currency board like system' rather than an orthodox currency board.

2. Advantages of a Currency Board

In this section and the next we consider more general issues regarding currency boards. First we analyze whether Bulgaria's currency board has benefited from the advantages commonly associated with currency boards. Then in the next section we investigate what economic problems may arise in Bulgaria under a currency board system.

2.1. Convertibility

A key aspect of a currency board is its guarantee of currency convertibility at a fixed exchange rate. To assure convertibility there must be adequate reserves to cover any demands for foreign currency. For a currency board where commercial banks hold their reserves at the currency board, the central bank should have foreign currency holdings at least as large as the monetary base. This will be adequate to guarantee the fixed exchange rate but insufficient to prevent a banking crisis. Commercial banks themselves will not have sufficient foreign currency to guarantee the convertibility. People will be forced to withdraw money from the banks and present their demands for foreign currency at the currency board. The currency board will be able to honor these demands, but the withdrawals will bring about a contraction of bank liabilities and the money supply as banks are forced to call in their loans and sell other assets.[91]

In Bulgaria at the end of 2000 gross foreign currency holdings far exceeded the minimum requirements for coverage of the monetary base. The Issue Department balance sheet (Table 5.2) shows that the BNB had foreign currency reserves of BGN 7.27 billion and the monetary base was only BGN 3.02 billion. Foreign currency reserves at the BNB were almost twice as large as M1. Indeed the ratio, broad money/foreign currency reserves, was only 1.3 (see Tables 5.2 and 6.1). Under these conditions there should be no problem in honoring commitments to the exchange rate fix.

While there should be no immediate problems, the longer-term picture is not so rosy. At the end of November 2000 Bulgaria's foreign debt was more than USD 10 billion. Debt service payments have been in the range of USD 1 billion a year. To put these figures in perspective, the government's deposits (including other deposits) at the Issue Department represent approximately one and half year's service payments. The total assets of the Issue Department are approximately the same as the debt service obligations over the next three years.

The future strength of the currency board depends on the management of these foreign debt service obligations. Thus far these obligations have been managed, but assistance from International Financial Institutions (IFIs) [i.e. the IMF, World Bank, European Union, etc.] has been crucial. Support from IFIs is a shifting situation. The IMF may change the direc-

[91] *Caprio, et. al.* (1996) analyze how these questions are tied to the lender-of-last resort function.

tion of its programs, as some critics of the IMF have suggested. If the IMF stops its long-term loan programs, this could have serious repercussions for Bulgaria unless other IFIs expand their lending.[92]

Other potential sources of foreign currency reserves include foreign direct and portfolio investment and floating a Eurobond. Attracting private portfolio money or floating a Eurobond has been made more difficult by the financial crises in emerging markets, especially the crisis in Russia. The war in Kosovo has further highlighted problems in the region. On the hand, improvements in the situation in Yugoslavia could bring more financial resources into the region.

The high inflation that preceded the establishment of the currency board in Bulgaria created a situation where there were more than enough initial foreign reserves, but without the support of IFIs, the foreign debt problem could still threaten the viability of the board. Because of these debt problems, dependence on the IFIs has grown. It is still too early to determine whether the stability provided by the currency board will provide sufficient impetus to the private sector to reverse this trend, but it is unlikely that these changes will occur quickly.

2.2. Macroeconomic Discipline

Advocates of currency boards argue that currency boards will tend to instill macroeconomic discipline. Williamson (1995) views fiscal policy, in particular, as a political problem that may or may not be solved by the establishment of a currency board.

Very weak commercial bank balance sheets and large government deficits helped bring on the Bulgarian financial crisis in 1996 – 1997. Proponents of the currency board hoped that the establishment of the currency board would signal a change of regime and greater economic discipline.

The currency board has indeed brought an end to these problems. The high inflation during the crisis reduced the value of the lev-denominated government debt. This, along with lower interest rates, lowered government debt service obligations. From 1998 through 2000, the government budget has been more or less in balance.

The situation in the banking sector has also improved dramatically. The banks have reduced their exposure to the nonfinancial sector and the capitalization of the banks rose to more than 35% in 2000 (against the minimum requirement of 12% required under the Basle guidelines). Initially the banks did little additional lending to the nonenterprise sector and expanded their cash holdings and their holdings of securities. After the first two years of the currency board, banks began to expand their lending to the nonfinancial sector and reduced their cash holdings. Still the banks continue to lend very conservatively.

[92] As accession talks proceed with the European Union relatively more assistance will probably be forthcoming from the European Union and less assistance from the World Bank and IMF.

By bringing more discipline to banking and government budgetary policy the currency board has enhanced macroeconomic stability. This is certainly a major accomplishment. While the economy has not grown rapidly, it has been stabilized, and it is easier for economic decision makers to make new business plans with longer horizons.

2.3. Confidence in the Monetary System and Promotion of Trade, Investment and Growth

Another important aspect of a currency board is that it should create confidence and promote trade and growth. A recent empirical study by Ghosh, Gulde and Wolf (1998) finds that countries that adopt currency boards do have better inflation experiences, and this improved inflationary environment does promote better growth. Indeed, they find that growth rates in currency board countries are twice as high as in pegged or floating exchange rate countries, a difference of about 1.8% a year.

When the currency board was adopted in July 1997, there were immediate indicators of confidence in the exchange rate fix. Nominal interest rates fell from more than 80% in May 1997 to single-digit annualized levels once the board was in place. These changes are to be expected since speculators will arbitrage between the DEM and the lev. The interest rate premium on lev securities is a measure of the additional risk in the Bulgarian market. The interest rate differential between three month DEM and three month Bulgarian government bonds has been around 2% since the beginning of 1998.

While the currency board has been able to stabilize the exchange rate, it has not brought dramatically increased inflows of foreign capital. A number of privatization deals have been completed but the deterioration in the capital stock over the past decade has been so great that many firms have very little value. *Per capita* foreign investment remains much lower than most other Eastern European countries.

3. Disadvantages of a Currency Board

In this section we discuss four disadvantages of a currency board identified by Williamson (1995): (a) the transition problem which arises when inflation leads to overvaluation of the real exchange rate; (b) the adjustment problem caused by BOP disequilibrium; (c) the potential crisis problem in the banking system when there is no lender of last resort; and (d) the political problem.[93]

[93] The other issues that Williamson discusses are: seigniorage, the start-up problem and the management problem. Currency boards allow countries to collect seigniorage. If Bulgaria adopted the euro, it would not be able to collect seigniorage. The start-up problem is the problem of collecting sufficient foreign currency reserves before establishing the currency board. The management problem is the inability of a country with a currency board to manage its monetary policy. This last problem is discussed below when the adjustment problem is analyzed.

3.1. Transition Problem

The transition problem is the problem of bringing inflation down quickly enough after the establishment of the currency board. Fixing the exchange rate should bring inflation down, but inflation can have a momentum that leads to an overvaluation of the real exchange rate. The gold standard mechanism will eventually correct the BOP imbalance that results, but the adjustment can be long and painful.

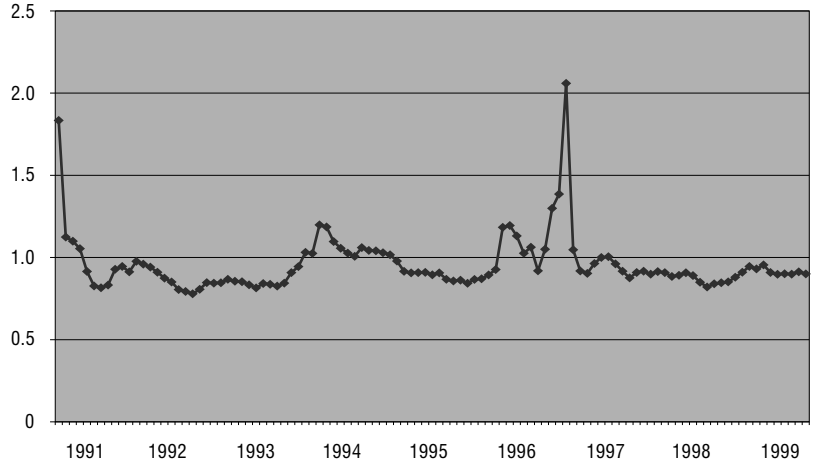
In Bulgaria there was some inflationary momentum, but it was short-lived. Following the very high inflation during the first half of the year, the CPI rose only 16% during the second half of 1997 and only 1% in the 1998. In 1999 the inflation rate was 6.2%; in 2000 it was 11.4%. The higher inflation in 2000 reflected the worldwide increase in oil prices. In the first part of 2001, the inflation rate was much lower, rising less than 1% during the first five months. This is relatively low inflation, but it is still higher than the inflation rate in Germany.

To determine whether this inflation would cause an overvaluation of the lev depends on where the nominal exchange rate fix was initially set. The real value of the lev fluctuated dramatically during the period immediately preceding the establishment of the currency board (see Fig. 8.1.). This made it more difficult to determine an appropriate nominal rate. While perhaps a little undervalued, the nominal exchange rate chosen secured a real rate in the middle of the range during the 1990s.

Figure 8.1

Real Exchange Rate

Lev/DEM, (PPI) July 1997=1



Source: BNB.

From the time the currency board system was implemented until the end of 2000, the real value of the lev is little changed against the dollar. This reflects two offsetting factors. Inflation in Bulgaria has been higher than in the US, but the US dollar has appreciated significantly in nominal terms against the euro. Because inflation in Germany has been very moderate during this period, the real appreciation relative to the DEM has been 27%.

There is considerable disagreement about the importance of this real appreciation. Banerji and Gelos (2000) have looked carefully at this question. They concluded that the real appreciation during the currency board period has been "quite moderate compared" with other transition economies' (p. 12). They point out that this situation could change, however, if productivity improvements do not continue. An important factor here is that wages in Bulgaria measured in US dollars are among the lowest in the region.

On the other hand, Dobrinsky (2000) is more concerned about the competitiveness of Bulgarian exports and worries that lack of competitiveness could lead to further deterioration in the balance of payments.

At present the most serious problem is that the balance on the current account has moved from surplus to deficit. So a transition problem has arisen. The current account surplus in 1997 was USD 426 million. In 2000 for the January – November period, the current account deficit was USD 656.1 million.

The deterioration in the trade deficit is even more severe, moving from a USD 380 million surplus in 1997 to a deficit of more than USD 1 billion in the first eleven months of 2000. Some of the deterioration in 1999 and 2000 can be attributed to the war in Kosovo and the difficulties associated with trade routes to Western Europe through Yugoslavia which have been blocked since the war.

Most of this shift is occurring in the trade balance. Initially, most of the change in the trade balance was due to a fall in exports, but exports recovered dramatically in 2000 and this increase in exports offset the rise in imports caused in part by the increasing price of oil. The increase in exports is an encouraging sign. In the period since the establishment of the currency board, there has been a major realignment of export markets away from the former Soviet Union towards the EU and more recently other countries in the Balkan region.

Rising imports reflect increases in both investment and consumption goods. Given the very low levels of investment in the early 1990s, new investment is important if the economy is to continue growing.

The current account problems in Bulgaria are not yet severe. Indeed, the current account deficits in Bulgaria (4.6% of GDP in January – November 2000) are considerably smaller than recently recorded current account deficits in Estonia, Lithuania and Latvia where currency board ar-

rangements were established earlier than Bulgaria. These countries still have economic stability and their currency boards have survived. Bulgaria has been hurt by the crisis in emerging markets, particularly the crisis in Russia and the events in Yugoslavia. Progress in expanding export markets in 2000 is an encouraging sign. Without this expansion in exports, the higher price of imported oil would have caused the current account deficit to be much worse.

3.2. Adjustment Problem

Unlike Hong Kong and Argentina which have had a currency board for a longer period of time, the currency board in Bulgaria has not been faced with a speculative attack. Hong Kong experienced a severe attack during the Asian Crisis, and there was speculation against the Argentine peso during the Mexican crisis of 1994.

There have been external events that might have generated a speculative attack against the lev, but there has been no attack. This suggests that there is a perception that the currency board is strong. For example, there was no speculation against the lev when the Russian crisis occurred in 1998 or when fighting started in Kosovo in 1999 or Macedonia in 2001. Bulgaria has also had to manage the large increase in oil prices and the appreciation of the dollar in 2000.

Events like the increase in oil prices, the appreciation of the dollar and economic problems in Turkey have had negative effects on the Bulgarian trade balance. Current account deficits have been growing, and these deficits could cause a contraction in the economy. These are the kind of problem that Argentina has been experiencing since Brazil devalued its currency in 1998.

Under a currency board arrangement there are two automatic adjustment mechanisms if current account deficits arise. First, if the current account deficits create BOP deficits the monetary base will contract, the money supply will fall and aggregate demand will decline. Either a fall in output or a decline in prices will improve the current account balance. The greater the decline in prices, the smaller the decline in output needed to bring about equilibrium. Second, if the current account deficits are offset by flows in the financial account, expanded investment in the economy will lead to greater export potential. Greater exports will then reduce future current account deficits.

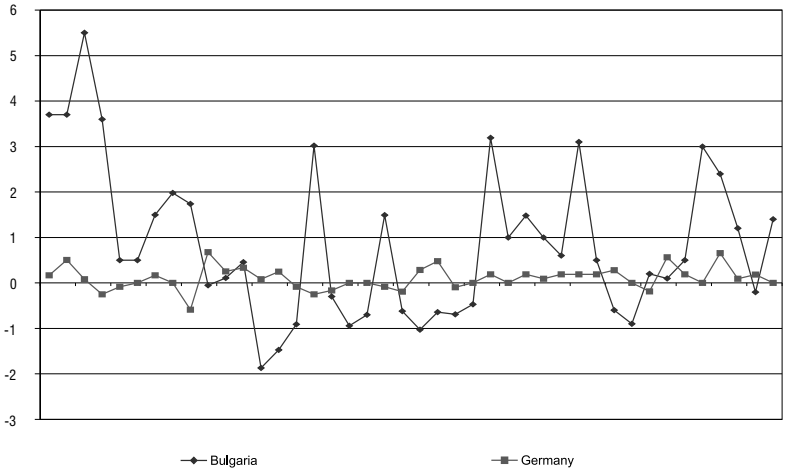
Thus far the current account deficits are not creating a monetary contraction. In spite of current account deficits the monetary base has actually increased during the period mid-1997 to end of 2000. On the other hand, the decline in exports is reducing aggregate demand. This should slow the growth of the economy. If the money supply contracted, this would reduce aggregate demand even more.

Under a currency board arrangement there is little that can be done to offset these contractionary pressures. In a more flexible policy environment expansionary, fiscal or monetary policy might slow the contraction. If Bulgaria had a floating exchange rate, a depreciation of the real exchange rate might spur exports. None of these options exist under a currency board.

The impact of contractionary policies on prices can be very important. If prices are more flexible in a downward direction, the contraction in output should be less severe. Figure 8.2 shows the relationship between monthly CPI adjustments in Germany and Bulgaria during Bulgaria's currency board period. The volatility of price adjustments in Bulgaria has been much greater than in Germany. This suggests that Bulgarian prices might indeed fall more during a contraction than a country like Germany. This should ease the output effects of a contraction caused by the adjustment process that will take place under a currency board arrangement.

Figure 8.2

Monthly CPI Inflation in Germany and Bulgaria



Sources:BNB, IMF:International Financial Statistics, Bundesbank.

Since there has not been a contraction in the money supply, improvements in the current account depend on the second mechanism where increases in foreign investment improve productivity. Higher investment levels, more imports of investment goods and indications of enterprise restructuring suggest that improvements in productivity may be possible. Still it is too early to determine whether these productivity improvements will be sufficient to bring about near term improvements in the current account.

3.3. Crisis Problem

What Williamson refers to as the crisis problem arises because there is no 'lender of last resort' under a formal currency board. In Bulgaria the Banking Department provides some protection during a crisis. A substantial amount of money was put aside in the Banking Department when the currency board was created and the amount has increased over time. In December 2000 Banking Department deposits at the Issue Department were 14% of all commercial bank deposits.

Another protection against banking crises is the presence of foreign banks. Most countries with currency boards have been countries where foreign banks were dominant. This was true, for example, of the first currency boards that were in British colonies. If banks have lines of credit in foreign currency upon which to draw, the contraction will be less severe. Foreign banks should be able to draw on their parent banking institutions for resources in the reserve currency, especially if their parent is in the reserve currency country. For Bulgaria today any bank from Euroland would serve this function. With the sale of Bulbank to the Italian bank Unicredito, a substantial part of banking assets are in banks with foreign ownership from the EU.[94]

It is difficult to judge what will happen during a financial crisis, but one can interpret from portfolio behavior what economic agents perceive the risks to be. Under a currency board the risk of currency devaluation is reduced, but the risk of bank failure is greater. In Figure 2 the cash-to-deposit ratio is plotted for period beginning in December 1990.[95] As can be seen from the figure, the cash-to-deposit ratio rose dramatically when the currency board was established. This rise reflects the greater confidence in the lev as people exchanged dollars for levs. But confidence in the banks is still weak.

The behavior of banks has also been conservative since the establishment of the currency board. During the first two years of the currency board banks held more reserves than was required. Later they became more aggressive and reduced their cash holdings and extended more loans. In part this reflected changes in the procedures for determining compliance with the minimum reserve requirements, but it may also reflect pressures on bank profitability. It is difficult for banks to make profits if they are holding large cash balances and low interest paying government securities.

[94] The DSK Bank (former State Savings Bank) is now the largest bank without foreign ownership interest. It was not formerly a commercial bank but is presently being prepared for sale to foreign investors.

[95] Deposits include both lev and foreign currency deposits.

3.4. Political Problem

The last disadvantage that Williamson lists is the political problem. The question he raises is whether the currency board will really impose controls on the fiscal authority. He remains skeptical that this will necessarily be the case.

Thus far the currency board in Bulgaria has created an environment where the government has been able to control budget deficits. If there is a political problem, it is the appearance, perhaps, that the currency board is too strong. In political debate the government has used the currency board to deflect demands on the budget. This has created an environment where the greatest political threat to the currency board is not the fiscal actions of the present government, but the political attacks on the currency board.

Ganev and Wyzan (2000) argue that these attacks are coming from elites that have, in the past, been able to extract money through their control of enterprises. This extraction is more difficult now that the currency board is hardening these budget constraints. Previously this group has had the support of the poor who feared that restructuring would result in job loss. As restructuring is proceeding, unemployment is rising. Ganev and Wyzan state that it remains to be seen whether this rich-poor coalition will form again and politically threaten the currency board.

4. Conclusions

The currency board has brought needed discipline to the Bulgarian economy. The money supply is no longer growing too rapidly. Government budgets are now under control. Banks' lending is much more cautious. The result is that inflation has come down dramatically, and the economy is beginning to grow.

Having met these challenges, there are others that still lie ahead. Bulgaria still has a very large foreign debt. The servicing of the debt is still a problem, and there is a heavy reliance on the IFIs to provide support for these payments. These problems have been made more difficult because the current account is now in deficit.

The current account deficit may well create the most serious challenge for the currency board. Herbert Stein[96] has been quoted as saying that when something cannot continue forever it will stop. The current account deficits in Bulgaria cannot go on forever. The problem will have to be corrected. The question is how.

The long-term solution is growth. It is still too early to determine whether the increased stability brought on by the currency board and the inflow of new foreign capital will be sufficient to increase productivity. If

[96] Stein was a former chairman of the US Presidential Council of Economic Advisors who was known for his humor.

productivity improves, Bulgarian goods will become more competitive, and the current account will readjust. If productivity does not improve, then the long-term viability of the board will be in question.

If the Argentine experience is an indicator of what lie ahead for Bulgaria, the biggest challenges may come from unpredictable external events. Argentina adopted a currency board in 1991. Since then there has been the Mexican crisis in 1994 and the worldwide financial crisis in 1998. The currency board survived the Mexican crisis, but the devaluation of the Brazilian real in 1998 has caused a severe downturn in Argentina.

Bulgaria's major trading partner is the EU. The lev is fixed to the euro so there will be no devaluation of the euro relative to the lev, but deteriorating economic conditions in Europe or in other trading partners could hurt the Bulgarian economy. The economy has already been hurt by the decline in exports to countries in the former Soviet Union as economic conditions in these countries have deteriorated. A currency board arrangement provides little policy flexibility to offset the damaging effects of these economic forces.

The Bulgarian currency board passed its first big political test during the election of 2001. All major political parties officially announced their support for the currency board. These announcements were made at a time when people were clearly unhappy with the slow growth rate of the economy. If, however, the current account deficits continue to increase or there is a negative external shock and the economy contracts, there will be additional pressure on the government to take action. The currency board limits the options that the government has. If political uncertainty reduces confidence that currency board arrangement will survive, the currency board could lose credibility, increasing the risk of speculation against the lev. It is, therefore, crucial that strong political support for the currency board be maintained.

IX. Conclusion

Before concluding our analysis of the financial system in Bulgaria, we would be remiss if we did not address the impact that European accession efforts have had on the financial sector in Bulgaria. In this final section, we first analyze these issues and then assess the overall situation of the financial sector using Stiglitz's financial sector criteria that we outlined in the introductory section.

1. European Accession

As in many areas of the Bulgarian economy, developments in the financial sector have been strongly influenced by the desire to meet the criteria for accession into the European Union and eventual participation in the euro system. The establishment of the currency board and the macro-

economic stability that has followed has made the prospects for accession more realistic, although it remains many years off.

The explicit criteria for entry into the EU are very broad. They include: a stable democracy, a functioning market economy, the capacity to cope with competitive pressures within the EU and endorsing the economic, monetary and political objectives as stipulated in the *acquis* that binds the union together (Lavigne, 1998, p. 40).

Lavigne (1998) argues that more important than these explicit conditions are the implicit conditions for EU membership. Among the most important implicit conditions is reasonable monetary stability that allows the applicant country to participate in the single currency zone. While accession countries are not expected to adopt the euro immediately, it is a good signal if they can participate in the present exchange rate mechanism (ERM-II). This requires a country to fix its exchange rate to the euro within a wide band of plus or minus 15%.

The European Central Bank has stated that a Currency Board is legally compatible with ERM-II. A decision by ECOFIN (9.11.2000) confirms this position. This means that there is no need to abandon the currency board before joining the EU. Thus having a well-functioning currency board should make it easier for Bulgaria to argue that the country is prepared to meet the conditions for membership.

Joining the euro zone also provides an exit strategy from the currency board. Critics of currency boards argue that they are inflexible and must be abandoned at some point. The Bulgarian currency board need not last forever. If reasonable stability can be maintained and inflation is reasonably low, the euro can eventually be adopted to replace the board.[97]

The prospect of eventual accession into the EU has been a catalyst for legal changes and development of more sophisticated and well-functioning institutional arrangements that meet the conditions of the *acquis*. New laws and regulations for the financial sector have been structured to meet these conditions. As Lavigne points out, this is only the first step for accession into the EU, however. "The law must be applied and – above all – be expected to be applied" (European Commission, 1995, Annex, p. 51). For Bulgaria to satisfy this condition, the courts and the regulatory authorities will have to demonstrate that these new laws and regulations can be applied in a reasonable manner, and the likelihood of another financial crisis is very small.

Another condition for membership is competitiveness. To be economically competitive with the countries in the EU, Bulgaria will have to develop a more sophisticated set of financial institutions. Banks will have to

[97] Indeed there has been some debate on the question whether Bulgaria should adopt the euro as its currency at some earlier stage in the process. See *Nenovsky*, *et. al.* (2000) for some arguments supporting early adoption of the euro and *Avramov* (2000b) some arguments against.

develop better lending practices, and nonbank financial institutions will have to demonstrate that they can play a larger role in the economy.

The desire to join the EU has provided a strong motivation for reform of the financial sector. The *acquis* has provided valuable guidance for how this should be done. It will be years before a sound and well-functioning financial sector is established and there will be bumps along the road ahead, but there now exists a broad consensus on the direction of reform in the financial sector.

2. The Stiglitz Criteria

While accession into the EU hopefully lies in the future, it is also valuable to assess what progress has been made to date in transforming the financial sector. To appreciate the progress made in the development of Bulgaria's financial system, it is important to remember the starting point. Levs did not necessarily buy goods. Banking was monolithic and entirely state-controlled. Secondary markets for financial instruments did not exist.

Since the transition to a market economy began, pressing macroeconomic problems, from financial crises to the establishment of a currency board, have dominated the attention of policy makers. Many of these problems are now under better control. But the long-term growth of the economy also depends on the development of sound financial institutions. Here many weaknesses remain. At the beginning of this essay we cited Stiglitz's (1992) list of functions that a financial system in a market economy must perform. Now that we have described the Bulgarian banking system it is useful to return to this list in order to assess how much progress has been made in each of the functional areas Stiglitz describes. The difficulties at the microeconomic level become more evident as we review this list.

1. Management of the medium of exchange.

Considerable progress has been made in management of the medium of exchange. The lev has been established as a viable internal currency used as a means of payment. The BISERA transaction payment system now provides for more reliable transfers of funds among banks. The fixed exchange rate established under the currency board has also facilitated international transactions.

2 and 3. Transferring funds from savers to investors in new economic production. Pooling small amounts of savings so that larger projects can be undertaken.

These two criteria are closely related since they both involve financial intermediaries. The financial system is beginning to expand beyond the core banking system, but almost all financial intermediation still involves the banking system which is performing in a very conservative manner. By selling the banks to foreign financial institutions which have more expertise, it is hoped that the banks will function better. It is still too early to

determine whether this strategy will work, but similar strategies have been working well in Poland and Hungary.

At present there are few viable investment options in Bulgaria for the individual saver beyond the banks. New laws and regulations have now laid the groundwork for the development of other nonbank financial institutions. Regulatory agencies have been created. If these institutions perform reasonably well over time, confidence in these alternatives should grow, giving savers more options and providing alternative vehicles for directing savings into longer-term projects.

4 and 5. Choosing among projects so that the most productive projects receive the most support. Monitoring the use of funds so that they are used in the intended way.

These two functions are closely tied. The difficulties that currently hinder their effective performance are identical. Some economists have referred to the early period of transition as the 'noisy period' (Tirole, 1991). During this period it is difficult to evaluate risks because there is so much uncertainty about the future course of the economy. Greater macroeconomic stability has lowered these risks from what they were in the early 1990s, but the rapid changes that are taking place as the economy restructures still creates an atmosphere where risks are high, although improving. Added to this is the lack of expertise and experience of economic agents. Unfortunately, the banks did not have the proper incentives to manage their assets properly during the pre-crisis period so there are still many inexperienced or untrained loan officers. Hopefully, the new foreign owners will provide the needed management controls and training.

In the nonbank financial institutions, there is little experience since these organizations are just opening their doors. The regulatory system is far better than it was for the banks in the early 1990s so a future financial crisis is less likely. But it will take time before these institutions function effectively.

6 and 7. Enforcement of loan contracts so that the loans are repaid. Definition of how risks will be shared among borrowers and lenders when new economic projects are undertaken.

Both of these criteria relate to the creation of laws that support business activity. These laws are particularly important if a country is going to have viable credit markets, because it is difficult to make loans if the lender does not believe that the creditor will be forced by the law to repay the loan.

Since the early 1990s, there have been significant improvements in the law regarding bankruptcy and collateralization of loans. The process of understanding the law and how it should be applied has begun. Significant steps have been taken in setting up a pubic registry for recording collateral. Bankers can now be more confident that they can recover their collateral if a collateralized loan is not repaid. This was a significant problem during the pre-crisis period.

8. Lowering of risk by creating methods for diversification of investment risks.

There has been little diversification of risk in private sector investment. The inability to obtain credit from the banks has forced most private enterprises to finance their activities out of their own savings. This has made it difficult to start even medium-sized private production activities. It also means that there has been almost no opportunity to diversify risks of private market activity. As nonbank financial intermediaries grow, alternatives to bank lending should develop.

For an economy to grow, effective mechanisms must be established to channel savings to investment activities. Thus far these mechanisms are still working inefficiently in Bulgaria. On the other hand, substantial progress has been made in defining a legal and regulatory structure for the financial system, creating an internal medium of exchange, and providing monetary and exchange rate stability. Judged by the Stiglitz criteria it is clear that there are still weaknesses in the functioning of the financial system in Bulgaria, especially at the microeconomic level. Improving conditions at the microeconomic level will take time and many problems remain, but the path forward is now much clearer than it was at the start of the transition.

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Корпоративен имидж на търговските банки (1996–1997 г.)

Мирослав Неделчев

Резюме. Дискусионният материал разглежда благоприятния корпоративен образ като главен фактор за стабилността на банковата система. В него се проучват търговските банки в България в периода 1996–1997 г.: тежката банкова криза от 1996 г. и въвеждането през 1997 г. на паричен съвет.

Корпоративният образ се влияе от управляеми и неуправляеми фактори. Управляеми са следните фактори: корпоративна идентичност, корпоративна комуникация и корпоративна общественост. Формирането на корпоративния образ включва предаването на корпоративната идентичност посредством корпоративна комуникация към корпоративната общественост. Действията, използвани, за да се формира корпоративният образ, са детерминирани от публичните очаквания.

Изследването разглежда средствата за масова информация като неуправляеми фактори. Контент анализът на ежедневните заглавия показва, че средствата за масова информация едновременно отразяват и формират образа на банките, т.е. масмедиите представляват както канал, така и активен източник на информация. С други думи, наученото от масмедиите формира груповото съзнание на обществеността. Резултатите от анализа показват отрицателен образ на банките през 1996 г. и положителен през 1997 г.

Всяко средство за масово осведомяване изгражда образа на банковата система, използвайки свои собствени методи: местоположение на статията на страницата, публикуването ѝ в различни дни от седмицата, използването на илюстративни елементи и т.н. Емпиричните данни разкриват зони на сходство, като отразявайки този образ, използват различни подходи на комуникация. Тези зони се определят като ефект от комуникационното фокусиране. Ефектът се свързва с публикуването през април на банковите годишни отчети.

Базирайки се на изводите от контент анализа, са определени критерии за започване на кампании за изграждане на образ в средствата за масова информация. Авторът препоръчва използването на понятията и термините, свързани с кредитирането. Разполагането на материали за банките на средни или специализирани страници може да има положителен ефект върху образа на банките. Препоръчително е също свързаните с банките материали да се публикуват между вторник и петък. Публикуването на интервюта и дискусии, съпроводени с таблици и диаграми, е друг метод за подобряване образа на банките.

Abstract. The discussion paper views the positive corporate image as a major factor for the stability of the banking system. The paper studies commercial banks in Bulgaria between 1996 and 1997: the dire 1996 bank crisis and introduction of a currency board in 1997.

Corporate image is influenced by manageable and unmanageable factors. Manageable factors are as follows: corporate identity, corporate communication and corporate public. Creation of the corporate image includes translation of corporate identity via corporate communication on the corporate public. The actions used to create the corporate image are determined by the public's expectations.

The paper studies mass media as unmanageable factors. The content analysis of dailys' headlines suggests that mass media both reflect and create the image of banks, i.e. mass media is a channel as well as an active source of information. In other words the knowledge acquired from mass media forms the group mind of the public. Analysis data shows a negative image of banks in 1996 and a positive image in 1997.

Any mass media creates the image of the banking system using its own methods: location of the article on the page, its publication on various days of the week, use of pictorial elements, etc. Empirical data reveals zones of similarity using various communicative approaches in reflecting the image. These zones are defined as effect of communication focusing. This effect is associated with the publication of banks' annual reports in April.

Based on the conclusions of the content analysis, criteria for initiating image creation campaigns in mass media are specified. The author recommends using concepts and terms related to lending. Location of bank materials in middle and specialized pages may have a positive effect on banks' image. It is also recommendable to publish materials related to banks between Tuesday and Friday. Publication of interviews and discussions accompanied by tables and charts is another method to improve the image of banks.

Съдържание

Предговор

Идеята за корпоративния имидж на търговските банки възникна през 1994 г. по време на участие в курс по търговска политика към Обединения виенски институт. Преходният период постави предизвикателства пред основните агенти на националната икономика. Икономиката като наука и практика започна да отчита влиянието на ирационалните понятия (имидж, доверие, традиции) върху успеха на корпорацията. Положителният имидж на търговските банки е основен фактор за стабилността на финансовия сектор и катализатор за успеха на прехода.

Тезата, заложена в дискусионния материал, е положителният корпоративен имидж като основен фактор за стабилността на банковата система, което определя неговата значимост за развитието на финансовия сектор. Под внимание са взети банки с преобладаващо българско участие, създадени по нормативен ред съгласно чл. 1, ал. 7 от Търговския закон. Във времето е разгледан периодът 1996 – 1997 г. През 1996 г. имиджът на банковата система бе негативен – към недоверието на обществото към банковата система се добави и недоверие към националната парична единица. През 1997 г. имиджът на търговските банки бе положителен вследствие на нерегулируеми фактори: въвеждане на паричен съвет, приравняване на българския лев към германската марка, приемане на нови закони за регулиране на дейността – Закон за банките и Закон за Българската народна банка. Дискусионният материал е разработен при наложено ограничение от разглеждания период, който е кратък за извеждане на изводи и тенденции за банковата система.

Публикуването на дискусионния материал е във връзка със 70-годишнината от приемането на първия в България нормативен акт, свързан с имиджа на банките – Закона за защита на влоговете.

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1. Регулируеми фактори за имиджа на банките

Върху изграждането на корпоративния имидж оказват влияние регулируеми и нерегулируеми фактори. Първите се изразяват в реалната възможност корпорацията да ги отчита, анализира и управлява. Нерегулируемите фактори са тези, които корпорацията отчита и анализира, но не е в състояние да ги управлява (законодателство, народопсихология, масмедии).

Транслирането на корпоративната идентичност чрез корпоративна комуникация върху корпоративната общност (вж. по-долу) за формиране на определено мнение се нарича корпоративен имидж. Той е функция от характеристиките на банките (корпоративна идентичност и комуникация) и на обществото (социални ценности и очаквания). Тези характеристики са регулируеми при изграждането на имиджа на корпорацията.

Корпоративната идентичност включва осезаеми аспекти, които правят корпорацията уникална[1]. Тя е образ, за който е характерен ефектът на синергията – изгражда се от действията на собственици и на управители. Собственици са лицата с право на собственост върху корпорацията и на контрол върху дейността на управителите[2]. Степените на свобода на управителите за формиране на имидж са ограничени до създаване на подходяща за корпорацията вътрешна и външна среда. Действията на собствениците по създаването на имидж се състоят в определяне на корпоративната идентичност: избор на име, лого (цвят и дизайн). Тези компоненти са относително устойчиви във времето и нормативно защитени.

Корпоративното име е дума или набор от думи за отъждествяване на корпорацията при вербална и епистоларна комуникация. Имената на банките показват преходния период на българската икономика: голям брой наименования, сочещи специализация, и малък брой имена на банки, насочени към глобализация и универсалност.

Корпоративното лого представлява фирмена марка за субективизиране на корпорацията. Предимствата му пред корпоратив-

[1] Olins, W., Selame, E. The Corporate Identity Audit. A Set of Objective Measurement Tools for Your Company's Image and Reputation. Cambridge Strategy Publications Ltd., Cambridge, UK. 1998.

[2] Боева, Б. Корпоративно управление: от мощните корпорации към икономиките в преход. Princeps, С., 2001, с. 21.

ното име са: не е нормативно изискуемо, а е само защитено; не са необходими знания на чужди езици и икономически познания за неговото дешифриране; не е необходимо прелицензиране при промяната му. Недостатъкът на логото се изразява в липсата на конвенционални кодове при възприемане и декодиране от обществото. Логото на банките бива два типа: графичен знак и запазен шрифт.

Целта на собствениците при определянето на корпоративния цвят е отличаване на корпорацията при зрителна комуникация. Корпоративният цвят на банките в България е с ниска цветова динамика – най-често се използват черно-бели и златистожълти цветове. Корпоративният цвят се използва и като защитно средство срещу фотокопиране и други нелоялни действия за фалшифициране, което означава, че той има допълнителна функция и носи добавъчна информация. Основният му недостатък е ограничението при използване на размножителна и телекомуникационна техника. Липсата на конвенционални кодове за цветовата гама и народопсихологическите характеристики на обществото са определящи при неговия избор и използване.

Мотивите на собствениците при избора на корпоративен (цялостен, тотал) дизайн имат за цел да се изгради корпоративната идентичност на движимата и недвижимата собственост. Основното отличие на корпоративния дизайн е наличието на ирационалност.

Други елементи на корпоративната идентичност са корпоративният флаг и химн. Корпоративният флаг е комбинация от корпоративно лого и цвят. Корпоративният химн се явява музикална интерпретация на корпоративната идентичност.

Към регулируемите фактори за имидж се отнасят и действията на управителите за корпоративна идентичност. Те са ограничени от договорните правомощия и от законите.

Корпоративната култура представлява обособена конфигурация от норми, ценности и стил на сътрудничество на индивидите и групите в корпорацията. Корпоративните социални отговорности за разлика от юридическите имат доброволен характер и представляват отклик на корпорацията на социалните проблеми в обществото. Мотивите на управителите за корпоративната филантропия са комплексни: психологически, социални и финансови.

Специфична черта на корпоративната комуникация е екстернализацията – превръщане на вътрешните качества във външни.

Целта на този тип комуникация е изграждането на имидж на ефективен финансов институт, водещ в сферата на мениджмънта и на банковите технологии.

Корпоративната комуникация предава информация относно действията на управителите за създаване и поддържане на подходяща вътрешна и външна среда. Действията на управителите по отношение на инвеститорите се основават на предоставяне на достоверна и навременна информация, съчетана с прозрачност за бъдещите планове. От своята първоначална функция да получават клиентски оплаквания свързаните с клиентите дейности стават действия в защита на клиента пред мениджърите. Отношенията с масмедиите включват действия на мениджърите по представяне на банката в средствата за масово осведомяване чрез корпоративни събития, значими за публиката. Действията на управителите по отношение на персонала се състоят в предоставяне на достоверна информация за политиката на корпорацията и създаване на чувството за въвлеченост в нея. Поради факта, че банките въздействат на законодателни и държавни органи чрез браншови асоциации, отношенията с правителството се явяват критична точка в контакта между управителите и обществото. Корпоративните програми по икономическо образование са насочени към обучение на публиката за икономическите резултати, които да бъдат пълноценно и правилно възприети от нея. Действията на мениджърите по защитна реклама (*Advocate Advertising*) представят корпоративната гледна точка по отделни социални или икономически въпроси.

Външната корпоративна среда се състои от обществени групи, върху които корпорацията целево проектира своята идентичност за изграждане на имидж. Целевите групи включват лица, заинтересовани от действията на корпорацията (*Stakeholders*), за разлика от лицата, заинтересовани от резултатите на корпорацията (*Shareholders*). Лицата, интересуващи се от действията на корпорацията, формират корпоративната общност. Тя е коректив за имиджа чрез актуализираните социални очаквания. Независимо от факта, че са външни за корпорацията, върху очакванията се въздейства чрез корпоративна комуникация.

Корпорацията влияе върху обществото чрез своята комуникация. Корпоративата общност не само е реципиент на корпоративната комуникация, но и източник на информация за своите очаквания от корпорацията – тя генерира доверие, слухове, репу-

тация и добра воля. Като социален капитал доверието подпомага предлагането на колективни блага. Непрофесионалната корпоративна комуникация води освен това до наличието на слухове, които са форма на социален протест. Корпоративната репутация представлява корпоративният имидж в исторически аспект. Доброто име (*Goodwill*) показва икономическата стойност на корпоративния имидж – сумата, с която цената на едно предприятие надвишава стойността на всичките му активи.

През разглеждания период действията на собствениците се ограничиха до избор на корпоративно име, а действията на мениджърите – до създаването на група по интереси за лобиране (Асоциация на търговските банки) и конституиране на банковата професия в социалното пространство („Кодекс на банковата практика“). Корпоративната комуникация бе ограничена до търговска реклама[3]. Очакванията на публиката се характеризират с натрупан банков опит преди наличието на знания за пазарните принципи (изпреварваща социализация).

Като извод за регулируемите фактори следва, че собствениците, управителите и корпоративната общност изграждат имиджа на корпорацията. Чрез своите действия собствениците и управителите формират корпоративната идентичност, която посредством корпоративната комуникация се проектира върху публиката. Действията на собствениците за корпоративна идентичност са ограничен брой, нормативно изискуеми и защитени, а действията на управителите – нормативно и договорно ограничени. Клиентите на банките промениха своите виждания за дейността и ролята на търговските банки – имиджът на банки с високи и бързи печалби отстъпи място на сигурните (доверие и традиции). Чрез своите очаквания като морален жироскоп клиентите определят действията на корпорацията по изграждане на имидж.

2. Нерегулируеми фактори за имиджа на банките (медиен контент анализ)

В настоящия дискусионен материал ще разгледаме ролята на средствата за масова информация в качеството на нерегулируем фактор за формиране имиджа на банките. Масмедиите отразяват

[3] Неделчев, М. Рекламата на търговските банки като източник на информация. Сп. „Банки, инвестиции, пари“. бр. № 3 – 4/1997, с. 50 – 57.

образа на финансовите институции, използвайки специфични техники и похвати.

Средствата за масова информация са външни канали за комуникация, т. е. те са неуправляем фактор за имиджа на корпорацията. Предаваната информация представлява мнение с определено съдържание, което се изследва чрез анализ на съдържанието. Схематично той се представя по следния начин: *кой казва, какво казва, на кого го казва и с какъв ефект*[4]. По така описаната схема контент анализът се явява хронологичен преглед на масмедиите по предварително избрана тема, касаеща определена публика.

Ще извършим анализ на съдържанието на заглавията (включително и подзаглавия), тъй като в тези динамични времена читателят има възможност да се запознае предимно с тях[5]. При извършване на контент анализа си поставяме следните задачи: да се анализират релационно-конструиращите техники и да се определят похватите (ключови думи, номер на страница, ден от седмицата, разположение на материала върху страницата, обем, типизация), използвани от масмедиите за отразяване имиджа на банките.

Анализираният период включва първите шест месеца на 1996 г. и на 1997 г., тъй като тези два времеви интервала са критични за банковата система: първата половина на 1996 г. е свързана с най-голямата банкова криза, а първите шест месеца на 1997 г. е периодът преди въвеждането на паричния съвет.

В качеството на източник на информация са включени вестниците „Континент“ и „Труд“ като национални, всекидневни, неспециализирани масмедии. Вестник „Труд“ е с най-голям тираж за разгледаните времеви интервали. „Континент“ е единственият вестник, който през тези периоди се разпространява зад граница на български език (в Македония).

Мнението, отразено в съдържанието на заглавията, ще отчитаме по тристепенна скала: отрицателно, неутрално и положително. Подбирани са заглавия, надзаглавия и подзаглавия на журналистически материали, отразяващи имиджа на банките в обществото. Рекламните материали не са включени в настоящия

[4] Stempel, G., B. Westley. Research Methods in Mass Communication. Prentice-Hall, N. J. 1981, p. 120.

[5] Неделчев, М. Корпоративен имидж на търговските банки и неговото отразяване в средствата за масова информация. Сп. „Връзки с обществеността“, бр. 4/1997, с. 34 – 60.

анализ. В случай че журналистическият материал има продължение на следваща страница, при анализа продължението е отчетено към началната страница. Анализът обхваща търговските банки с преобладаващо българско участие, създадени по нормативен ред. Промяната на имената на търговски банки за разглеждания период е отчетена.

2.1. Анализ на текстове[6]

В настоящата глава ще разгледаме имиджа на търговските банки, отразен в средствата за масова информация. Предмет на изследването е активната роля на средствата за масова информация при изграждане на корпоративния имидж. Масмедиите, използвайки специфични похвати, създават виртуален (интенционален) свят, който измества материалната фактология на нещата[7].

Ще изследваме резултатите от контент анализа като следните видове текстове: думи, словосъчетания, изрази, заглавия. Основният критерий, по който са подбрани текстовете, са приетите три критерия на Луман: важно/нужно/полезно:

Анализ на думи

Ситуацията в банковата система е отразена от масмедиите чрез употреба на юридически термини от наказателното право: *съд*[8], *прокурор*[8], *арест*[10], *обир*[11], *кражба*[12]. Използването на тези специфични думи описва реалното състояние на финансовия сектор и изгражда негативен имидж на банките.

За икономия на място в текста (заглавието) се появяват думи като *обирджии*[13] вместо лица, извършили обир. Иновативността се състои в употребата на нови думи в дейност, характеризираща се с традиционализъм. Бързото навлизане на неологизмите се обяснява с непрозрачността и специфичната терминология на

[6] Тук под текстове ще разбираме единица, носеща информация, която се предава от един индивид на друг чрез комуникация. Вж. Dawkins, R. The Selfish Gene. Oxford University Press, New York, 1976.

[7] Фотев, Г. Принципът на отговорността в медийния свят. Масмедии и преход. Център за развитие на масмедиите. С., 2000, с. 231.

[8] „ПЧБ заплашва със съд „Континент“. Континент, бр. 107, с. 1.

[9] „Прокурори ще нищят ТСБанк“. Труд, бр. 137/1997, с. 2.

[10] „Почват арести на банкери“. Континент, бр. 54/1997, с. 1.

[11] „Хванати последните бандити от обира на Пощенска банка“. Континент, бр. 130/1997, с. 3.

[12] „Кристалбанк банкрутира след петилетка кражби“. Труд, бр. 57/1997, с. 14.

[13] „Обирджиите на Пощенска банка изгубиха играта на криеница със следователите“. Труд, бр. 158/1997, с. 13.

банковия сектор, които водят до необходимост от нови словесни конструкции.

Сложността на банковата дейност и стремежът на масмедиите да я огласят определят използването на сложни думи, образувани чрез замяна на предлога – маркер на синтактичните отношения, между пълнозначните думи с чуждоезикова представка – *хиперинфлация*[14]. Предимството на сложните думи в сравнение със словосъчетанията е, че са по-икономични – членува се само втората част. Недостатъкът им е, че са по-неточни и тяхната употреба не оказва позитивно влияние върху имиджа на финансовата система.

Липсата на специалисти и на литература по изграждане на имидж оказва влияние при използването на сродни, но не и на аналогични думи: терминът „имидж“ в заглавията се среща като *реноме*[15] и *престиж*[16]. Употребата на подобни заместители има положително влияние върху имиджа, ако се използват при банки с репутация.

Исторически чуждите думи, преобладаващо от турски произход, се изместват от руски, а на сегашния етап основно присъствие имат англо-американските думи (адстрат). Архаизмите формират отрицателно отношение към банките: лоши *борчове*[17], *кончината* на частния бизнес[18], *сарафи*[19].

Думите *аферата* „Биохим“[20], *скандалът* „Агропромстрой-БЗК“[21] правят аналогия с други случаи, например с казуса „Уотъргейт“. Тези сравнения са негативни и формират съответен имидж на банките.

[14] „Хиперинфлацията ще докара още нули върху банкнотите“. Труд, бр. 22/1997, с. 15.

[15] „Клиент на банка задържан при получаване на превод от 1 млн. лв.“. Подзаглавие: „Измами се пазят в тайна заради реномето на финансовите институции“. Континент, бр. 45/1996, с. 2.

[16] „До 200 милиона глоба за уронване престижа на банка“. Труд, бр. 172/1997, с. 1.

[17] „Клон на Балканбанк събрал $ 700 000 лоши борчове“. Континент, бр. 62/1997, с. 11.

[18] „Държавата гарантира влоговете на гражданите с парите на данъкоплатеца“. Надзаглавие: „Парламентът узакони кончината на частния бизнес“. Труд, бр. 142/1996, с. 18.

[19] „750 лева за долар искат банки“. Подзаглавие: „Големият скок предстои, предупреждават сарафи“. Континент, бр. 16/1997, с. 9.

[20] „Петима на съд за аферата „Биохим“. Труд, бр. 22/1996, с. 3.

[21] „Скандалът „Агропромстрой „БЗК пак влиза в прокуратурата“. Труд, бр. 40/1997, с. 4.

Тенденцията в масмедиите е към създаване на съкратени сложни думи с първа производна основа: *топ*финансист[22], *мега*банка[23]. Тези чуждоезикови представки (префикс) се използват за по-голяма краткост и изпълняват благоприятна роля за имиджа.

При използване на милитаризми масмедиите залагат на асоциативната сила на термините. Използват се главно сравнения и метафори в негативен смисъл: *заложник* в ПЧБ[24], *атака* срещу банките[25], *война* срещу банки[26], Петрич дава *ултиматум* на БНБ[27]. Военните термини също изграждат негативен имидж на банките.

За състоянието на банковата система читателят е информиран чрез използваните медицински термини, които водят до негативизъм и недоверие: *лечение* на банките[28], *оздравяване* на банките[29].

Анализ на словосъчетания

Словосъчетанията, използвани от масмедиите за отразяване на имиджа на банките, биват устойчиви и неустойчиви. Ще цитираме някои неустойчиви словосъчетания, които определят негативизма за имиджа на банките: *спасителни афери*[30], *наказателни лихви*[31].

Наличието на експресивни словосъчетания се свързва с отрицателен имидж на финансовия сектор: *бурканбанки* и *бурканикономика*[32], *наколни жилища* и *наколни банки*[33]. Компаративизмът е допълнителен фактор за спад в образа на финансовите корпорации.

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[22] „Топфинансистът: Арестите са политическо шоу". Континент, бр. 83/1997, с. 7.

[23] „Мегабанката „Биохим" е с над 700 млн. лева печалба само за три месеца след сливането". Труд, бр. 80/1996, с. 12.

[24] „Най-ценната ни икона заложник в ПЧБ". Труд, бр. 37/1997, с. 1.

[25] „Атаката срещу БЗК сринала банките". Континент, бр. 134/1996, с. 2.

[26] „Води се война срещу малките банки". Труд, бр. 4/1996, с. 8.

[27] „Петрич ще скалпира кредитни милионери". Подзаглавие: „Градът дава ултиматум на БНБ, иска си влоговете от затворените банки". Континент, бр. 45/1997, с. 1.

[28] „БНБ отложи лечението на банките". Континент, бр. 141/1996, с. 1.

[29] „Проектът на Булбанк за оздравяване на държавните банки беше отложен". Континент, бр. 22/1996, с. 2.

[30] „Черен петък" за банките предизвика масова паника и „спасителни афери". Континент, бр. 117/1996, с. 5.

[31] „Прехвърлянето на сметките в ДСК – без наказателна лихва". Труд, бр. 157/1996, с. 8.

[32] „Драмата около бурканбанките е финал на бурканикономиката". Труд, бр. 151/1996, с. 9.

[33] „За наколните жилища и наколните банки". Труд, бр. 165/1996, с. 1.

При описание на банките масмедиите използват следните определения: *проблемни* банки[34], *спрени* банки[35]. Прилагателните имена към съществителното „банка“ изграждат отрицателен имидж на банковата система.

Употребяват се синтактични форми, назоваващи лица според притежавани от тях наклонности, които сполучливо създават неустойчиви словосъчетания с други термини: *крадец* новатор[36], *перачи* на пари[37]. Тяхното прилагане води до отрицателно мнение за банковата система.

Анализ на изрази

Целевото използване от масмедиите на известния от психологията ефект, че най-привлекателни са сравнимите неща, формира негативен имидж. Например: *лев*/*марка* и *кранта*/*Мерцедес*[38].

Средствата за масова информация провокират фантазията на читателя – *банкери мечтаят за фалит*[39]. При този механизъм на предаване на информация адресатът изгражда виртуален образ, който няма допирни точки с истинския имидж.

Предаване на информация, изразяваща апокалиптична картина, води до създаване на напрежение в очакванията на обществото – *трета вълна банкови фалити преди борда*[40]. Тази стратегия има претенции за превантивни и информативни действия, но в действителност довежда до отрицателно отношение към банките.

Предавайки само негативната страна на въпроса, масмедиите изграждат нова словесна действителност: *от некоректни длъжници се допусна фалит на банки*[41]. Отразяването на имиджа на банките чрез използване на този ефект изгражда отрицателно отношение към финансовата система.

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[34] „БНБ и ДСК да не рефинансират проблемните банки, препоръча кабинетът“. Континент, бр. 70/1996, с. 13.

[35] „Митинг готвят вложителите в спрените банки“. Труд, бр. 74/1996, с. 8.

[36] „Крадец новатор обра банка, полицията скри метода му“. Континент, бр. 28/1996, с. 2.

[37] „До пет милиона лева глоба чака перачите на пари“. Континент, бр. 121/1996, с. 1.

[38] „Да вдигнеш кранта с Мерцедес“. Подзаглавие: „Фиксирането на лева към марката е излишно, ако има реформи“. Континент, бр. 19/1997, с. 9.

[39] „80% от родните банкери мечтаели за фалит“. Континент, бр. 137/1996, с. 1.

[40] „Възможна е трета вълна банкови фалити преди борда“. Труд, бр. 72/1997, с. 12.

[41] „Вместо да се закрият некоректни длъжници, се допусна фалит на банки“. Труд, бр. 78/1996, с. 12.

В езика на масмедиите се наблюдава навлизане на нестандартни за книжовния език явления[42]: използване на жаргон и просторечни думи. В журналистическите материали често се среща прекалена употреба на глаголи в разговорна форма: банките *тласкат* долара[43], банка *глътна* пари[44]. Предимството на тези явления е бързото и лесно възприемане на информацията от публиката, а недостатъкът им – липса на конвенционални кодове и евентуална двусмисленост.

Играта на думи (тавтология, римуване) е специфичен похват, използван от масмедиите за конструиране на имиджа на банките. Прилагането на паралелни синтактични конструкции, както и повторенията усилват емоцията на предаваното мнение чрез различни уточнителни думи или определения. Производни и синонимни думи, разположени една до друга, имат усилващ ефект: *честни частници*[45], *банка „Моллов“ се отказа от Моллов*[46].

При предаване на информацията масмедиите използват понятия от митологията, фолклора и крилати изрази: *авгиеви обори* на пловдивските брокери[47], банков *Рубикон*[48], *ориста* на банките[49]. При този подход изграденият имидж също е негативен.

Характерен момент при отразяване на медийния имидж е използването на субстантивация на прилагателното име. Директното приложение на субстантивацията при наименованията на банките се изразява в редукция на името в полза на характерното в наименованието или с нещо специфично за самата банка: Българска пощенска банка – *Пощенска банка*[50], *Пощенска*[51]; Българо-

[42] Ницолова, Р. Основни тенденции в развитието на българския печат след 1989 г. Масмедиите и езикът. София, 1999, с. 114.

[43] „Банките плавно тласкат долара към 150 лева“. Континент, бр. 141/1996, с. 5.

[44] „Фалирала банка глътна пари за сираци в Могилино“. Континент, бр. 136/1996, с. 2.

[45] „ПЧБ стартира с банички, за да охрани милионери“. Надзаглавие: „Одисеята на „честните частници“ завърши с фалит“. Труд, бр. 175/1997, с. 14.

[46] „Банка „Моллов“ се отказа от Моллов“. Континент, бр. 144/1996, с. 1.

[47] „Агробизнесбанк разчиства авгиевите обори на пловдивските брокери“. Труд, бр. 54/1996, с. 10.

[48] „Банковият Рубикон“. Континент, бр. 104/1996, с. 16.

[49] „Ориста на банките: приласкавани, присвоявани или унищожавани“. Труд, бр. 69/1996, с. 15.

[50] „Пощенска банка увеличава капитала си до 80 млн. лева“. Континент, бр. 4/1996, с. 9.

[51] „Хаос цари пред затворените банки“. Подзаглавие: „Хората масово прехвърлят депозитите си в ДСК, Пощенска и Централна кооперативна банка“. Континент, бр. 125/1996, с. 8.

руска инвестиционна банка – *Българо-руска банка*[52]; Агробизнесбанк – *Пловдивската банка*[53], *Агробизнес*[54]; Международна ортодоксална банка „Св. Никола“ – *Ортодоксална банка*[55]; Българска земеделска и промишлена банка – *Орионска банка*[56]; Първа частна банка – *Първа частна*[57]; Добруджанска банка – *Добричката банка*[58]. При използването на този похват изграденият имидж на банките е негативен.

Анализ на заглавия (надзаглавия, подзаглавия)

При нарушаване на достоверността на комуникацията се появява шум в канала на съобщението. Често такъв шум се използва преднамерено за достигане на определен ефект върху общественото мнение, т. е. своего рода манипулация. Например: *ПЧБ стартира с банички, за да охрани милионери*[59]. В подобни случаи ключовата роля е отделена на „медиазирания читател“[60], който вече е приучен да разгадава езиковите кодове в медийната комуникация.

При изразяване на мнение масмедиите използват лозунги: *Един народ – една банка*[61]; *Банките – общонародни*[62]. Тяхната краткост и позитивизъм създават добър имидж на банковата система.

Стилистичният дисонанс между лексикалното значение и контекста има за цел да заинтересува читателя, за да се запознае той с целия журналистически материал: *При развихрилото се поскъпване най-изгодно е да си длъжник*[63]. Този метод за привличане на вниманието на читателя води до накърняване на имиджа

[52] „Двама от ръководството на Българо-руската банка сменени“. Труд, бр. 7/1996, с. 20.

[53] „Шефове на ВМЗ и Агробизнесбанк са печелили и от паралелен бизнес“. Подзаглавие: „Днес акционерите на пловдивската банка и БНБ сменят надзорния съвет на общо събрание“. Континент, бр. 6/1996, с. 1.

[54] „Агробизнес“ търси 184 млн.“. Континент, бр. 1/1997, с. 3.

[55] „Ортодоксалната банка се включва в приватизацията“. Труд, бр. 105/1996, с. 8.

[56] „Орионската банка преодоля кризата“. Континент, бр. 110/1997, с. 6.

[57] „БНБ финансирала с предимство Първа частна“. Труд, бр. 175/1996, с. 8.

[58] „Добричката банка преодоля кризата“. Труд, бр. 2/1996, с. 8.

[59] „ПЧБ стартира с банички, за да охрани милионери“. Труд, бр. 175, с. 14.

[60] Хабермас, Ю. Структурни изменения на публичността. Университетско издателство „Св. Климент Охридски“, С., 1995.

[61] „Един народ – една банка“. Континент, бр. 38/1996, с. 6.

[62] „Банките – общонародни“. Континент, бр. 60/1996, с. 6.

[63] „Хиперинфлацията ще докара още нули върху банкнотите“. Надзаглавие: „При развихрилото се поскъпване най-изгодно е да си длъжник“. Труд, бр. 22/1997, с. 15.

и появата на слухове.

Целевото изпускане на глагола е ефект, характерен за заглавия със сензационен характер: *Спешни мерки за спасяване на банковата система до МВФ*[64]. Изведени на първа страница и без надзаглавия/подзаглавия, тези журналистически материали оказват влияние върху очакванията на публиката по отношение на банките.

Използването на изречения с метонимия на подлога представлява замяната му с друга дума или израз с преносно значение, като например: *Консорциумът* няма да приема закъсали банки[65]. Този подход има положително влияние върху имиджа на банките.

Синтактичните модели на сложни изречения създават впечатление за динамика в мерките на други нерегулируеми фактори за стабилизация на банковата система. Моделите са: изпускане на съюза като в телеграфния език – *БНБ ще обявява фалити на банките, съдът ще я контролира*[66]; свързани сложни изречения, в които отделните предикативни единици нямат семантична връзка помежду си, освен че принадлежат към обща хипертема – *БНБ вдигна лихвите, но доверието в лева е слабо*[67]; сложни изречения, съдържащи цитирана реч, с поставено в постпозиция съединително изречение на авторската реч: *Правителството да успокои вложителите, искат от АТБ*[68].

Друг използван от масмедиите метод е субективният словоред, при който на първо място се поставя по-важната част от изречението: *Отваряне на банковите сметки искат работници*[69]. Приложената „правилна“ комуникационна пирамида влияе благотворно върху имиджа на банките.

Част от изследваните заглавия (надзаглавия, подзаглавия) показват отношенията между банките и масмедиите: *Банкер съди журналист за клевета*[70]. Заглавията на подобни журналистичес-

[64] „Спешни мерки за спасяване на банковата система до МВФ“. Континент, бр. 124/1996.
[65] „Консорциумът няма да приема закъсали банки“. Континент, бр. 50/1996, с. 8.
[66] „БНБ ще обявява фалити на банките, съдът ще я контролира“. Труд, бр. 138/1997, с. 8.
[67] „БНБ вдигна лихвите, но доверието в лева е слабо“. Континент, бр. 36/1996, с. 9.
[68] „Правителството да успокои вложителите, искат от АТБ“. Континент, бр. 41/1996, с. 2.
[69] „Отваряне на банковите сметки искат работници“. Континент, бр. 37/1996, с. 2.
[70] „Банкер съди журналист за клевета“. Труд, бр. 80/1996, с. 4.

Таблица 1

ОСНОВНИ РЕЗУЛТАТИ ОТ КОНТЕНТ АНАЛИЗА

	Вестник "Континент" 1996 г.						Вестник "Континент" 1997 г.					
	януари	февруари	март	април	май	юни	януари	февруари	март	април	май	юни
Общо количество на броевете	26	25	26	25	24	26	25	24	25	24	25	28
Общо количество на броевете със статии	25	24	26	21	21	26	16	14	22	19	22	23
Общо количество на страниците	408	396	432	396	332	360	520	480	496	488	528	552
Общо количество на страниците със статии	46	53	62	43	43	56	23	17	36	33	45	42
Общо количество на страниците със статии с отрицателно мнение	30	33	41	30	26	44	20	15	16	10	30	29
Общо количество на страниците със статии с неутрално мнение		2	4	2		3	1		10	7	9	2
Общо количество на страниците със статии с положително мнение	21	28	23	16	22	17	3	3	13	19	13	14
Общо количество на статиите	63	77	82	52	52	77	24	20	40	39	53	48
Общо количество на статиите с отрицателно мнение	34	41	51	33	28	54	20	17	17	10	31	31
Общо количество на статиите с неутрално мнение		2	4	2		3	1		10	7	9	2
Общо количество на статиите с положително мнение	29	34	27	17	24	20	3	3	13	22	13	15
Среднозаеман обем със статии от страницата	18%	17%	13%	12%	13%	13%	19%	21%	16%	17%	23%	31%
Среднозаеман обем със статии с отрицателно мнение от страницата	18%	16%	13%	12%	14%	12%	20%	22%	16%	24%	21%	35%
Среднозаеман обем със статии с неутрално мнение от страницата		5%	5%	5%		20%	10%		18%	11%	13%	78%
Среднозаеман обем със статии с положително мнение от страницата	14%	14%	10%	9%	10%	8%	10%	10%	11%	13%	21%	10%
Среднодневен брой статии	2	3	3	2	2	3	1	1	2	2	2	2
Среднодневен брой статии с отрицателно мнение	1	2	2	1	1	2	1	1	1		1	1
Среднодневен брой статии с неутрално мнение												
Среднодневен брой статии с положително мнение	1	1	1	1	1	1			1	1	1	1

(продължава)

(продължение)

	Вестник "Труд"						Вестник "Труд"					
	1996 г.						1997 г.					
	януари	февруари	март	април	май	юни	януари	февруари	март	април	май	юни
Общо количество на броевете	30	29	30	28	29	30	30	28	31	26	31	30
Общо количество на броевете със статии	21	25	29	26	27	28	22	18	23	20	25	23
Общо количество на страниците	800	792	832	840	828	792	764	752	936	808	952	920
Общо количество на страниците със статии	34	56	58	45	65	58	37	28	41	40	40	35
Общо количество на страниците със статии с отрицателно мнение	16	38	43	27	50	49	27	18	24	24	26	23
Общо количество на страниците със статии с неутрално мнение:	2	1		1	3	7	1	1	2	2	3	4
Общо количество на страниците със статии с положително мнение	21	23	23	19	23	18	12	10	18	18	19	11
Общо количество на статиите	46	84	77	56	94	95	42	32	48	48	56	43
Общо количество на статиите с отрицателно мнение	19	52	51	31	63	64	28	19	25	24	31	25
Общо количество на статиите с неутрално мнение	2	1		1	3	9	1	1	2	2	3	4
Общо количество на статиите с положително мнение	25	31	26	24	28	22	13	12	21	22	22	14
Среднозаеман обем със статии от страницата	23%	32%	25%	22%	30%	28%	17%	20%	18%	20%	25%	24%
Среднозаеман обем със статии с отрицателно мнение от страницата	26%	30%	24%	23%	29%	24%	15%	20%	18%	18%	20%	24%
Среднозаеман обем със статии с неутрално мнение от страницата	8%	10%		20%	12%	20%	20%	20%	15%	20%	18%	10%
Среднозаеман обем със статии с положително мнение от страницата	16%	27%	19%	18%	22%	15%	16%	18%	15%	19%	21%	24%
Среднодневен брой статии	2	3	3	2	3	3	1	1	2	2	2	1
Среднодневен брой статии с отрицателно мнение	1	2	2	1	2	2	1	1	1	1	1	1
Среднодневен брой статии с неутрално мнение												
Среднодневен брой статии с положително мнение	1	1	1	1	1	1			1	1	1	

ки материали влияят негативно върху имиджа на банките и отразяват липсата на отношения с масмедиите в корпоративната комуникация на финансовите институции.

Изследваните думи, изрази, словосъчетания и заглавия констатират целевото им използване от масмедиите при отразяване на имиджа на банките. Приложените похвати – журналистически и редакционни – следва да се отчитат от банките при конструиране на имиджа. В качеството си на неуправляеми фактори средствата за масова информация изграждат корпоративния имидж, което обуславя необходимостта от управление на информационните потоци и отношения с масмедиите.

2.2. Резултати от контент анализа

Резултатите ще представим чрез програмната рамка на масмедиите. Тя съдържа четири елемента[71]: обем; редакционно структуриране (автор, онагледяване, ключови думи и др.); размер на конфликта, поместен в една новина; отражения във времето (четири месеца е оптималният срок за изграждане на една тема).

Обхват на темата

Темата за състоянието на банковата система е представена в зависимост от източниците на информация (таблица 1). Те изграждат имиджа на банките чрез промяна на обема на журналистическите материали: намаляване броя на отрицателните и на положителните мнения за „Труд“, увеличение броя на отрицателните и на положителните мнения за „Континент“, а неутралните мнения и за двата източника се увеличават.

Редакционно структуриране

Разположение на журналистическия материал на страницата.

На първа страница преобладават журналистически материали с отрицателно мнение (таблица 2). На последна страница журналистическите материали са изцяло отрицателни. Основното количество неутрални и положителни журналистически материали се поместват на средна страница. Потвърждава се становището на Донсбах, че положителен имидж се разрушава с отрицателна информация[72].

[71] McCombs, M., G. Sheldon. News Influence on Our Pictures of the World. In: Bryant, S., D. Zillmann. Perspectives on Media Effects. Hillsdale, N.Y. 1986.

[72] Donsbach, W. Legitimationsprobleme des Juornalismus. Freiburg/Br. 1982.

Таблица 2

МНЕНИЕ И БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ НА ПЪРВА, СРЕДНА И ПОСЛЕДНА СТРАНИЦА

Статия на:	отрицателно мнение	неутрално мнение	положително мнение	Общо
първа страница	122	6	46	**174**
средна страница	113	16	87	**216**
последна страница	21			**21**
Всичко	**256**	**22**	**133**	**411**

Страници от 7-а до 10-а са с най-голям брой публикувани журналистически материали, но тези страници и за двата вестника са специализирани за банково дело и за икономика (таблица 3)[73]. По-голям интерес представляват първите страници, на които има голям брой журналистически материали с относително малък обем от страницата в сравнение със специализираните страници. С най-голям заеман обем от страницата са журналистически материали за банките на страници от 10 до 20, на които в съботните, неделните и съботно-неделните броеве има публикувани самостоятелни журналистически материали. Количеството отрицателни журналистически материали преобладава над неутралните и положителните, взети заедно, но при заемания обем отрицателните и положителните са почти еднакви, т. е. отрицателните журналистически материали са повече на брой и заемат по-малък обем от страницата в сравнение с положителните. Неутралните мнения преобладават на първа и на специализираните страници.

[73] Следва да се отчете издателската специфика на двата източника на анализа. Вестник „Континент“ има отделно приложение за икономика, а „Труд“ – специални страници за икономика и за финанси. На тези страници се поместват положителни материали (коментари и анализи) с голям обем, чийто автор е компетентен в областта на банковото дело. Политиката за публикуване на материали на първа страница маргинализира двете масмедии: „Континент“ съчетава статиите на първа страница с допълнителни, отделни статии на специализираните страници, придружени от нагледен материал; „Труд“ публикува материали с малък обем на първа страница, чието продължение е на друга страница, комбинирани с надзаглавия и подзаглавия. „Труд“ издава отделни броеве за събота и за неделя, а „Континент“ – съботно-неделен брой.

Таблица 3

ТИП МНЕНИЕ НА ЖУРНАЛИСТИЧЕСКИЯ МАТЕРИАЛ ПО СТРАНИЦИ

Номер на страницата	отрицателно мнение	неутрално мнение	положително мнение	Общо
1	122	6	46	**174**
2	52	3	16	**71**
3	53	2	5	**60**
4	22		5	**27**
5	40	1	19	**60**
6	36	8	30	**74**
7	69	7	50	**126**
8	186	15	159	**360**
9	47	11	50	**108**
10	49	10	48	**107**
11	17	2	3	**22**
12	14		7	**21**
13	15		5	**20**
14	10	1		**11**
15	15	2	6	**23**
16	7	1	1	**9**
17	4		2	**6**
18	7		2	**9**
19	6		9	**15**
20	4		10	**14**
21	3		3	**6**
23			1	**1**
24	5			**5**
25	2			**2**
26	1		1	**2**
28			1	**1**
29			1	**1**
32	11			**11**
40	2			**2**
Всичко	**799**	**69**	**480**	**1348**

Брой думи, ключови думи и име на банка в заглавието, надзаглавието, подзаглавието.

Анализът показва, че най-често се срещат двадесет думи (14% от всички използвани думи), т. е. масмедиите отразяват банковия имидж с ограничен набор от думи (таблица 4). Положителните мнения се поместват на страницата в полето среда/среда, а отрицателните и неутралните – горе/среда.

Ролята на регулируемия фактор за изграждането на имиджа – корпоративното име, е отразена в думите *банка* и *лиценз*, които се употребяват в негативен смисъл. Действията на управителите за изграждане на имидж намират отражение в употребата на думите *банкер* и *шеф*, които са с негативна оценка. Липсват понятия, сочещи действията на собствениците за формирането на имиджа, но са засегнати техните очаквания от постигнатите резултати на банките чрез употреба на думата *акция*. Действията на корпоративната общност за изграждане на имиджа са отразени в употребата на думата *вложители* (отрицателни мнения), а техните очаквания – *влог* и *кредит* (положителни мнения). Имиджът на банките е отразен с термините *фалит* (отрицателно мнение) и *печалба* (положително). Думите *капитал*, *дело* и *печалба* нямат неутрални мнения.

Нерегулируем фактор, влияещ върху изграждането на имиджа и съдействащ за стабилността на банковата система, е БНБ (*фалит*, *лиценз*).

Най-често срещаната дума е *банка* (вкл. прилагателното *банков*), което е заложено от избраната тема на анализа. Терминът се използва предимно в журналистически материали с отрицателно мнение. Икономически сходните по смисъл думи *пари* и *капитал* се употребяват в диаметрално противоположни като оценки заглавия на журналистически материали: *пари* се употребява главно в отрицателен смисъл, докато *капитал* – в положителен. Журналистически материали, съдържащи в заглавието *кредит*, заемат най-много място на страницата (над 30%). С балансирана употреба между отрицателни и положителни мнения е *процент*. Кризата в банковата система е отразена в употребата на думите *дело* (съдебно дело), *милион* и *милиард* (инфлация в икономиката).

Таблица 4

НАЙ-ЧЕСТО СРЕЩАНИ КЛЮЧОВИ ДУМИ В ЗАВИСИМОСТ ОТ МНЕНИЕТО И ОТ РАЗПОЛОЖЕНИЕТО НА ЖУРНАЛИСТИЧЕСКИЯ МАТЕРИАЛ НА СТРАНИЦАТА*

Мнение				Ключови думи	Разположение на страницата									
отрица-телно	неут-рално	положи-телно	Общо		горе/ ляво	горе/ среда	горе/ дясно	среда/ ляво	среда/ среда	среда/ дясно	долу/ ляво	долу/ среда	долу/ дясно	Общо
298	29	177	**504**	**банка**	174	181	80	140	151	93	58	68	49	**994**
117	5	102	**224**	**лев**	95	95	21	42	77	29	17	22	9	**407**
71	1	63	**135**	**милион**	57	54	13	19	44	22	11	18	9	**247**
72	4	31	**107**	**банков**	42	39	19	26	21	22	10	12	6	**197**
65	3	39	**107**	**БНБ**	42	48	21	30	31	19	10	14	9	**224**
45	5	38	**88**	**долар**	47	47	8	14	25	7	3	7	5	**163**
46	2	40	**88**	**милиард**	41	40	12	20	29	15	10	14	6	**187**
72	1	14	**87**	**фалит**	34	36	15	26	28	23	10	12	12	**196**
59	7	14	**80**	**банкер**	24	22	13	27	19	22	9	9	8	**153**
53	5	16	**74**	**пари**	32	32	13	21	20	18	13	13	15	**177**
25	3	28	**56**	**влог**	25	24	7	13	21	12	3	4	3	**112**
15		36	**51**	**капитал**	18	18	7	14	13	6	2	3		**81**
46		2	**48**	**дело**	9	10	7	14	7	8	4	6	4	**69**
33	5	10	**48**	**шеф**	12	16	8	14	15	9	4	10	6	**94**
34	1	9	**44**	**вложители**	13	14	9	11	13	11	5	11	9	**96**
19	2	20	**41**	**кредит**	23	24	10	13	11	14	4	3	3	**105**
17	5	17	**39**	**процент**	20	21	2	8	7	5	3	3	3	**72**
15	1	18	**34**	**акции**	7	7	3	2	21	3	3	2	2	**50**
9	5	19	**33**	**лихва**	10	11	2	4	7	6	2	4	4	**50**
18	1	13	**32**	**лиценз**	10	12	5	9	9	5	2	2		**54**
2		30	**32**	**печалба**	12	12	1	6	11	6	1	2		**51**
1131	**85**	**736**	**1952**	**Всичко**	**747**	**763**	**276**	**473**	**580**	**355**	**184**	**239**	**162**	**3779**

* Думите *дело*, *милиард*, *милион*, *печалба*, *процент* и *шеф* се отнасят за банковото дело.

Таблица 5

НАЙ-ЧЕСТО СРЕЩАНИ КЛЮЧОВИ ДУМИ ПО СТРАНИЦИ

	Номер на страница																											
Ключови думи	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	24	25	26	29	32	40	**Общо**
банка	78	18	15	7	23	28	54	140	41	34	9	7	6	4	14	2	1	2	5	5	2	1	1		1	5	1	**504**
лев	26	7	3	3	4	6	22	82	22	15	2	3	4	1	8			3	5	5	1					2		**224**
милион	18	5	5	3	1	6	14	42	6	8	1	2	4		3			1	4	6	2			1	1	2		**135**
банков	14	5	7	6	6	5	5	29	9	4	2	4	3			2	1	3		1		1						**107**
БНБ	27	2	2		2	5	12	34	8	5		1	1		3	1		2	1	1								**107**
долар	6	2	2	1	3	5	7	25	11	7	2		2		3	1			2	3	2		1	1	1	1		**88**
милиард	8	2	1	1	1	4	9	27	12	7	3	1	3	1	4			2		1						1		**88**
фалит	21	3	1	2	4	5	6	17	2	15	1	3		2	2	1	1	1										**87**
банкер	9	12	10	3	5	3	9	5	7	2	2		3			2	1		2			1				4		**80**
пари	9	3	3	2	3	4	5	17	12	5	5	2			2			1								1		**74**
влог	10				2	4	3	25	3	2	1	1		1	1	1		1		1								**56**
капитал	2		1		3	2	6	21	3	6			2				1	1	1	2								**51**
дело	1	5	8	7	7	3	1	8	2	3	1		2															**48**
шеф	11	7	6	4	2	1	3	4	3	2			1	1		1					1						1	**48**
вложители	8	2	2		2	1	8	11	2	2					5				1									**44**
кредит		1	1	3	1	2	10	9	2	3		1	4				1		1		1					1		**41**
процент	4	1				5	5	18	3	1		1									1							**39**
акции	2	1					2	21	2	3					1				1	1								**34**
лихва	5	1				5	4	8	5	2	1			1					1									**33**
лиценз	5	2	3		1	3	3	8	4	2							1											**32**
печалба	1	1				2	4	14	3	3		1	1		1			1											**32**
Всичко	**265**	**80**	**70**	**42**	**70**	**99**	**192**	**565**	**162**	**131**	**30**	**27**	**36**	**11**	**47**	**11**	**7**	**18**	**24**	**26**	**10**	**3**	**2**	**28**	**3**	**17**	**2**	**1952**

Банковите термини се срещат най-често на специализираните страници по икономика – от 7-а до 10-а (таблица 5). С изключение на тези страници с най-често срещани ключови думи е първа страница (главно от думата *банка*, която се употребява преобладаващо в отрицателен смисъл). Статиите на първа страница са с малък обем и със сензационен характер – *бяла книга*, *черен списък*, *жълт плик*, *синя папка* (в палитрата липсва само *червена книга за банките*). Доверието между банките и корпоративната общност е отразено в положителното използване на думите *влог* (на първа и на специализираните страници) и *кредит* (без публикуване на първа страница). Специализираните банкови термини (*процент*, *акции*) се употребяват само на първа и на специализирани страници. Думата *долар*, както и *лев*, се среща с отрицателен нюанс на специализираните страници.

Таблица 6

ДУМИ, КЛЮЧОВИ ДУМИ И ИМЕНА НА БАНКИ В ЗАГЛАВИЕТО, НАДЗАГЛАВИЕТО, ПОДЗАГЛАВИЕТО

Брой думи, ключови думи и имена на банки	отрицателно мнение	неутрално мнение	положително мнение	Общо
в заглавието				
думи (вкл. ключови думи и имена на банки)	5914	457	3528	**9899**
ключови думи	2694	165	1800	**4659**
име на банка	365	25	258	**648**
в надзаглавието				
думи (вкл. ключови думи и имена на банки)	1164	79	831	**2074**
ключови думи	376	29	292	**697**
име на банка	15	2	16	**33**
в подзаглавието				
думи (вкл. ключови думи и имена на банки)	1096	109	451	**1656**
ключови думи	358	21	168	**547**
име на банка	16	1	4	**21**

Името на банката определя отношението в журналистическия материал. Заглавието носи най-голяма информация за имиджа на конкретна банка (таблица 6). Надзаглавието носи повече положителна информация в сравнение с подзаглавието. Най-много ключови думи има в заглавията (50%); в надзаглавията и подзаглавията – от 20 до 30%. При отрицателните мнения броят на думите превишава сумата от броя на неутралните и положителните мнения.

Под *банкова система* ще разбираме журналистически материал, чието заглавие (надзаглавие и подзаглавие) засяга неопределен кръг от банки. За разглеждания период има журналистически материали за всички банки[74] (таблица 7). С най-много отрицателни статии са банки с наименования, сочещи специализация на банката. Заеманата позиция се определя най-вече от броя на журналистическите материали с отрицателно мнение (с изключение на Булбанк). С най-голям общ брой журналистически материали (68) е Булбанк (преобладаващо положителни), следвана от Българската земеделска и промишлена банка и Първа частна банка, на които са посветени най-много отрицателни журналистически материали. Най-много неутрални журналистически материали (3) са публикувани за Българска пощенска банка, Минералбанк и Първа източна международна банка.

По-често се използва самостоятелно името на отделна банка, отколкото комбинация от наименованията на няколко финансови институции (таблица 8). Характерна особеност е съчетанието от названия на банки с еднаква собственост на капитала – държавни/държавни и частни/частни банки. Данните на „Континент“ за 1997 г. отразяват най-вече банковата система и в помалка степен състоянието на конкретна банка. Заглавия на статии с имена, сочещи специализация на банката, се публикуват всеки месец. Като извод от анализа се посочва, че смяната на името и запазването на съкращението, не води до подобряване на имиджа: напр. преименуване от Туристспортбанк (ТСБанк) на Търговско-спестовна банка (ТСБанк). Журналистически материал за отделна банка съдържа положителна оценка, а при комбинация от наименования на повече от едно име – негативна. От случаите на повече от две имена на банки с различна форма на собственост се проследява възникването на някои частни банки.

[74] Вкл. и нерегистрирани, като ТБ „Национал“ и Олимпийска банка.

Таблица 7

КЛАСАЦИЯ НА БАНКИТЕ ПО БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ

Банка	отрицателно мнение	неутрално мнение	положително мнение	Общо
Агробизнесбанк	24		2	26
Агробизнесбанк, Балканбанк, БЗК, Минералбанк, ПЧБ, Стопанска банка, Ямболска ТБ	1			1
Агробизнесбанк, Биохим ТБ, Бургаска ТБ	1			1
Агробизнесбанк, Бобовдол ТБ	1			1
Агробизнесбанк, Булбанк	1			1
Агробизнесбанк, Кристалбанк, ЧЗИБ	3			3
Агробизнесбанк, Моллов ТБ, ПЧБ	1			1
Агробизнесбанк, Славяни ТБ	1			1
Балканбанк	24	1	7	32
Балканбанк, БЗК, Биохим ТБ, ОББ, ЦКБ, ПИМБ, ПЧБ			1	1
Балканбанк, Биохим ТБ, Булбанк, БПБ, Експресбанк, ОББ, Стопанска банка, Хебросбанк			1	1
Балканбанк, Булбанк, ОББ	1			1
Балканбанк, Минералбанк, ПЧБ, Стопанска банка, ТСБ	1			1
Балканбанк, Минералбанк, Стопанска банка	1			1
Балканбанк, Моллов ТБ, Славяни ТБ	1			1
Балканбанк, Стопанска банка	2			2
Балканска популярна банка	1			1
банкова система	278	37	164	479
БЗК	31	1	6	38
БЗК „Витоша“	14	1	7	22
БЗК „Витоша“, БЗПБ	1			1
БЗК, БЗПБ	1			1
БЗК, БПБ, ОББ	1			1
БЗК, Елитбанк	2			2
БЗК, Капиталбанк, ЧЗИБ, Ямболска ТБ	1			1
БЗК, Кредитна банка	1			1

(продължава)

(продължение)

БЗК, Кристалбанк, ПЧБ, ЧЗИБ	1			1
БЗК, ПЧБ			1	1
БЗПБ	57	1	5	63
БЗПБ, ЦКБ	1			1
Бизнесбанк	1	2	5	8
Българска инвестиционна банка			6	6
Биохим ТБ	26	2	14	42
Биохим ТБ, БПБ			1	1
Биохим ТБ, Булбанк, БПБ, Експресбанк, ОББ, Хебросбанк			1	1
Биохим ТБ, Булбанк, Експресбанк, ОББ, Хебросбанк	1			1
Биохим ТБ, Булбанк, ОББ			1	1
Биохим ТБ, ОББ, ПЧБ, ТСБ			2	2
Биохим ТБ, ОББ, Стопанска банка, Тексимбанк	1			1
Биохим ТБ, Хебросбанк	1			1
БПБ	22	3	22	47
БПБ, Балканбанк			1	1
БПБ, Експресбанк, ЦКБ		1	1	2
БПБ, ЦКБ			1	1
БПЗБ	1			1
БРИБ	2		5	7
БТИБ		1	4	5
БУБ, Славяни ТБ, Капиталбанк, Добруджанска ТБ, Тракиябанк			1	1
Булбанк	10	1	57	68
Булбанк, БПБ		1		1
Булбанк, БПБ, ОББ			1	1
Булбанк, ЦКБ			2	2
Бургаска ТБ, ПЧБ, ЦКБ	1			1
Българска търговска инвестиционна банка	1			1
Българска търговска индустриална банка	2			2
Витоша ТБ			2	2
Габровска популярна банка	1			1

(продължава)

(продължение)

Добруджанска ТБ	5		3	8
Добруджанска ТБ, Стопанска банка	1			1
Държавна банка за инвестиции	1		1	2
Евробанк	1		2	3
Експресбанк	3	1	5	9
Електроника ТБ	1			1
Елитбанк	7		16	23
Елитбанк, МОБ, Търговска спестовна банка			1	1
Елитбанк, ПИМБ, ПЧБ			1	1
Капиталбанк	5		2	7
Компас ТБ			1	1
Кредит Експрес ТБ			2	2
Кредитна банка	1	2	3	6
Кристалбанк	11		1	12
Кристалбанк, Минералбанк, ПЧБ	1			1
Кристалбанк, ПЧБ	1			1
Кристалбанк, ЧЗИБ	9		2	11
МБИР	2		4	6
МБТР			3	3
Минералбанк	28	3		31
Минералбанк, ПЧБ	20			20
Минералбанк, Стопанска банка	2			2
Минералбанк, Ямболска ТБ, Балканбанк	1			1
МОБ			3	3
Моллов ТБ	5		5	10
Моллов ТБ, ПЧБ	1			1
Моллов ТБ, ЦКБ	1			1
Насърчителна банка			3	3
Национал ТБ, БПБ			1	1
ОББ	6	1	14	21
ОББ, Тексимбанк	1			1
Общинска банка		1		1
Олимпийска банка			2	2
ПИБ			3	3

(продължава)

(продължение)

ПИБ, ОББ	1			1
ПИМБ	3	3	5	11
Популярна банка	3			3
ПЧБ	51	1	8	60
ПЧБ, Хебросбанк	1			1
Сирбанк, ТСБ, ЦКБ, ЧЗИБ	1			1
Славяни ТБ	8	1	4	13
СОБ		1	6	7
СОБ, Тексимбанк			2	2
Софиябанк	2			2
Стопанска банка	3	1	5	9
Тексимбанк	6		1	7
Тракиябанк	9		2	11
Турист спорт банк	8		15	23
Търговско-спестовна банка	2		2	4
Хебросбанк	6	2	6	14
ЦКБ	16		10	26
ЦКБ, Юнионбанк			1	1
ЧЗИБ	39		8	47
Юнионбанк			3	3
Ямболска ТБ	3		3	6
Всичко	**799**	**69**	**480**	**1348**

Таблица 8

КЛАСАЦИЯ НА БАНКИТЕ ПО ИЗТОЧНИК НА ИНФОРМАЦИЯ

	вестник „Континент“ 1996 г.						вестник „Континент“ 1997 г.						вестник „Труд“ 1996 г.						вестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Агробизнесбанк	2		1	2	2	4	1					1	2	4		1	1	1	1			2		1	26
Агробизнесбанк, Балканбанк, БЗК, Минералбанк, ПЧБ, Стопанска банка, Ямболска ТБ					1																				1
Агробизнесбанк, Биохим ТБ, Бургаска ТБ															1										1
Агробизнесбанк, Бобовдол ТБ			1																						1
Агробизнесбанк, Булбанк															1										1
Агробизнесбанк, Кристалбанк, ЧЗИБ						1	1												1						3
Агробизнесбанк, Моллов ТБ, ПЧБ																		1							1
Агробизнесбанк, Славяни ТБ	1																								1
Балканбанк		2	3			1	1		2	1			1	2	2			1	3	2	3	1	3	4	32
Балканбанк, БЗК, Биохим ТБ, ОББ, ЦКБ, ПИМБ, ПЧБ	1																								1
Балканбанк, Биохим ТБ, Булбанк, БПБ, Експресбанк, ОББ, Стопанска банка, Хебросбанк																		1							1
Балканбанк, Булбанк, ОББ															1										1
Балканбанк, Минералбанк, ПЧБ, Стопанска банка, ТСБ																							1		1

(продължава)

(продължение)

	вестник „Континент“ 1996 г.						вестник „Континент“ 1997 г.						вестник „Труд“ 1996 г.						вестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Балканбанк, Минералбанк, Стопанска банка																1									1
Балканбанк, Моллов ТБ, Славяни ТБ						1																			1
Балканбанк, Стопанска банка											1							1							2
Балканска популярна банка															1										1
банкова система	18	24	27	19	18	24	9	7	17	10	22	27	18	30	27	15	46	30	14	14	20	12	21	10	479
БЗК	3	4	7	1	2	2			1		1	2	1	1	6	2	1			1		1	1	1	38
БЗК „Витоша“	3	4		5									1	6	2	1									22
БЗК „Витоша“, БЗПБ	1																								1
БЗК, БЗПБ																						1			1
БЗК, БПБ, ОББ																								1	1
БЗК, Елитбанк							1												1						2
БЗК, Капиталбанк, ЧЗИБ, Ямболска ТБ			1																						1
БЗК, Кредитна банка														1											1
БЗК, Кристалбанк, ПЧБ, ЧЗИБ			1																						1
БЗК, ПЧБ															1										1
БЗПБ	6	7	4	8	6	5	1		1		4	1	1	2	3	5	4	2		1			2		63
БЗПБ, ЦКБ																		1							1
Бизнесбанк	2		1						2		2										1				8

(продължава)

(продължение)

	вестник „Континент“ 1996 г.						вестник „Континент“ 1997 г.						вестник „Труд“ 1996 г.						вестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Българска инвестиционна банка		1	1							1				1	1					1					6
Биохим ТБ	2		1			2	1	1	1	2	3		1	1	3	1	1	6	5	1	4	3	1	2	42
Биохим ТБ, БПБ									1																1
Биохим ТБ, Булбанк, БПБ, Експресбанк, ОББ, Хебросбанк																					1				1
Биохим ТБ, Булбанк, Експресбанк, ОББ, Хебросбанк								1																	1
Биохим ТБ, Булбанк, ОББ																						1			1
Биохим ТБ, ОББ, ПЧБ, ТСБ													2												2
Биохим ТБ, ОББ, Стопанска банка, Тексимбанк		1																							1
Биохим ТБ, Хебросбанк																					1				1
БПБ	2				1	7	2		3	1	1	3	3	1				11	3		2		1	6	47
БПБ, Балканбанк															1										1
БПБ, Експресбанк, ЦКБ						1												1							2
БПБ, ЦКБ					1																				1
БПЗБ			1																						1
БРИБ	1				1								2				2					1			7
БТИБ									1	1						1				1		1			5

(продължава)

(продължение)

	вестник „Континент“ 1996 г.						вестник „Континент“ 1997 г.						вестник „Труд“ 1996 г.						вестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
БУБ, Славяни ТБ, Капиталбанк, Добруджанска ТБ, Тракиябанк														1											1
Булбанк	3	3	4	2	4	1		1	2	5	4		5	9	2	6	5	2			2	2	6		68
Булбанк, БПБ										1															1
Булбанк, БПБ, ОББ																			1						1
Булбанк, ЦКБ					1														1						2
Бургаска ТБ, ПЧБ, ЦКБ														1											1
Българска търговска инвестиционна банка																					1				1
Българска търговска индустриална банка									1												1				2
Витоша ТБ		2																							2
Габровска популярна банка														1											1
Добруджанска ТБ	1			2		1							1			2		1							8
Добруджанска ТБ, Стопанска банка																					1				1
Държавна банка за инвестиции		1	1																						2
Евробанк										1												1		1	3
Експресбанк	1					1						1				1		1				2		2	9
Електроника ТБ																1									1
Елитбанк	4	2	2	1	1		1	1		1	1		2		2	1			1	1		1	1		23

(продължава)

(продължение)

	Вестник „Континент“ 1996 г.						Вестник „Континент“ 1997 г.						Вестник „Труд“ 1996 г.						Ввестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Елитбанк, МОБ, Търговско-спестовна банка				1																					1
Елитбанк, ПИМБ, ПЧБ	1																								1
Капиталбанк		1							2						1				1		1		1		7
Компас ТБ																							1		1
Кредит Експрес ТБ									1												1				2
Кредитна банка		1		1						2							1					1			6
Кристалбанк							3					1	1		1				2	2	1			1	12
Кристалбанк, Минералбанк, ПЧБ										1															1
Кристалбанк, ПЧБ												1													1
Кристалбанк, ЧЗИБ			3	1											4	2	1								11
МБИР	2		1							1					1							1			6
МБТР			1		1										1										3
Минералбанк		1		1	1	6	1		1	4				2	1	1		4			1	6	1		31
Минералбанк, ПЧБ					2	7											6	5							20
Минералбанк, Стопанска банка			1																				1		2
Минералбанк, Ямболска ТБ, Балканбанк			1																						1
МОБ																2						1			3
Моллов ТБ						1				2								4	1			2			10

(продължава)

(продължение)

	Вестник „Континент“ 1996 г.						Вестник „Континент“ 1997 г.						Вестник „Труд“ 1996 г.						Ввестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Моллов ТБ, ПЧБ																		1							1
Моллов ТБ, ЦКБ																				1					1
Насърчителна банка		2												1											3
Национал ТБ, БПБ	1																								1
ОББ		3				1	1			3			1	2		2	2		3	1			1	1	21
ОББ, Тексимбанк																	1								1
Общинска банка				1																					1
Олимпийска банка		1												1											2
ПИБ			1								1				1										3
ПИБ, ОББ											1														1
ПИМБ	2					1					2	1				3		1					1		11
Популярна банка			1											2											3
ПЧБ		2	8	4	4	3		1			4	2		2	2	1	8	6	2	1		3	4	3	60
ПЧБ, Хебросбанк		1																							1
Сирбанк, ТСБ, ЦКБ, ЧЗИБ															1										1
Славяни ТБ				1								4			1	2					1		1	3	13
СОБ	1		1					1				1			1					1				1	7
СОБ, Тексимбанк										1												1			2

(продължава)

(продължение)

	Вестник „Континент“ 1996 г.						Вестник „Континент“ 1997 г.						Вестник „Труд“ 1996 г.						Ввестник „Труд“ 1997 г.						Общо
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI	
Софиябанк		1			1																				2
Стопанска банка		1			1	1					1			1		1	2	1							9
Тексимбанк								1	2						1			3							7
Тракиябанк								3			1	2								2			1	2	11
Турист спорт банк		2												4	2	2	5	1			1	1	4	1	23
Търговска спестовна банка				1		1				1	1														4
Хебросбанк	2		1		2				1				1		1	1	1				2	1		1	14
ЦКБ	1	1	2		1	3	1	3	1		1			1	1		1	1	2	2	2		1	1	26
ЦКБ, Юнионбанк																						1			1
ЧЗИБ	2	9	5	1		2					2		1	7	2	1	5	6			1	1	2		47
Юнионбанк													2					1							3
Ямболска ТБ					1							1			1		1	1						1	6
Всичко	**63**	**77**	**82**	**52**	**52**	**77**	**24**	**20**	**40**	**39**	**53**	**48**	**46**	**84**	**77**	**56**	**94**	**95**	**42**	**32**	**48**	**48**	**56**	**43**	**1348**

Автор на журналистическия материал

Типът на мнението (отрицателно, неутрално или положително) се определя от статуса и представителността на автора, а не от имиджа на банката. Съществуват пет групи автори на журналистически материали, подредени в низходящ ред според броя на публикуваните материали: журналисти; държавници и политици; управители на банки; научни кадри; други (таблица 9). При източник с институционализиран лидер на обществено мнение преобладават положителните мнения. Липсват материали с автор от корпоративната общност и от специалисти по имидж. Журналистите имат основна роля при отразяване на имиджа – най-много отрицателни мнения. Лидерите на общественото мнение (държавници и политици) са на второ място с балансирано участие. Мениджърите на банки имат най-голяма роля за изграждане на положителен имидж. Теоретиците са песимисти за състоянието и бъдещето на банковата система.

Жанр на журналистическия материал

Анализ на вида печатен материал сочи превес на журналистическо мнение – статиите заемат най-голям дял (таблица 10). Печатни материали, при които има информационна дискусия (интервю и разговор), изграждат положителен имидж, а тези, при които журналистите нямат контрол (анализ, доклад, коментар и мнение) – отрицателен.

Таблица 9

ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ В ЗАВИСИМОСТ ОТ ИЗТОЧНИКА НА МНЕНИЕ

Източник на мнение	отрицателно мнение	неутрално мнение	положително мнение	Общо
журналисти	751	63	437	**1251**
държавници и политици	25	1	23	**49**
управители на банки	8	1	17	**26**
научни кадри	8	3	1	**12**
други	7	1	2	**10**
Всичко	**799**	**69**	**480**	**1348**

Таблица 10

ВИД НА ЖУРНАЛИСТИЧЕСКИЯ МАТЕРИАЛ

Материал	отрицателно мнение	неутрално мнение	положително мнение	Общо
анализ	2			**2**
доклад	1		1	**2**
интервю	27	4	28	**59**
коментар	9	1	1	**11**
кореспонденция	1			**1**
мнение	13	2	3	**18**
обръщение към НС			1	**1**
писмо	2		2	**4**
превод	4			**4**
разговор	4		6	**10**
статия	733	62	433	**1228**
съобщение	1		1	**2**
телекс	2		4	**6**
Всичко	**799**	**69**	**480**	**1348**

Характерно за избраната тематика са комплексните текстове – при наличие на банков термин в заглавието (надзаглавието, подзаглавието) присъства онагледяващ материал (таблица 11). Материалите с отрицателно мнение са с най-много онагледяващ материал (43%). Снимковият материал винаги е придружен с текст, което отличава журналистическите материали за банките от останалите. Негативният характер на статиите се определя от наличието на снимки и на карета, а положителният – на таблици.

Таблица 11

ТИПОВЕ ОНАГЛЕДЯВАНЕ НА ЖУРНАЛИСТИЧЕСКИЯ МАТЕРИАЛ

Тип онагледяване	отрицателно мнение	неутрално мнение	положително мнение	Общо
графика	36		30	**66**
каре	115	5	54	**174**
снимка	191	14	96	**301**
таблица	7	1	10	**18**
Всичко	**349**	**20**	**190**	**559**

Ден от седмицата за публикуване на журналистическия материал

Работните дни от седмицата са с най-голям брой журналистически материали, а с най-малко – съботните, неделните и съботно-неделните броеве (таблица 12). Малкият обем на журналистически материали в началото и в края на седмицата се обяснява с почивните дни за банките.

За материали, издадени в понеделник, е характерно, че заемат голяма част от страницата. С най-много статии на последна страница са броевете от вторник. Вестниците в сряда са с най-много нагледни материали. Най-много отрицателни статии има в изданията от четвъртък. С преобладаващ брой положителни мнения се характеризират вестниците от петък. Съботните издания на „Труд“ са с най-много статии за банковата система, а не за отделна банка. В неделя излизат най-малко броеве със статии за банки и банковата система (за „Труд“). Съботно-неделните броеве на „Континент“ са с най-много статии на първа страница.

Резултатите сочат разпределението на дните от седмицата в зависимост от поместването на журналистическите материали на страницата. По брой на заеманите полета работните дни от седмицата преобладават над дните в края на седмицата. Използването на шрифтовата игра, въведена от Пулицър във вестник „Journal“, води до извода, че на първа страница материалите са от една печатна колона, разположена в долния край на страницата, докато на другите страници статиите са от две и повече колони, разположени в средата или горе на страницата. В хоризонтално разположение предпочитани са полетата, намиращи се в средата, горе и долу на страницата. Във вертикално разположение предпочитани за журналистически материали са полетата, поместени в средата и ляво, а най-малко – вдясно. Журналистическите материали, публикувани в понеделник, заемат най-голям обем от страницата (30%), докато в останалите дни заемат около 20%.

Размер на конфликта

Размерът на конфликта е изследван чрез сравнение между обема на новината за банковата система и останалите новини – материалите за банковата система заемат 1/3 от всички публикации (таблица 1). Няма тенденция за позитивизъм/негативизъм към държавните или частните банки.

Таблица 12

РАЗПОЛОЖЕНИЕ НА ЖУРНАЛИСТИЧЕСКИТЕ МАТЕРИАЛИ НА СТРАНИЦАТА ПО ДНИ ОТ СЕДМИЦАТА

Мнение				Ден от седмицата	Разположение на статията на страницата									
отрица-телно	неут-рално	положи-телно	Общо		горе/ ляво	горе/ среда	горе/ дясно	среда/ ляво	среда/ среда	среда/ дясно	долу/ ляво	долу/ среда	долу/ дясно	Общо
109	11	56	**176**	**понеделник**	68	64	36	59	61	45	19	25	21	**398**
140	14	85	**239**	**вторник**	58	55	22	67	59	39	19	31	14	**364**
124	8	78	**210**	**сряда**	62	61	29	48	69	36	16	17	13	**351**
151	14	79	**244**	**четвъртък**	64	61	32	69	79	51	26	31	17	**430**
113	9	93	**215**	**петък**	66	62	35	64	73	46	22	27	19	**414**
78	9	50	**137**	**събота**	39	37	11	37	45	30	19	20	13	**251**
21	1	7	**29**	**неделя**	9	8	6	6	8	8	10	10	10	**75**
63	3	32	**98**	**събота/ неделя**	20	25	16	18	25	16	19	14	20	**173**
799	**69**	**480**	**1348**	**Всичко**	**386**	**373**	**187**	**368**	**419**	**271**	**150**	**175**	**127**	**2456**

Отражения в хода на времето

Отразяването на състоянието на банковата система е анализирано за период от шест месеца (първата половина на 1996 г. и 1997 г.). Данните от анализа сочат, че при непроменливо количество на броевете и на страниците материалите за банките бележат спад, т. е. темата за състоянието на банковата система не е на дневен ред през 1997 г. (таблица 1). Според „Континент“ кризата в банковата система е през месеците януари, февруари и март 1996 г. (предоставя изпреварваща информация с цел извършване на превантивни действия), а за „Труд“ кризата е през май и юни 1996 г. (отразява ситуацията в реално време). За двата източника на информация увеличението на броя и обема на статии с положително мнение през 1997 г. засяга въпроси, свързани с въвеждането на паричния съвет и стабилизацията на банковата система.

Таблица 13

БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ ПО ДНИ ОТ СЕДМИЦАТА

	Вестник "Континент" 1996 г.						Вестник "Континент" 1997 г.					
	януари	февруари	март	април	май	юни	януари	февруари	март	април	май	юни
Понеделник	9	12	13	11	6	15	3	2	6	3	5	9
Вторник	15	10	15	16	9	10	4	4	8	12	10	6
Сряда	12	13	11	7	12	13	2	2	6	7	9	5
Четвъртък	11	15	16	11	9	9	6	2	6	7	9	8
Петък	10	19	16	3	12	13	4	4	4	6	12	5
Събота												
Неделя												
Събота/ неделя	6	8	11	4	4	17	5	6	10	4	8	15
Всичко	63	77	82	52	52	77	24	20	40	39	53	48

	Вестник "Труд" 1996 г.						Вестник "Труд" 1997 г.						
	януари	февруари	март	април	май	юни	януари	февруари	март	април	май	юни	Общо:
Понеделник	8	9	12	11	6	11	4	4	8	2	5	2	82
Вторник	8	16	10	10	15	17	3	7	8	8	8	10	120
Сряда	9	10	12	9	15	17	5	5	6	9	8	6	111
Четвъртък	7	21	11	11	19	14	7	5	9	14	9	8	135
Петък	8	14	17	6	10	11	8	3	8	10	7	5	107
Събота	5	14	12	7	20	22	14	7	8	3	15	10	137
Неделя	1		3	2	9	3	1	1	1	2	4	2	29
Събота/ неделя													
Всичко	46	84	77	56	94	95	42	32	48	48	56	43	721

Обхватът на темата е определен от дните на седмицата. Медийните материали, публикувани през работните дни на 1997 г., се увеличават и в двата източника (таблица 13). Единствено съботно-неделните броеве на „Континент“ запазват постоянен броя на материалите.

Данните в графики 1, 2 и 3 констатират как броят на журналистическите материали с положителни мнения през април съвпада. Този ***ефект на комуникационно фокусиране*** се обяснява с публикуването през този месец на годишните отчети от търговските банки, което показва основната роля на годишния отчет за положителен имидж. Чрез използване на „Теорията за рамкирането“[75] се планира наличието на подобен ефект на комуникационно фокусиране в данните за август, когато се публикуват отчетите за първите шест месеца на текущата година.

2.3. Изводи от контент анализа

При отразяване имиджа на търговските банки печатните средства за масова информация използват широк набор от похвати и средства. Масмедиите действат като източник и активен канал за информация за банковата система, т. е. медийното знание формира груповото съзнание на корпоративната общност[76]. Чрез анализ на медиите (нерегулируем фактор) изследвахме регулируемите фактори за имиджа: корпоративната идентичност (действия на собствениците – корпоративно име), констатирахме наличието на корпоративна комуникация (действия на управителите – годишен отчет) и очакванията на обществото (доверие), т. е. имиджът е авторегулируем механизъм, в които масмедиите осигуряват обратната връзка.

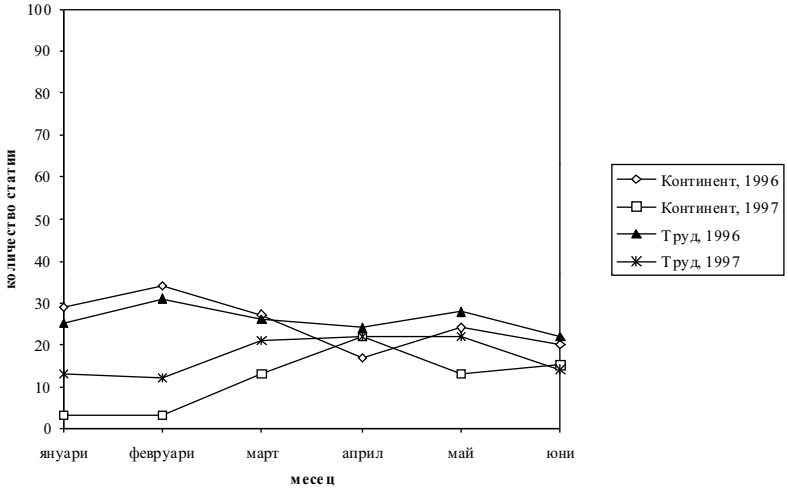
От направения анализ са изработени критерии при предприемане на кампания за формиране на положителен имидж чрез средствата за масова информация. В качеството на практически изводи от контент анализа са дадени препоръки въз основа на оценка на публикационната политика на масмедиите. Препоръчително е при кампании за положителен имидж да се използват думи, засягащи дейности на изхода на банката (кредитиране) поради съществуващата небалансираност на медийните методи.

[75] Петев, Т. Комуникация и социална промяна. Никс принт, С., 2001, с. 146.
[76] Бек, У. Световното рисково общество. Обсидиан, С., 2001, с. 40.

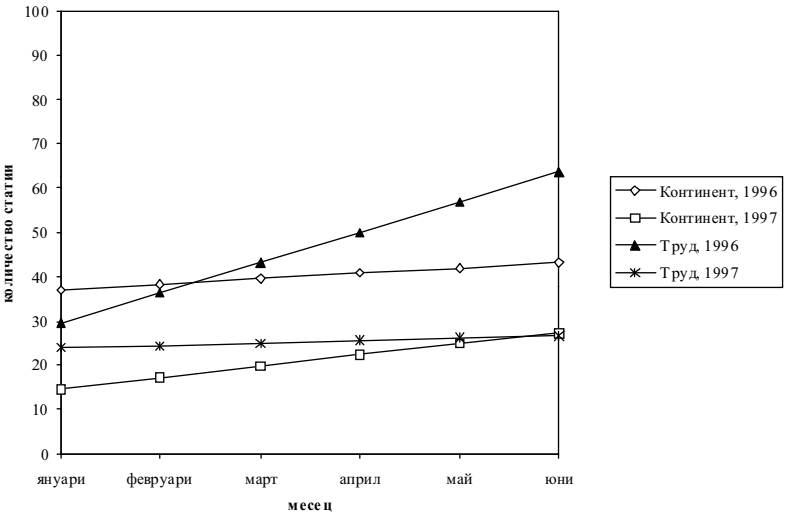
Графика 1

БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ, ЧИЕТО ЗАГЛАВИЕ Е С ОТРИЦАТЕЛНО МНЕНИЕ

Общо количество на статиите с положително мнение



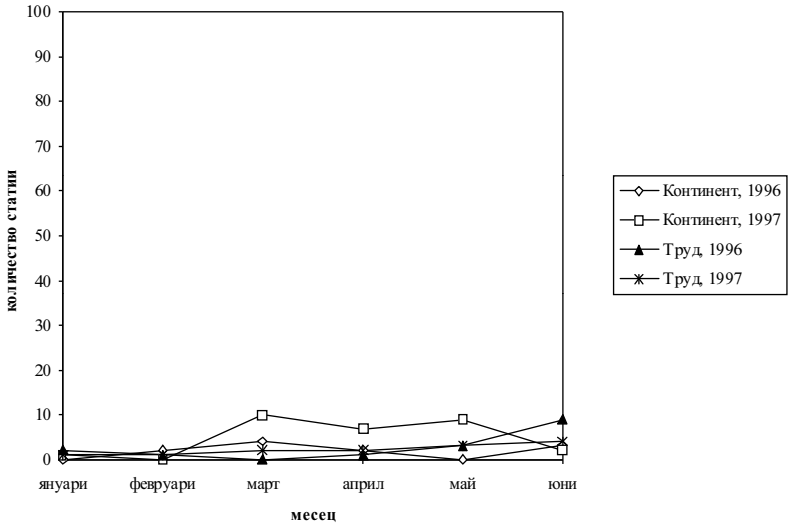
Общо количество на статиите с отрицателно мнение (тренд)



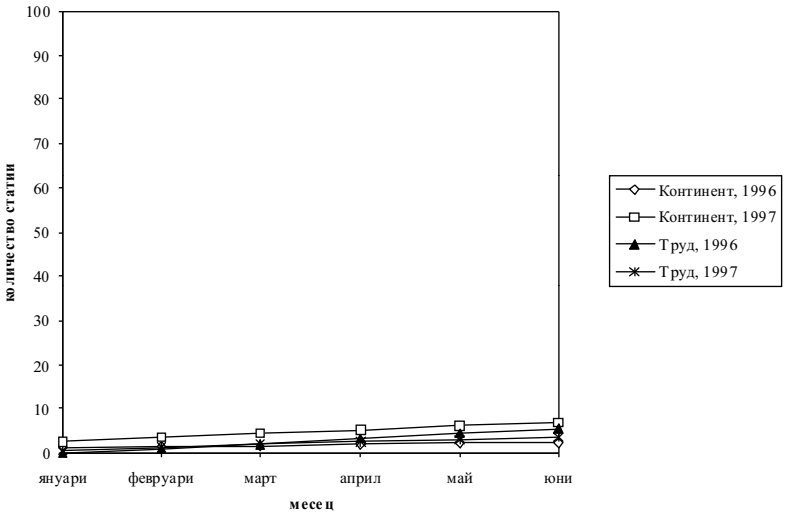
Графика 2

БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ, ЧИЕТО ЗАГЛАВИЕ Е С НЕУТРАЛНО МНЕНИЕ

Общо количество на статиите с неутрално мнение



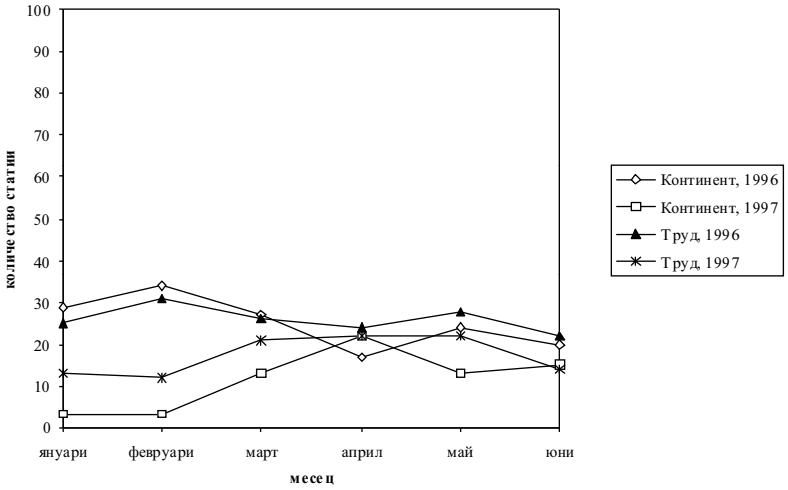
Общо количество на статиите с неутрално мнение (тренд)



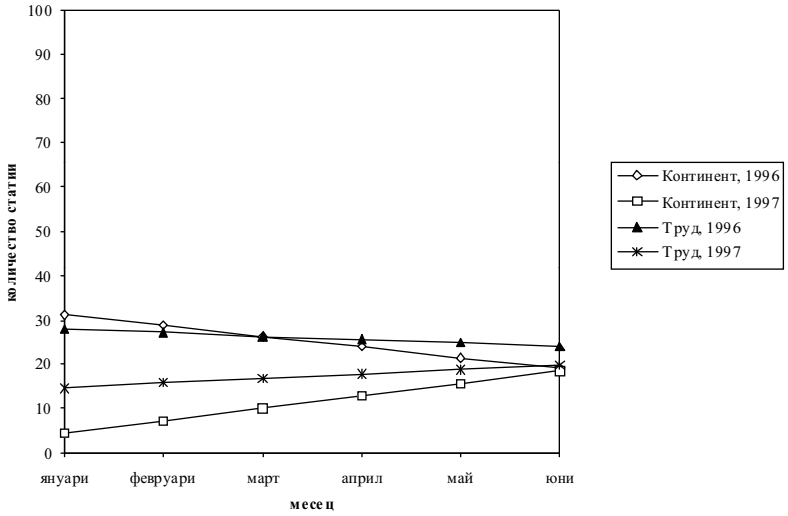
Графика 3

БРОЙ ЖУРНАЛИСТИЧЕСКИ МАТЕРИАЛИ, ЧИЕТО ЗАГЛАВИЕ Е С ПОЛОЖИТЕЛНО МНЕНИЕ

Общо количество на статиите с положително мнение



Общо количество на статиите с положително мнение (тренд)



Подходящи страници за подобни кампании са фолиото (средният разтвор на две страници) и специализираните страници, като е желателно да се използват полетата в средната и в лявата част на страницата. Поместването на журналистически материали през дните от вторник до петък ще има положителен ефект при разпространяване на информация за финансовите институции. Използването на ключови думи предимно в заглавието и в надзаглавието ще има допълнителен положителен ефект. Предоставянето на информацията да се извършва чрез дискусионни журналистически жанрове: интервюта и разговори, комбинирани с таблици и графики; да се ограничават мненията и статиите, придружени със снимки.

Анализът на текстове предвижда при изграждане на положителен имидж да се използват думи от банковата терминология при спазване на точно третиране на дадените дефиниции за корпоративна идентичност, комуникация, публика, репутация. Да се избягва употребата на неустойчиви и експресивни словосъчетания. Използваните изрази да не са архаизми, жаргони, игра на думи и свързани с митологията сравнения и метафори. Заглавията, съдържащи лозунги, изграждат позитивен имидж.

Оценката в журналистическия материал за имиджа на банковата система се определя от името на банката и от автора на материала. При публикуване на материал в масмедиите е желателно да фигурира името само на една банка, а в случаите на комбинация на две и повече имена да се съблюдава съвместимост между собствеността върху банките. Имиджът на банките не се определя от формата на собственост и националността на капитала. Предпочитани автори на материали за положителен имидж са управителите на банките.

Различните печатни масмедии използват собствена стратегия за изграждане имиджа на банките: предоставят превантивна или актуална информация, променят или запазват количеството и обема на материалите. По данни от анализираните вестници отделни банки запазват положителен имидж през разглеждания период, докато банковата система през 1996 г. е в криза, а през 1997 г. се стабилизира. Имиджът на банките се подобри след въвеждане на паричния съвет (нерегулируем фактор) и при публикуването на годишните отчети (регулируем фактор). Единствената институция, оказваща влияние върху имиджа на банките, е БНБ (нерегулируем фактор за имиджа).

Честотата на публикуване на журналистическите материали трябва да съвпада с други положителни нерегулируеми фактори – национална и международна конюнктура. За преодоляване на определен праг на общественото внимание да се публикува корпоративна информация най-малко два пъти в седмицата в продължение на 5 – 6 месеца. С цел определяне значимостта на състоянието на банковата система в помощ на заинтересованите лица да се прилагат данни за сравнение – например търговско салдо, обем на застрахователната дейност. Съзвучието между журналистическите материали за банковата и други сектори на финансовата система ще окаже положителен ефект. Моментът на изненадата за имиджа на банките да се ограничи чрез предоставяне на информация посредством други канали освен печатните масмедии. За създаване на чувство за приемственост на темата за банките следва да се инициират допълнителни, субординирани програми за имидж – пресконференции, привличане на лидери на общественото мнение. Не е за пренебрегване моментът с отношението на елита към банковия сектор – персонифицирането на въпроса с банковия имидж създава чувството за ангажираност.

Средствата за масова информация отразяват и своевременно изграждат имиджа на банките. За намаляване на манипулативния ефект масмедиите използват стратегия на солидаризирането (*ние-дискурс*). Тези изводи правят необходимо изграждането на база данни за елементите на статиите от масмедиите и конструиране на система за ранно предупреждение. В качеството на противодействие на масмедиите като нерегулируем фактор се предприеха стъпки чрез други нерегулируеми фактори. За изграждане и поддържане на положителен имидж на търговските банки чрез масмедиите Асоциацията на търговските банки предприе активни действия по *перманентно отстояване на изискването средствата за масова информация да отразяват адекватно и безпристрастно състоянието и проблемите на банковия сектор, както и своевременно да реагират срещу всяка необективна информация, представяща тенденциозно състоянието на една или друга банка и влияеща дестабилизиращо върху нея*[77]. Влиянието на средствата за масова информация бе отчетено и ограничено в чл. 99, ал. 3 от Закона за банките (1997 г.): *Който разпространява чрез средство за масово осведомяване невярна информация*

[77] Годишен отчет на Асоциацията на търговските банки за 1996 г.

или обстоятелства за банка, с което се уронват доброто име на банката и доверието към нея, се наказва с глоба в размер от 5 хил. до 20 хил. лв.

3. Заключение

При конструиране на значимата реалност основна роля за стабилността на финансовата система изпълнява корпоративният имидж на търговските банки. Имиджът като социологически термин (ирационално понятие) се отчита от икономистите (в нематериалните активи на корпорацията), което изисква интердисциплинарност при неговото изграждане и анализ.

Върху имиджа оказват влияние регулируеми фактори – корпоративна идентичност, комуникация и очаквания на публиката. Изграждането на имидж се извършва от действията на собствениците, на управителите и на корпоративната среда. През разглеждания период (1996 – 1997 г.) основна роля за имиджа имат действията на управителите, които са нормативно и договорно ограничени. Действията на собствениците по корпоративна идентичност са законово защитени. Корпоративната общност в преходния период ценят действията и в по-малка степен резултатите на банките. Корпоративна комуникация липсва или е непрофесионална, вследствие на което като социално санкциониране се влошава имиджът на банките.

Нерегулируемите фактори са изследвани чрез контент анализ на масмедии. Средствата за масова информация отразяват и изграждат имиджа на банките чрез използване на специфични похвати. Положителният екстремум от диапазона се формира от публикации за ограничен набор от банки. Установеният отрицателен екстремум в медийното отразяване има екзогенни за банковата система причини. Анализът констатира наличие на зони на сходство (в инструментално и в съдържателно отношение) при използването на подходи и параметри от средствата за масова информация за отразяване имиджа на банките. Тези зони са обозначени като ***ефект на комуникационно фокусиране***.

Друг нерегулируем фактор е държавното участие, изразяващо се в саниращите функции на БНБ като централна банка. Тенденцията е към нарастване на стабилизационната намеса на държавата в регулирането на банковия сектор. Тази намеса ще бъде осезаема за обществото.

Допълнителен нерегулируем фактор е процесът на преход, който усилва социалните очаквания към банковите институции. Този натиск генерира нов корпоративен имидж – генератор на действията по корпоративна идентичност и комуникация. Процесът на преход е благоприятен фактор за изграждането на имиджа.

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Fundamental Equilibrium Exchange Rates and Currency Boards: Evidence from Argentina and Estonia in the 90's

Kalin Hristov

Abstract. Hard pegs and especially currency boards have been criticized as a policy tool for fighting inflation, as over the medium to long-run period they are thought to lead to an overvalued exchange rate and to a significant worsening of the current account. In order to verify this criticism we calculate historic fundamental equilibrium exchange rates (FEERs) for two countries which have introduced currency boards in the beginning of the 90's, namely Argentina and Estonia. Our analysis suggests that there were no severe misalignments of real exchange rates in currency board countries at least in the recent past. Overall, since the introduction of the currency board the Argentinian real exchange rate has had periods of relatively small undervaluation and overvaluations. These misalignments are in the order of 6%, which is far from the severe misalignments that might have been expected given the current economic problems in Argentina. In Estonia the size of the misalignments has been much larger than in the case of Argentina. The results of this analysis suggest that the parity at which Estonia entered the currency board was overvalued. However, the process of transformation has allowed Estonia to improve its competitiveness. At the end of the sample period (1999) the Estonian real exchange rate was undervalued by around 15%.

Резюме. Механизмите за твърдо фиксиране на валутния курс и по-специално паричните съвети биват критикувани като политически инструменти за борба с инфлацията, тъй като се е смятало, че през средно- и дългосрочен период водят до надценен валутен курс и до значително влошаване на текущата сметка. За да проверим верността на тази критика, изчисляваме ретроспективен валутен курс на базисното равновесие (historic fundamental equilibrium exchange rates, EERs) за две държави, които в началото на 90-те години въвеждат паричен съвет, а именно Аржентина и Естония. Нашият анализ показва, че поне през последните години не съществуват сериозни несъвпадения на реалните валутни курсове в държави с паричен съвет. Като цяло от въвеждането на паричен съвет в Аржентина реалният валутен курс имаше периоди на сравнително слаби подценявания и надценявания. Тези несъвпадения са от порядъка на 6%, което е твърде далеч от сериозните несъвпадения, които се очакваха предвид текущите икономически проблеми на Аржентина. В Естония размерът на несъвпаденията беше малко по-голям, отколкото в Аржентина. Резултатите от този анализ показват, че паритетът, по който Естония въведе режим на паричен съвет, беше надценен. Но процесът на трансформация позволи на Естония да подобри своята конкурентоспособност. В края на периода на извадката (1999 г.) естонският валутен курс беше подценен с близо 15%.

Contents

I. Introduction

Over the last decade currency boards have regained popularity. Initially seen as a colonial monetary regime applicable only to very small, open and well integrated countries, currency boards have made a comeback becoming popular in both small and medium size economies. There are two different explanations of the revival of currency boards in the 90's.

First, proponents of currency boards argue that the revival of this monetary regime is part of a global tendency of hollowing out of the middle part of the distribution of exchange rate regimes. As intermediate regimes become unsustainable, countries move towards either flexible exchange rates or hard exchange rate commitments (*Hanke and Schuler*, 1999).[1] These authors regard currency boards as a permanent means of achieving a stable monetary standard. According to this view, currency boards ensure monetary discipline and instill confidence in the domestic currency and indeed provide important anti-inflationary benefits. In addition, currency boards are successful in maintaining high growth and low inflation. This explanation of revival of currency boards treats them as a permanent monetary regime.

The second explains the revival of currency boards with their ability to stabilize economies which have a long history of monetary instability or lack the institutions and expertise to conduct independent monetary policy. Indeed the adoption of a currency board is a solution for countries in transition from centrally planned to market economy (Estonia, Lithuania), countries which desperately need to import monetary stability due to the history of hyperinflation or absence of stable institutions (Argentina, Bulgaria); or countries in the process of postwar reconstruction (Bosnia and Herzegovina). This explanation views currency boards as a transitory monetary regime. Once the economy is stabilized and credibility in the national currency and monetary authorities is rebuilt, the country needs to find an exit strategy from the existing currency board arrangement. The reason for this is that currency board arrangements are very rigid. Since the nominal exchange rate is irrevocably fixed, changes in the real exchange rate can

[1] *Fischer, S.* (2001) states that empirical evidence shows that in the last decade there has been a tendency of hollowing out of the middle of the distribution of exchange rate regimes and moving toward either flexible exchange rates or hard exchange rate commitments ('two poles'). There is an opposite view that "intermediate solutions are more likely to be appropriate for many countries rather than corner solutions" *Frankel, J.* (1999). *Masson* (2001) rejects the hypothesis that there are only transitions toward the two poles (floating or firm fixed) using a wide set of countries. According to *Masson* (2001), the evidence of exchange rate regimes transitions suggests that intermediate regimes will continue to constitute an important fraction of actual exchange rate regimes.

only take place through differential price movements. Such adjustment is likely to be slow and partial (if prices and wages are sticky), which could lead to continuous overvaluation of the real exchange rate. This exchange rate misalignment implies a loss of competitiveness, a worsening current account balance and eventually speculative attacks and a collapse of the fixed exchange rate. Countries should therefore follow different exit strategies in order to avoid the collapse of the fixed exchange rate. Exit can be to a simple peg to the same or to a different currency, and at the same or different parity; to a floating rate; or to a different monetary standard including joining monetary union or adopting foreign currency as legal tender. For the Central and Eastern European countries with currency boards the path of exchange rate regime transition looks predetermined. These countries (Bulgaria, Estonia and Lithuania) have started negotiations for EU membership. Since new member countries cannot use an opt-out clause, eventually they will have to join EMU.

Joining EMU, currency board countries will need to decide at what parities to enter the monetary union (*Gulde, A. M., et al.,* 2000). One option is to stick to the current parity. This means that they will need to quantify their equilibrium exchange rate and the deviation from this rate to assess whether the current parity would be sustainable. If the current parity is undervalued inflation in the economy will be higher than in the other members of the monetary union (this is likely due to convergence). If it is overvalued, the country will have competitive problems, which in the case of a common monetary policy could cause lower output. The second option is to change the current parity in order to narrow the gap between the equilibrium real exchange rate and the current level of the real exchange rate. This change could be done when they enter ERM II. Since ERM II is a multilateral commitment to fix the exchange rate within a 15% band, the change in the parity might not lead to loss of credibility and currency crisis.

Currently there is intense discussion about whether Central and Eastern European countries should adopt the euro as legal tender before joining EU (euroization). Since euroization is practically irreversible, these countries have to choose very carefully the level of the exchange rate at which they adopt the euro as legal tender.

The collapse of the Argentinian currency board at the end of 2001 reopened the discussion on the sustainability of currency board arrangements and possible exit strategies from this monetary regime. In the case of Argentina prior to the collapse of the currency board there was some slight probability that they could form a monetary union with the United States or a re-

gional monetary union with MERCOSUR countries.[2] A widely recommended solution to Argentina's problems was the proposal to abolish the national currency and adopt the US dollar as legal tender (*Calvo*, 2000; *Hanke and Schuler*, 1999, 2002). If Argentina had chosen dollarization, the authorities would have had to decide the level of exchange rate at which to adopt the US dollar as legal tender. The authorities had an option to dollarize preserving the existing level of exchange rate or to devalue in order to correct any overvaluation of the real exchange rate. At the end the authorities floated the peso in order to compensate the accumulated real overvaluation of the exchange rate.

In this paper we estimate equilibrium exchange rates for Argentina and Estonia and calculate misalignments of the exchange rates in order to address the issue of sustainability of existing currency boards and a possible path of transition for exchange rate regimes.

The plan of the paper is as follows. Section II provides a short discussion of the appropriate methodology for estimating equilibrium exchange rates and the definition of the real exchange rate. Section III provides an explanation of the assumptions underlying the calculation of fundamental equilibrium exchange rates. The results are presented in Section IV. Section V offers some brief conclusions.

II. Which Measure of Equilibrium?

In this paper we try to address two related questions. *First*, does the adoption of a currency board arrangement lead to a prolonged appreciation of the real exchange rate and big misalignments, which affect the country's export competitiveness and growth performance? *Second*, we try to calculate quantitative measures of the deviation of real exchange rates from equilibrium, which will give us valuable information about possible channels of correction of accumulated misalignments.

To find answers to these questions we need a concept of equilibrium real exchange rates against which to measure actual exchange rate changes. Traditionally the purchasing power parity (*PPP*) doctrine is viewed as a model of the long-run real exchange rate. Under *PPP* the equilibrium real exchange rate is a constant. Recent studies, which emphasize purchasing power parity as a long-run concept, allow short-run deviation from the equilibrium rate. In this case the real exchange rate need only be stationary rather than a con-

[2] For a discussion of the possibility that Argentina forms a monetary union with other Latin American countries (MERCOSUR countries) see *Eichengreen, B.,* 1998; *Levy Yeyati, E., and Sturzenegger, F,* 2000.

stant. Stationarity implies that the real exchange rate returns to its mean in the long-run. The mean is considered to be the long-run equilibrium real exchange rate, which is fixed. Thus the model of long-run PPP admits changes in the real exchange rate, but not in its mean.

Consensus estimates suggest that the speed of convergence of the real exchange rate to PPP is extremely slow with a half-life of three to five years. The long-run equilibrium real exchange rate delivered by PPP also gives no information about whether this equilibrium is desirable or not. The famous example is *Frenkel* (1978), which finds support for PPP during German hyperinflation period in the 1920's. Few would claim that the nominal and real exchange rates during this episode were the outcome of an underlying macroeconomic equilibrium.

There are number of reasons for the empirical failure of PPP.[3] Barriers to trade such as tariffs and transportation costs are obvious reasons why the same goods are not sold at the same price throughout the world. Different consumer preferences across countries lead consumers in each country to choose different baskets of goods. As price indices are constructed for a basket of goods designed to represent a particular country's consumption, an apparent failure of *PPP* could be due to different rates of inflation across two countries' distinctive baskets of consumption goods rather than different prices for the same goods across countries. The presence of nontraded goods in the consumer basket may cause a breakdown in *PPP* because these goods are not directly comparable across countries. Productivity differentials among economies and sectors within an economy might lead to long-run deviations of real exchange rate from *PPP* (Balassa-Samuelson effect). Differences in government spending and demographic profiles across countries may also affect equilibrium real exchange rates and cause deviation from purchasing power parity.

The underlying balance methodology addresses the issue of the relationship between equilibrium real exchange rates and macroeconomic fundamentals. This approach expresses the equilibrium exchange rate in terms of fundamental variables.[4] The most popular and widely applied in empirical work on the underlying balance model is the Fundamental Equilibrium Exchange Rate (*FEER*) approach. The concept of *FEER* was introduced by *Williamson* (1983). It is the real exchange rate, which is consistent with internal and external equilibrium of the economy. Within this framework inter-

[3] For review of *PPP* puzzle see *Rogoff*, 1996.

[4] For review of a wide variety of concepts and empirical approaches to estimating equilibrium exchange rates see *Driver, R. L., and Westaway, P.,* 2001.

nal equilibrium is a situation where demand for domestic output is equal to its supply. This implies that there will be no output gap either in the domestic economy or abroad. External balance is defined as a position where saving minus investment in the economy is at a sustainable level. The definition of external balance does not imply that the economy has to achieve full stock-flow equilibrium, where net foreign assets are constant and sustainable current account is equal to zero. The *FEER* is therefore a medium term rather than long-run concept of equilibrium exchange rates. The medium term nature of the *FEER* is consistent with a neutrality assumption that the real economy will be independent of nominal variables. Therefore the *FEER* is a real exchange rate, which is consistent with a range of combinations of nominal exchange rates and prices.

Before moving to the next section, which explains in detail the methodology applied to estimate equilibrium exchange rates, we need to clarify which measure of real exchange rate will be used as a basis for the *FEER* calculations. The measure needs to be a multilateral real exchange rate construction, as the *FEER* represents equilibrium in the whole economy. This choice implies that we will estimate multilateral equilibrium exchange rates and cannot derive bilateral equilibrium exchange rates directly. It is possible to back out the associated bilateral equilibrium exchange rates if estimates of equilibrium exchange rates are also available for the country's main trade partners.[5] Since we estimate *FEER*s only for two countries (Argentina and Estonia) this does not allow us to back out estimates of bilateral exchange rates. In terms of the price indices used for the construction of the real exchange rate we used indices which focus on traded goods prices.

The definition of real exchange rate used in this paper is given by:

$$R = \frac{WPXG * r}{PD}$$

where r is the nominal exchange rate (local currency per US dollar), *WPXG* is world export prices in US dollars and *PD* is domestic prices expressed in domestic currency, given by producer prices. An increase in *R* represents a depreciation. This is the definition of real exchange rate used in most of the existing work on fundamental equilibrium exchange rates.[6]

Using this definition of the real exchange rate allows us to abstract from the Balassa-Samuelson effect, which accounts for productivity differentials between traded and nontraded sectors of the economy. Since there is substantial empirical support for the Balassa-Samuelson effect, especially in

[5] See *Alberola et al.,* 1999; *Faruqee,* 1998.

[6] See for example *Barrell and Wren-Lewis,* 1989; *Wren-Lewis and Driver,* 1998.

comparisons between developed and developing countries, the choice of real exchange rate definition that excludes nontraded goods will significantly affect our estimation of *FEER*s for currency board countries.[7] In appendix C we provide graphs of the real effective exchange rates and *R* for Argentina and Estonia.

III. Calculating FEERs

There are two main approaches to estimating *FEER*s. The first uses a complete macroeconomic model and generates the *FEER* as a solution to that model. This can be done with a single country model, under given assumption about the rest of the world or a multicountry model.[8] The main advantage of this approach is that it derives estimates of the equilibrium exchange rate, which are consistent with all macroeconomic variables. However, sometimes it may lack transparency. The second and most widely used method to calculate *FEER*s takes a partial equilibrium approach. The approach estimates trend output and sustainable current accounts separately and solves for the real exchange rate which is consistent with these estimates. The main advantage of this approach is its simplicity and clarity. It allows to identify the factors that particularly affect the *FEER* estimation and permits different sensitivity tests.[9] The disadvantage of the partial equilibrium approach is that there is no model which ensures consistency between estimates of trend output and the sustainable current account. In addition, this approach does not allow for any feedback from the *FEER* to the inputs for trend output and saving minus investment relationships. This implies that trend output and saving minus investment influence *FEER*, but there is no feedback from the equilibrium exchange rate to the rest of the model.[10]

[7] A definition of the real exchange rate that uses relative output or trade prices rather than consumer prices is also more appropriate when countries produce different goods. *Obstfeld and Rogoff*, 1996, show that *PPP* holds for relative consumer prices, but not for relative producer prices. This occurs even though all consumers are identical across countries, there is no home bias in consumption, no pricing to market and the law of one price holds for each individual good.

[8] *Wren-Lewis et al.* 1991 estimate *FFER* for the UK economy using a complete macroeconomic model. *Bayoumi et al.* 1994 calculate equilibrium real exchange rates for major industrial countries using IMF's multicountry macromodel MULTIMOD.

[9] For discussion how sensitive *FEER* estimation is to exogenous assumptions and weaknesses in the underlying structure see *Driver and Wren-Lewis,* 1999.

[10] *Barrell and Wren-Lewis*, 1989, and *Driver and Wren-Lewis*, 1999, investigate the impact of relaxing this assumption in the case of trend output. They allow trend GDP to vary with the real exchange rate. The results show that allowing for output endogeneity does not make substantial difference.

Since we do not have complete macroeconomic models for the countries of interest we are going to use the 'partial-equilibrium' model following the *Barrell and Wren-Lewis* (1989) and *Wren-Lewis and Driver* (1998) methodology to estimate FEERs.

The methodology applied in this paper for the calculation of *FEER*s can be broken down in three stages. Each of these stages illustrates the importance of the assumptions made about external and internal equilibrium of the economy. The first stage is to calculate the trend current account, which differs from actual current account. The difference between the actual and trend current account depends on the accuracy of the model of trade equations and *IPD* flows and estimation of the output gap. The difference between actual and predicted trade flows can be described as an outcome of shocks, which are viewed as temporary shocks and can be stripped out in calculations of the trend current account. Then we use the estimated trade equations to calculate what exports and imports would have been if output were equal to potential output (zero output gap). This allows us to derive a trend current account that is consistent with existence of internal balance within economy.[11] The first stage shows what the medium current account would be if the real exchange rate remained unchanged. However, the real exchange rate must move to clear the balance of payments, so the trend current account matches the medium-run sustainable current account. A critical element in estimating *FEER* is the assumption of the medium-term sustainable current account (also called structural capital flows if we look from the capital account point of view).[12] The second stage involves calculation of sustainable level of current account that corresponds to the external equilibrium of the economy. The final stage involves calculation of the real exchange rate that produces medium-term current account, which is equal to sustainable current account (structural capital flows). (See Appendix A for a full equation listing for the current account model.)

Modeling Aggregate Trade

Trade is disaggregated into eight components: prices and quantities of imports and exports of goods and services. Trade volumes are modeled in the traditional 'demand curve' approach. This approach has a long tradition in empirical macroeconomics and remains the standard way of modeling

[11] For simplicity we use actual *IPD* flows, smoothed using a four-quarter moving average.

[12] *Driver and Wren-Lewis*, 1999, show that *FEER* estimates are much more sensitive to sustainable current account norms and trade parameters than to estimates of trend output.

trade flows.[13] There are three arguments in trade volume equation: a measure of the total demand, a measure of competitiveness, and an exogenous time trend. The functional form is the traditional log-linear specification. We use domestic income as the variable, which captures the impact of activity for both goods and services imports. For goods exports we use world trade, while for services exports we use world income approximated by OECD real GDP. Export competitiveness is measured by the ratio of world trade prices converted in domestic currency and domestic export prices. Import competitiveness is measured by real exchange rate defined as a ratio of world trade prices expressed in domestic currency and domestic producer prices. Export and import competitiveness for services is captured by the real exchange rate for services defined as a ratio of world consumer prices (approximated by OECD consumer prices) and domestic consumer prices multiplied by nominal effective exchange rate.

The estimation technique, which we apply, is a simple error correction mechanism (*ECM*). As we are not interested in short-term dynamics (FEERs are a medium-term concept) it would be preferable to use also cointegration techniques. Since our sample is quite short (1993:Q1 – 1999:Q4) we do not test for cointegration for trade volumes. A crucial ingredient in the estimation of an *ECM* is the assumption that the term capturing the disequilibrium effect is correctly specified. If estimation of the *ECM* does not produce residuals that are stationary it might be because the levels of variables are not cointegrated, and this in turn may be because a variable had been inadvertently omitted. To control this we perform variety of diagnostic tests to check for misspecification in the equations. These tests are for serial correlation, functional form, normality, and heteroskedasticity.[14] Results from this estimation are reported in Appendix B.

Price elasticities have a big impact on the *FEER* calculations because their size determines how much the real exchange rate has to change in order to bring the economy into internal and external balance. Higher price elasticities mean that smaller changes in real exchange rate are needed in or-

[13] For a survey see *Goldstein and Kahn*, 1985. The demand curve specification has serious empirical and theoretical inadequacies. First, this approach does not account for nonprice competitiveness factors so the demand curve approach does not account for variety and quality of goods produced in the economy. Second, modelling trade volumes with demand curve equation neglects supply side factors, in particular decisions over the location of production.

[14] The test for serial correlation is Lagrange multiplier test; for functional form Ramsey's RESET test; for normality Jarque-Bera test, and for heteroskedasticity, White's Heteroskedasticity Test. The tests are all distributed as χ^2 and null is accepted when the test statistics is less than critical value.

der to correct disequilibrium. In the extreme case, where price elasticities are infinite, the equilibrium real exchange rate is a constant and *PPP* holds.

Theoretically the Marshall-Lerner condition is regarded as the dividing line for the size of price elasticities. It requires the sum of the price elasticities for imports and exports volumes (in absolute terms) to be greater than unity. Under this condition the nominal trade balance (in domestic currency) will improve following a depreciation of the real exchange rate.[15] For both countries the results for goods exports and imports show that Marshall-Lerner condition is satisfied (see Table 1). For Argentina we found higher goods imports and exports prices elasticities than for Estonia. These relatively high price elasticities imply that for a given change in saving-investment norm relatively small changes in the *FEER* will be needed to reach a new equilibrium.

In both cases the prices elasticities with respect to services exports and imports are relatively low. Exception is the price elasticity of Argentina's services export (see Table 2).

Table 1

NORMALIZED ELASTICITY ESTIMATES FOR GOODS EXPORTS AND IMPORTS

	Argentina	Estonia
Export		
Price elasticity	1.4	0.85
Income elasticity	3.3	3.8
Import		
Price elasticity	-3.9	-1.2
Income elasticity	2.3	3.5

Activity elasticities give the amount by which trade volumes respond to a change in output. If they are greater than unity, this implies that trade volumes will be rising as a proportion of associated activity variable. Activity elasticities play an important role in the determination of the *FEER* because they transmit changes in the potential output into changes of the equilibrium exchange rate. A change of the potential output at home will trigger changes

[15] This condition assumes that trade balance is initially zero. If the trade balance is in deficit, then for the nominal balance (expressed in domestic currency) to improve, the amount by which the sum of the trade price elasticities must exceed unity increases. The size of this increase will be determined by the relative size of export and import price elasticities (see for example *Goldstein and Kahn*, 1985; *Hooper and Marquez*, 1995).

in the *FEER* (for an unchanged level of sustainable current account) and the size of these changes will be determined by the size of the activity elasticities of trade volume. The higher the activity elasticities, the bigger the resulting change in the trend current account for a given change in potential output. In other words, the size of the change in the *FEER* associated with a change in trend output is an increasing function of the size of the activity elasticities.

The activity variable associated with goods import volumes is given by domestic output. No restrictions are imposed on this elasticity. Export goods volumes are modeled as a function of world trade. Any prior belief in unit elasticity is not supported by the data. In both countries (Argentina and Estonia) the estimated activity elasticities are much bigger than unity. This makes *FEER* very sensitive to changes in trend output at home and abroad and to world trade. For Estonia the estimated activity elasticities are higher than for Argentina, which reflects the fact that Estonia is a smaller and more open economy.

In the case of services exports and imports the activity variables are given by domestic output and world output respectively. No restrictions are imposed on the associated activity elasticities.

Table 2

NORMALIZED ELASTICITY ESTIMATES FOR SERVICES EXPORTS AND IMPORTS

	Argentina	Estonia
Export		
Price elasticity	1.6	0.4
Income elasticity	4.8	3.8
Import		
Price elasticity	-0.1	-0.4
Income elasticity	2.4	3.0

Trade prices are modeled separately for goods and services. Goods prices are divided into two groups: commodity prices and manufacturing prices.

Commodity prices are broken down into four categories: oil prices, food prices, world agricultural nonfood prices and world metals and mineral prices. Commodity prices for imports and exports are defined as a weighted function of these four commodity prices groups, where country specific weights are based on the relevant shares of commodity exports and imports in total trade. Coefficients A_1 and B_1 give the share of all commodities within

total goods exports and imports, respectively. Data are derived from the UNCTAD Handbook of International Trade and Development Statistics and for each country the totals are for 1995.

Table 3

COEFFICIENTS ON COMMODITY PRICES

	Argentina	Estonia
Exports: B_1	0.66	0.32
Oil: b_1	0.16	0.18
Food: b_2	0.75	0.48
Nonfood: b_3	0.07	0.26
Metals: b_4	0.02	0.08
Imports: A_1	0.14	0.29
Oil: a_1	0.29	0.33
Food: a_2	0.40	0.54
Nonfood: a_3	0.14	0.09
Metals: a_4	0.17	0.04

Manufacturing export and import prices are modeled as a weighted average of world export prices and domestic producer prices. The elasticities for import and export prices to world trade prices are obtained using the error-correction mechanism model. In each case, the models are estimated using quarterly data from 1993:Q1 to 1999:Q4. Results of estimated and chosen price elasticities to world trade prices are presented in Table 4 (in Appendix B2 we present *ECM* and results). In the case of Argentina we found an estimate for the elasticity of import prices to world trade prices, which is not plausible. In this case we impose coefficient of 0.86, which is derived from a Johansen cointegration test.[16] The estimate for the elasticity of Estonian export prices to world trade prices is very low. This result implies that Estonian export is composed of goods whose prices are independent of world export prices. The evidence of the structure of Estonian export does not seem to support the view that the country's goods exports prices are independent of world trade prices. Taking into account the fact that Estonia is a very small and open economy we impose an export price elasticity to world trade prices of 1.

[16] Estimation period for this cointegration test is 1993:Q1 − 1999:Q4. We found one cointegration vector at 5% significance level. Due to short estimation period this result has to be accepted with caution.

Table 4

THE IMPACT OF WORLD PRICES WITHIN TRADE PRICE EQUATIONS

	Import prices		Export prices	
	Estimated A_2	Chosen A_2	Estimated B_2	Chosen B_2
Argentina	3.17	0.86	0.61	0.61
Estonia	0.55	0.55	0.08	1.0

For trade in services, export prices are assumed to be identical to domestic consumer prices and import prices to OECD consumer prices.

In addition to the trade price equations, we also assume simple relations between domestic GDP deflators and domestic producer prices; domestic consumer prices and domestic producer prices; and world consumer prices and world trade prices (specifications of these relationships are given in Appendix A3).

Since current account is not made up only of net trade flows we need to model interest, profit and dividend flows and net transfers.

In this paper we take *IPD* flows as exogenous because over the historical period, actual foreign assets and liabilities will determine *IPD* flows. If we assume that foreign assets are denominated in foreign currency then *IPD* credits will be in foreign currency (this is a plausible assumption for both Argentina and Estonia). On the other side, if foreign liabilities are denominated in domestic currency, then *IPD* debits will be in domestic currency. Here we assume that foreign liabilities are also denominated in foreign currency.[17] When these flows are denominated in foreign currency we need to allow for exchange rate revaluation effects since changes in real exchange rate will affect *IPD* flows. We also smooth the series for *IPD* flows using a four-quarter moving average.

The balance of *IPD* flows as a proportion of GDP for the historic period is given by:

$$bipd = \left[1 + \rho * \left(\frac{FEER - R}{R}\right)\right] * (ipdc - ipdd)$$

where:

[17] For example in the case of Argentina federal government debt is denominated 96 % in foreign currency (70% in US dollars, 20% in euro and 5% in Japanese yen) and only 4% in domestic currency – pesos (information from Argentinean Ministry of Economy, Undersecretariat of Financing).

bipd is balance of *IPD* flows as a percent of GDP,

ipdc is *IPD* credits as a percent of GDP,

ipdd is *IPD* debits as a percent of GDP,

ρ gives proportion of revaluation effect (in our case set to 1 for both Argentina and Estonia),

FEER is fundamental equilibrium exchange rate, and

R is actual real exchange rate.

Net transfers are modeled simply as an exogenous variable with trend, and are expressed as a proportion of GDP (in Appendix A4 we present equation for net transfers).

Estimating the Trend Current Account

An important element of *FEER* estimation is the calculation of trend output. Since the *FEER* is a concept which is compatible with exogenously determined values for internal balance, we need to model potential output in order to set output gaps (at home and abroad) to zero. In the literature three different methodologies are widely used for estimation of potential output and output gap.[18] The first two approaches are based on mechanical times series smoothing of GDP series. These are the time trend method and the Hodrick-Prescott filter. Estimates of potential output and output gaps derived by these two techniques use no information about the structure of the economy or economic relationships. The third approach is based on a Cobb-Douglas production function constructed by using a measure of equilibrium unemployment and the whole economy capital stock. This structural framework is less mechanical and reflects structural factors, which affects potential output. The disadvantage is that the production function estimation of potential output demands data for capital stock within the whole economy and a measure of potential employment, which are in most cases unavailable for developing countries.

In this paper we use the time series approach for estimation of the trend output and output gap. Trend output is modeled as exogenous with a time trend, and is given by:

$$Y = \lambda_0 e^{\lambda_1 T}$$

where λ_0 is a measure of trend GDP for a given period (in the case of this paper, 1995) and is equal to actual GDP plus output gap; λ_1 is a measure of

[18] For short review and comparison of the estimation properties of these methodologies see *Giorno et al.,* 1995.

potential output growth and *T* is time trend (1995:Q1 = 0).

As an alternative to the time trend method we use the *HP* filter to calculate trend output and the output gap. In general, the results produced by the *HP* filter method for trend output and the output gap are very similar to those produced by the time trend method. The difference is that at the end of the sample the *HP* filter method generates a level of trend output, which is slightly higher than that produced by the time trend method. In the calculation of the trend current account we prefer to use trend output estimations generated by the time trend method as the *HP* filter suffers from a well-known end point problem. We apply this method to calculate domestic trend output, world trend output and trend world trade.

Once we have estimates of trend output and trend world trade we use the estimated trade equations to calculate the levels of exports and imports when there is no output gap at home and abroad. The trend current account obtained is consistent with internal balance within economy.

Estimating Sustainable Current Account

In order to estimate *FEER*s, we need a measure of the sustainable level of the current account, or in other words the level of the current account that corresponds to external balance. Since the notion of sustainability in the *FEER*s calculation is associated with the medium run, assets stocks may still be adjusting over time towards a long-run steady state. This implies that our estimation of sustainable current account needs not to be zero (net foreign assets are not constant).

There are two different approaches applied in the empirical work to estimate sustainable current account. The first approach derives measures of sustainable (structural) capital flows, which finance current account imbalances (*Williamson and Mahar,* 1998). These structural capital inflows are not speculative flows which move from country to country in search of high short-term rates of return, but inflows or outflows that are likely to persist for a considerable period of time. This measure of sustainable capital flows is usually assumed to be a constant proportion of GDP. The second approach to estimating sustainable currents account is developed by *Masson*, 1998, and implemented by *Faruqee and Debelle,* 1998. Since saving minus investment in the economy and current account are by identity equal, this approach focuses on the determinants of net domestic savings. Saving minus investment norms provide an assessment of what might be the sustainable level of the current account in the medium term if the economy were in internal balance. This methodology does not aim to account for short-term cy-

clical movements in the current account. The estimates for long-run saving minus investment are calculated by setting the output gap equal to zero.

In this paper we estimate sustainable current accounts based on saving-minus-investment norms. Within the saving-minus-investment framework the determinants of current account are given by:

- The fiscal position. An improving fiscal position (rising surplus or falling deficit) reduces investment and increases saving, which leads to an improvement in the current account. As we are interested in current accounts in medium term, we have to use a structural, cyclically adjusted measure of fiscal balance. In order to obtain such a measure we regress the actual fiscal position on the output gap and then subtract the estimated impact of output gap. There is also a study, which suggests that it is not only the size of fiscal surplus that matters but also its composition. To control this effect we follow *Bussiere and Driver* (2001) and include taxation as a proportion of GDP as an explanatory variable. This will also capture any effects due to the government share within the economy.
- The demographic structure, which affects saving behavior due to life cycle reasons. Countries where young and retired people dominate the population will have low level of savings. Countries with a big share of active population will have higher levels of saving. Demographic profile of countries is proxied by dependency ratio, defined as population younger than 14 and older than 65 as a proportion of the population aged between 14 and 65 years.
- The stage of development, proxied by GDP per head. This has implications on the amount of capital countries need to import. Poor countries (low levels of GDP per capita) have a low capital-labor ratio and high marginal return on capital. Countries with access to international capital markets borrow from abroad and over time the country builds up its capital stock and international debt. The higher level of capital increases output share which is diverted into servicing foreign debt. As countries developed intensively they started to export capital and to run current account surpluses. Income per capita is converted into US dollars using *PPP* exchange rates.
- The world real interest rate, which will equilibrate saving and investments in the world. As an approximation of world real interest rates we are using an US real interest rate.[19]

[19] US real interest rate is defined as treasury bill rate minus consumer price inflation.

We derive a sustainable current account level for Argentina and Estonia within a panel framework. In the case of Estonia the panel contains eleven Central and Eastern European transition countries for the 1993 to 1999 period.[20] The time span is chosen taking into account data availability for the countries within the panel. For most of them we have data since 1993.[21] Since all variables are relative to their sample average, estimation can be conducted only on a balanced panel. All the countries except Croatia are in the process of accessing the European Union, which means that these countries form a homogenous group. We do not include former Soviet Union countries in the panel (except Baltic countries), taking into account the fact that these countries lag behind Central and Eastern European countries in the process of economic transformation from centrally planned to market economies and differ significantly from accession countries in terms of macroeconomic variables development. In the case of Argentina we again use a regional panel, which consists of twelve Central and Latin American countries covering the 1985 to 1999 period.[22] The selection of the countries included in the panel and time span were based on available data.

All explanatory variables are measured relative to their sample averages, which give us two advantages. First is that any shock, which is common for all countries in the panel and hit them simultaneously will not affect the current account. Second, measuring explanatory variables relative to their sample averages allow the world real interest rate to be substituted out from the equation specification (see *Masson*, 1998). Dropping out of the world real interest rate is based on the assumption that position of transition countries included in the sample relative to the rest of the world does not change over time. The use of fixed effects does, however, imply that the current account position of each panel with respect to the rest of the world should not be zero. The disadvantage of applied panel data framework for estimation of sustainable current account is that this approach assumes homogeneous coefficients across countries. The preferred equation for sustainable current accounts for Argentina and Estonia are presented in Table 5:

[20] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

[21] Croatia and Slovenia gained independence from Yugoslavia in June 1991. Lithuania became independent from the Soviet Union in March 1990, Estonia in August 1991 and Latvia in September 1991. In January 1993 former Czechoslovakia has split into Czech and Slovak republics (EBRD, 2000).

[22] Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela.

Table 5

PANEL ESTIMATES OF CURRENT ACCOUNT EQUATION

	Argentina	Estonia
c_i	-0.06	0.45
RDR	0.26	
	(2.18)	-
RYPC	-0.12	
	(-2.63)	-0.31
	(-2.89)	
RSFB	-	0.01
	(2.01)	
RTY	-	-0.25
	(-3.54)	
Adjusted R^2	0.29	0.38
DW	1.83	1.89
S.E.E.	0.039	0.041

Note: T-statistics are given in parentheses.

Here, CA_i is a dependent variable expressed as a ratio of current account to the GDP. *RDR* is a dependency ratio relative to sample average; *RYPC* is GDP per capita relative to sample average, *RSFB* is the structural fiscal surplus relative to sample average and *RTY* is taxation as a percentage of GDP relative to sample average. c_i is a constant which captures country specific effects (fixed effects).

In the transition countries panel demographic factors are omitted because the dependency ratio proves insignificant. World real interest rate approximated by US real interest rate also proves to be insignificant. As we mentioned above panel data methodology applied allows to drop out real interest rate from the model of saving-minus-investment norms. All explanatory variables are significant and the signs of the coefficients are consistent with those expected from the theory. The results show that stage-of-development variable proxied by GDP per capita relative to sample average plays the most important role in determining saving-minus-investment norms in transition countries. This result is expected, since all these countries need to import capital in order to finance the restructuring of their economies and to converge to developed countries. Fiscal policy development has a marginal effect, but its compositional effect is significant: increases in the fiscal surplus due to higher taxes result in a weaker contractionary effect than falls in

government spending.[23]

In the Latin American panel the results suggest that the relative dependency ratio and relative GDP per capital give the best model. Variables are significant and the signs of the coefficients are consistent with those predicted by the theory. Structural fiscal balance and taxation as a percentage of GDP proved to be insignificant and were not included in the model. As with the transition country panel the world real interest rate is also insignificant in the Latin America panel. This allows to exclude the real interest rate from the estimation of sustainable current accounts.

In the next section we present charts with actual, trend and estimated sustainable current accounts for Argentina and Estonia.

Since we have estimates for trend current accounts, which are compatible with internal balance of the economy and sustainable current account, we can now solve the model in order to get the level of real exchange rate that matches these two estimates. The next section provides an overview of the results of the historic *FEER*s for Argentina and Estonia, as well as a discussion on policy implications.

IV. Results and Discussion

This section presents results of our estimates of Fundamental Equilibrium Exchange Rates for Argentina and Estonia. We have estimated only historic *FEER*s covering the sample of 1993:Q1 – 1999:Q4.[24]

Essentially actual and trend current accounts may differ due to several reasons: domestic and international (OECD) outputs differ from trend output; world trade differs from the trend; commodity prices differ from trend prices; and existence of unexplained deviations (residuals) from the model's relationship for trade.

In the case of Argentina the difference between trend current account and actual current account represents mainly the effects of deviation of output from its trend (output gaps). Between 1993:Q3 and 1994:Q3 output growth exceeded the trend and output gap reached a positive 5%. This pushed the actual current account below the trend current account. At that time the trend current account stood below the sustainable current account, and therefore the real effective rate needed to be appreciated in order to reach the *FEER* (the real exchange rate was undervalued).

[23] In the long run one would expect supply effects which differed substantially from short-term demand effects of a Keynesian nature.

[24] The choice of the sample was based only on available data.

Between the last quarter of 1994 and the last quarter of 1995 contagion effects from the Mexican crisis resulted in negative growth and a negative output gap for Argentina. The result was a sharp reduction of imports and a significant improvement of actual current account during 1995. The trend current account was therefore below actual current account. However, it stood still higher than the sustainable current account. Consequently, the real exchange rate needed to be appreciated to reach the *FEER*.

Since the beginning of 1996 the Argentinian economy signaled a recovery from the crisis and accelerated. Higher growth combined with relatively high magnitudes of activity coefficients in the trade volume prompted a deterioration of the actual and trend current accounts. Concurrently, the current account deficit implied by savings-minus-investments norms tended to narrow. This lead to a depreciation in the *FEER* and an overvalued exchange rate by the end of the 1998. In the first quarter of 1998 Argentina's output growth subdued reflecting the effect of Asian crisis. Output decline during 1999 caused by the negative effect of the dramatic devaluation of the Argentina's main trade partner (in the beginning of 1999 Brazilian real devalued by 50%). Despite the negative impact on competitiveness as a result of Brazil's devaluation during this period the output effect dominated and

Chart 1.

ARGENTINA ACTUAL, TREND AND SUSTAINABLE CURRENT ACCOUNTS

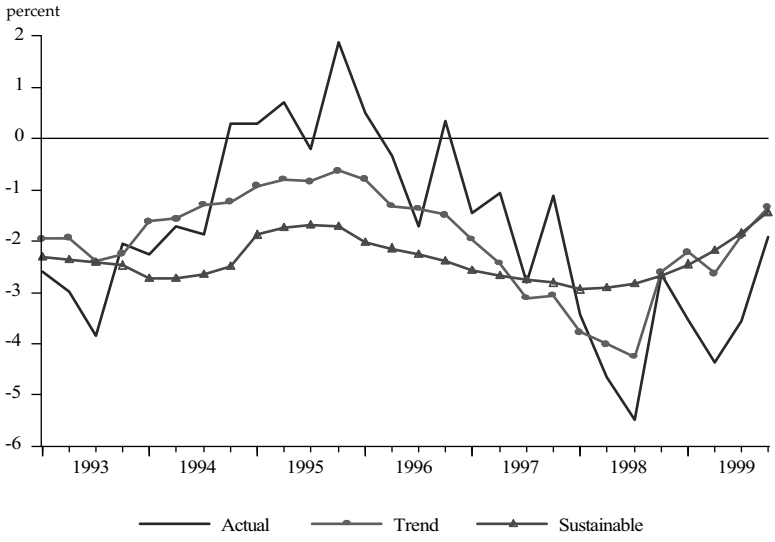
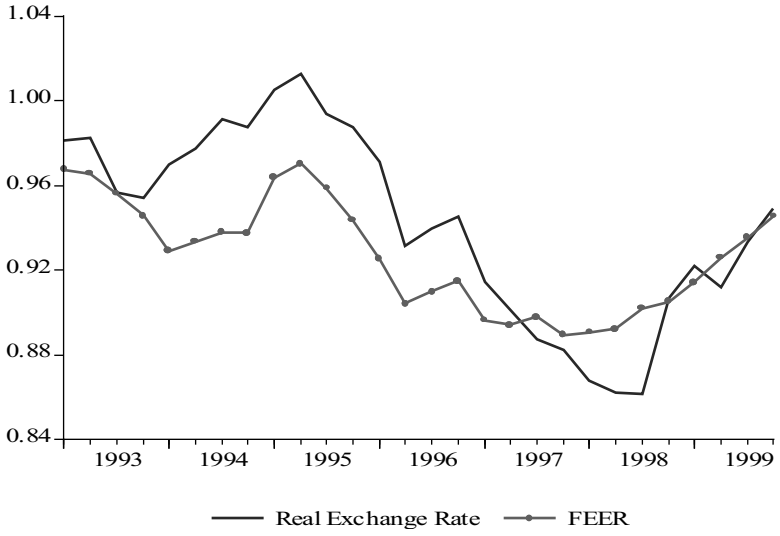


Chart 2.

ARGENTINA REAL EXCHANGE RATE AND FEER



the actual current account started to recover. In effective terms the US dollar depreciated in 1999 and this also had a favorable effect on Argentina given the link between the two currencies. Argentina's trend current account therefore, also improved and the gap between the *FEER* and the actual real exchange rate diminished.

The model for Estonia produces results which are more volatile. This is due to the fact that Estonia's economy was changing very fast during the transition from a planned to a market economy. This was a period of price and trade liberalization, which affected the development of trade flows. The structural changes in the economic environment are also relevant and may cause permanent shifts in the real exchange rate level.

Between 1994 and 1996 Estonian output growth was below trend output growth, and correspondingly the trend current account was below actual current account. The exception to this reflects the existence of unexplained deviations (residuals) from the model's trade equations. However, the estimated sustainable current account was much higher, with the gap between the two reflecting a large overvaluation of the real exchange rate. The slight increase in the sustainable current account over this period resulted in a sharp appreciation in the *FEER*.

Between 1997 and first half of 1998 the Estonian economic growth was higher than trend output growth which resulted in a lower actual current account than the trend current account. The effect of Russian crisis reversed this trend pushing the actual current account back above the trend current account. By 1997 the sustainable current account tended to fall, causing a slight depreciation of *FEER*.

An analysis of the equilibrium real exchange rates indicates the degree of sustainability of the currency boards. Conventional criticism of the currency boards states that this monetary regime is associated with big misalignments, which eventually lead to the collapse of the fixed exchange rate (*Roubini*, 1998). Comparison of the *FEER* dynamics and the actual real exchange rate can give us an idea to what extend conventional criticism is supported by empirical evidences.

Chart 3.

ESTONIA ACTUAL, TREND AND SUSTAINABLE CURRENT ACCOUNTS

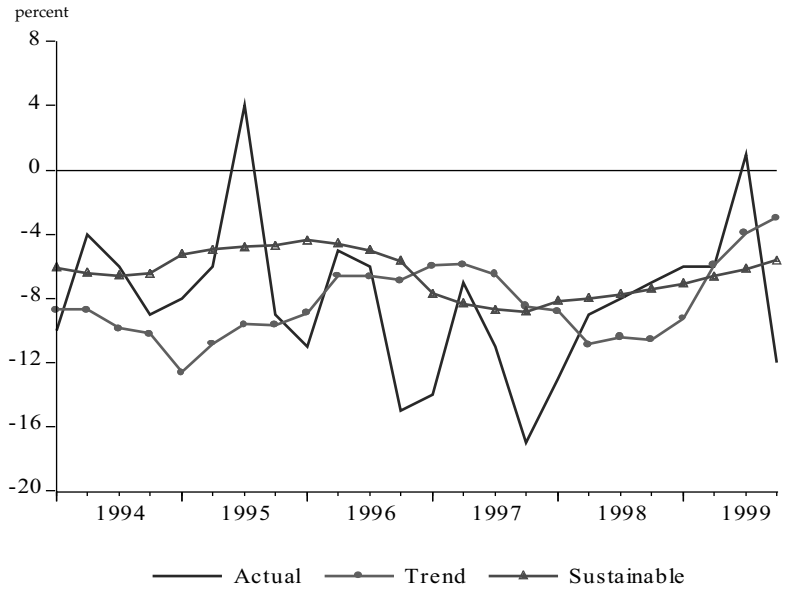
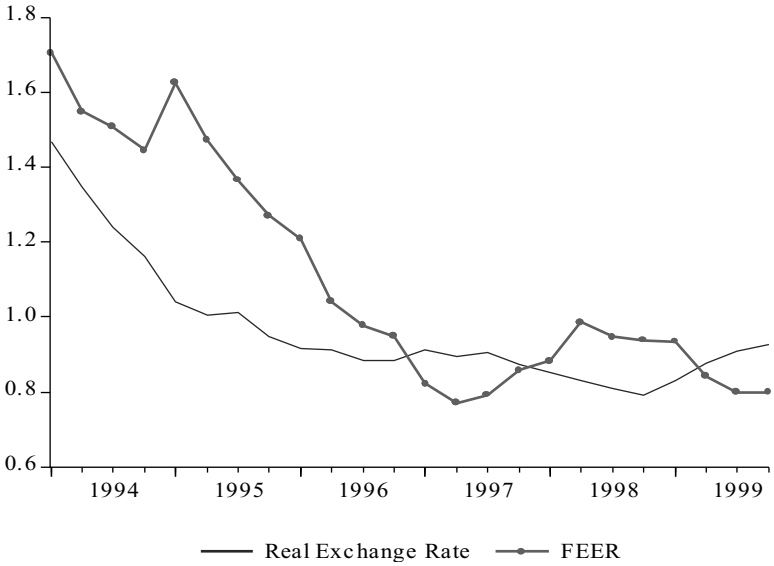


Chart 4.

ESTONIA REAL EXCHANGE RATE AND FEER



In the case of Argentina development of the actual real exchange rate/ *FEER* ratio can be broken down into three main periods: 1993:Q3 – 1997:Q2 (undervaluation); 1997:Q2 – 1998:Q3 (overvaluation) and 1998:Q3 – 1994:Q4 (equilibrium) (see Chart 5).[25]

[25] Measures the difference between actual real exchange rate and *FEER* as a percentage of the FEER $\left(\frac{FEER - R}{FEER}\right)$. A negative figure indicates an undervaluation, that is the real exchange rate needs to be appreciated to reach the *FEER*.

Chart 5.

ARGENTINA ACTUAL REAL EXCHANGE RATE AGAINST FEER

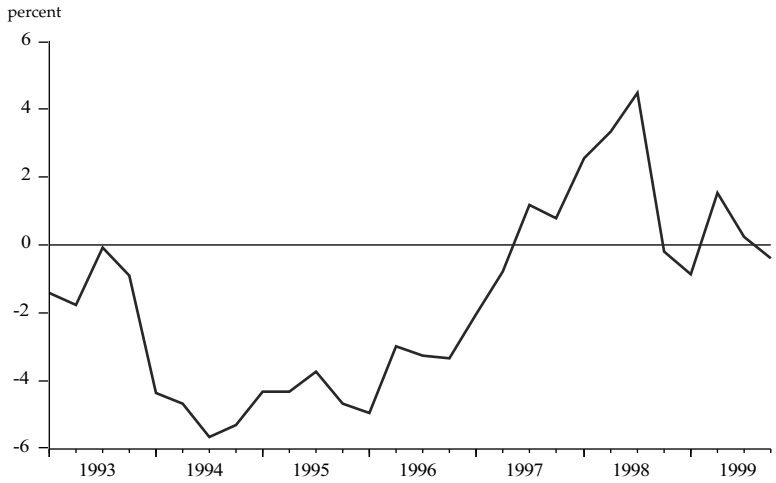
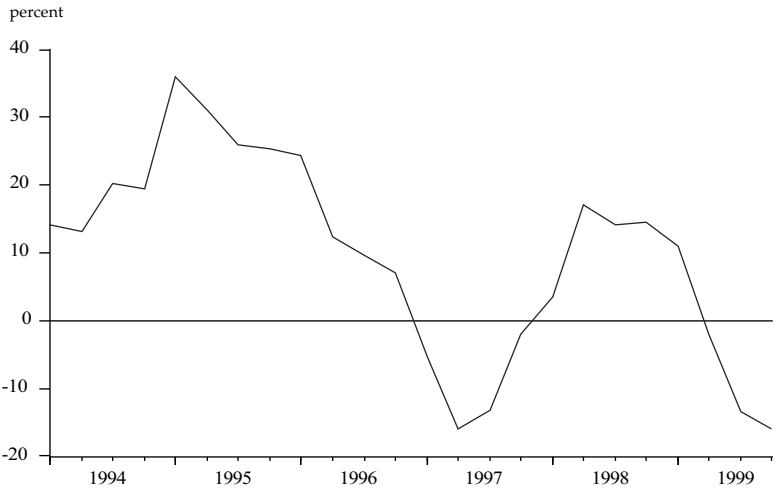


Chart 6.

ESTONIA ACTUAL REAL EXCHANGE RATE AGAINST FEER



Overall, the dynamics of the Argentinean real exchange rate and *FEER* during the period of the currency board arrangement does not show the persistent overvaluation of fixed exchange rates predicted. Indeed, the size of any misalignment is insignificant, below the 10% *Williamson* band (1983). *Williamson* assumes that this band guarantees that uncertainty of FEER calculations will not affect the assessment degree. Even in 1999 when Argentinean economic performance started to deteriorate, the real exchange rate was roughly at equilibrium. This was the period when severe economic problems in Argentina occurred. At that time there were proposals for the adoption of the US dollar as legal tender at the existing parity (*Calvo*, 2000; *Hanke and Schuler,* 1999). The main argument against official dollarization was that Argentinean real exchange rate was significantly overvalued and adoption of the US dollar would not solve the problems of poor competitiveness of Argentinean exports (*Sachs and Larrain,* 1999). Moreover, dollarization will aggravate the problems as it is an irreversible process, locking the country in the wrong exchange rate parity, which will have a permanent negative effect on Argentinean economy. Our results show that the Argentinean real exchange rare was not severely misaligned. At the end of 1999 real exchange rate was close to equilibrium exchange rate (*FEER*) with almost zero percent misalignment. Official dollarization at the beginning of 2000 might have helped to avoid the deeper crisis faced by Argentina at the end of 2001. Dollarization brings two big advantages:[26]

First, the establishment of a monetary union (symmetric or asymmetric) stimulates trade among member countries, which makes goods produced in different countries substitutable (*Rose and Van Wincoop*, 2001; *Rose*, 2001).[27] This would have an effect of rising the relative price elasticities in mutual trade relationships. The greater these elasticities, the less adjustment of real exchange rate required in respond to any shock of a particular size. Second and more important benefit for Argentina might be the reduction of interest rates since the devaluation premium will disappear with the adoption of the US dollar.

In the case of Estonia development of the actual real exchange rate/ *FEER* ratio can be broken down into two main periods: 1994:Q1 – 1997:Q1 (overvaluation) and 1997:Q1 – 1999:Q4 (overvaluation and undervaluation) (see Chart 6).

[26] For a discussion of pros and cons of dollarization, see for example *Berg and Borensztein*, 2000; and *Bogetic*, 2000.

[27] *Rose and Van Wincoop*, 2001; and *Rose*, 2001; estimate that a common currency can boost trade among countries participating in a monetary union by a factor of three.

In general the size of misalignments have been much larger than in the case of Argentina. Consequently, the uncertainties surrounding the calculation of equilibrium exchange rates for Estonia will also be higher. The results of this analysis suggest that the parity at which Estonia entered the currency board was overvalued.[28] However, the process of transformation allowed Estonia to improve its competitiveness.

During the early period the trend current account was far below sustainable levels, which produced a big overvaluation. Over time the gap between the trend current account and sustainable current account narrowed bringing the real exchange rate close to equilibrium (*FEER*).

In early 1997 the continuous improvement of the trend current account and decline of the sustainable current account produced an undervaluation of the real exchange rate of about 15 percent. The real exchange rate needed to be appreciated in order to reach *FEER*. Appreciation started in the first quarter of 1998 as a result of the sharp deterioration of the trend current account. Over 1998 the real exchange rate was overvalued relative to the equilibrium level by 15 percent. The gap between the real exchange rate and *FEER* was eliminated in the middle of 1999 due to a sharp improvement in the trend current account which offset the slight rise in the sustainable current account. At the end of 1999 the Estonian real exchange rate was undervalued by 15 percent relative to equilibrium level. It is generally thought that the euro is currently undervalued. Therefore, recent movements in the degree of misalignment experienced in Estonia may also reflect movements in the anchor currency.

Real exchange rate misalignments can be an important determinant and indicator of a currency crisis. Our estimates of misalignments in the Estonian real exchange rate accounting for about 15% are far from the misalignment expected by the critics of fixed exchange rates and currency boards.

In contrast to Argentina, the end point of exchange rate regime path for Estonia is clear − the adoption of the euro. The main issue here is whether a currency board can be instrumental for Estonia through the process leading up to adoption of the euro. New entrants are envisaged to undergo three stages: EU accession, participation in ERM II and joining the Euro zone. For countries with a currency board the main question is whether this regime is

[28] K. Schuler states that Estonia started in 1992 with an exchange rate that deliberately undervalued the kroon. As a result they had higher inflation in 1992 than would otherwise have. According to calculations in this paper by 1994 the kroon was already overvalued versus *FEER*, so the gains from deliberate undervaluation did not last long. This result might suggest how quickly the advantage from a deliberate undervaluation disappears.

compatible with participation in ERM II.[29] On this stage it is important that the exchange rate regime fulfils several objectives: facilitating nominal convergence; allowing a market test for exchange rate stability; ensuring countries' entry in the Euro zone at an appropriate exchange rate and preparing central banks for operating within the Euro zone (European Commission). Perhaps the most important of these is to ensure that countries enter the Euro zone at an appropriate exchange rate.

It is known that Estonia, which has started negotiations for EU membership and is expected to join EU in early 2004, prefers to preserve the currency board. The Estonian authorities state that a currency board is compatible with ERM II and they wish to maintain it until full membership in EMU. This implies that Estonia will enter the monetary union at the existing parity. Since entry in the monetary union is practically irreversible, entry at the wrong level of the nominal exchange rate could have a permanent negative effect on the country's economic performance (*Barrell and In't Velt,* 1991). Entry at an overvalued exchange rate will result in losses of both export markets and foreign direct investment. Such losses may not be reversible and the country may be permanently affected if it chooses the wrong entry level of the exchange rate.

Our results show that the Estonian real exchange rate is not severely overvalued relative to equilibrium level. Indeed, at the end of the sample period it is undervalued by 15 percent. Based on these results we might expect that Estonia could sustain the existing nominal parity and preserve its currency board during the second stage of the accession process. Taking into account relatively short sample of our work and the fact that any decision about the Estonian entry rate into EMU will be taken around 2006, we can not answer the question whether the current parity is appropriate for entering EMU.

[29] When a country with a currency board pegged to the euro wishes to join ERM II, the decision on the compatibility of a particular currency board arrangement with ERM II could only be taken on the basis of a profound assessment of the appropriateness and sustainability of the said currency board. This conclusion logically follows from the procedure foreseen in the ERM II Resolution concerning the adoption of central rates. Although currency board arrangements cannot be regarded as an acceptable substitute for participation in ERM II, they may in particular circumstances constitute an appropriate unilateral commitment within ERM II. Such unilateral commitment would not impose any additional obligations on the ECB beyond those deriving from the ERM II resolution and the Central Bank Agreement.

V. Conclusions

Hard pegs and especially currency boards have been criticized as a policy tool for fighting inflation, as in the medium to long run they are thought to lead to an overvalued exchange rate and a significant worsening of the current account. Locking a country's exchange rate for a too long period to a misaligned nominal parity is bound to lead to a speculative attack and the collapse of the currency board (currency boards carry seeds of their own destruction).

In order to verify this criticism we calculate historic Fundamental Equilibrium Exchange Rates (*FEER*s) for two countries which introduced currency boards in the beginning of 90's: Argentina and Estonia. *FEER*s are measures of medium-term equilibrium real exchange rates and they are not intended to explain short-term movements in exchange rates. Rather, we use the calculated *FEER*s to assess medium and long-term movements in real exchange rates and sustainability of currency board arrangements.

Our analysis suggests that there were no severe misalignments of the real exchange rates in currency board countries at least in the recent past. Overall, since the introduction of the currency board the Argentinean real exchange rate has had periods of relatively small undervaluation and overvaluations. These misalignments varied within 6%, which is far from the severe misalignments that might have been expected given the current economic problems in Argentina. At the end of the sample period (1999) the Argentinean real exchange rate was virtually equal to the equilibrium rate (*FEER*). The analysis suggests that neither currency board arrangement nor the overvaluation of real exchange rate are at the root of the economic problems in Argentina. Based on this result we could expect that official dollarization in early 2000 might have helped to prevent the deeper crisis faced by Argentina at the end of 2001.

In Estonia the size of misalignments were much larger than in Argentina. Uncertainties surrounding the calculation of equilibrium exchange rate for Estonia will also be bigger. The results of this analysis suggest that the parity at which Estonia entered the currency board was overvalued. However, the transformation helped Estonia to improve its competitiveness. At the end of the sample period (1999) the Estonian real exchange rate was undervalued by around 15%. Based on these results we might expect that Estonia could sustain the existing nominal parity and preserve its currency board during the second stage of the accession process. Taking into account the relatively short sample of our work and the fact that any decision about Estonian entry rate into EMU will be taken around 2006, we can not certainly

answer the question of whether the current parity is appropriate for the entering EMU.

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Appendices

Appendix A: The model.

This appendix presents the structure of the model used to estimate *FEER* for Argentina and Estonia. It is based on *Barrell and Wren-Lewis*, 1989, and Wren-Lewis and Driver, 1998.

A1 Trade Volumes

Exports

Goods: $XGI = \gamma_0 RX^{-\gamma_1} S^{\gamma_2} e^{\gamma_3 T}$

Services: $XS = \theta_0 RS^{-\theta_1} YW^{\theta_2} e^{\theta_3 T}$

Imports

Goods: $MGI = \delta_0 R^{\delta_1} Y^{\delta_2} e^{\delta_3 T}$

Services: $MS = \psi_0 RS^{\psi_1} Y^{\psi_2} e^{\psi_3 T}$

Where:

RX is export competitiveness given by: $RX = \frac{WPXG * r}{PXG}$

r − the nominal exchange rate (local currency per US dollar)

WPXG − world export prices expressed in US dollars

RS − the real exchange rate for services given by: $RS = \frac{PCW}{PC * NEER}$

PCW − world consumer prices, approximated by OECD consumer prices

PC − domestic consumer prices expressed in domestic currency

NEER − the nominal effective exchange rate

S − the world trade volume

YW − world real GDP, approximated by OECD real GDP

R − the real exchange rate given by: $R = \frac{WPXG * r}{PD}$

PD − domestic prices, approximated by producer prices expressed in domestic currency

Y − domestic real GDP

T − time trend (1995:Q1 = 0)

A2 Trade Prices

Exports

All goods: $PXGA = (PCOMX * r)^{B_1} PXG^{1-B_1}$

Manufacturing: $PXG = (WPXG * r)^{B_2} PD^{1-B_2}$

Commodities: $PCOMX = WPO^{b_1} WPFD^{b_2} WPANF^{b_3} WPMM^{b_4}$

Services: $PXS = PC$

Imports

All goods: $PMGA = (PCOMM * r)^{A_1} PMG^{1-A_1}$

Manufacturing: $PMG = (WPXG * r)^{A_2} PD^{1-A_2}$

Commodities: $PCOMM = WPO^{a_1} WPFD^{a_2} WPANF^{a_3} WPMM^{a_4}$

Services: $PMS = PCW * r$

Where:

$PCOMX$ − country's commodity export prices

PXG − country's manufacturing export prices

WPO − oil prices, in US dollars

$WPFD$ − world food prices, in US dollars

$WPANF$ − world agricultural nonfood prices, in US dollars

$WPMM$ − world metals and minerals prices, in US dollars

A3 Price Equations

Domestic GDP deflator: $PY = \omega_0 PDe^{\omega_1 T}$

Domestic consumer prices: $PC = \omega_2 PDe^{\omega_3 T}$

Foreign consumer prices: $PCW = \omega_4 WPXGe^{\omega_5 T}$

Where: PY is the domestic GDP deflator and all other variables are previously defined.

A4 Trade Balance

The equations above can be combined to give a single expression for the trade balance as a proportion of t nominal output:

$$bgs = \frac{BGS}{PY * Y} = \frac{\gamma_0 RX^{-\gamma_1} S^{\gamma_2} e^{\gamma_3 T} (PCOMX * r)^{B_1} PXG^{(1-B_1)}}{PY * Y} + \frac{\theta_0 RS^{-\theta_1} YW^{\theta_2} e^{\theta_3 T} PC}{PY * Y}$$
$$- \frac{\delta_0 R^{\delta_1} Y^{\delta_2} e^{\delta_3 T} (PCOMM * r)^{A_1} PMG^{(1-A_1)}}{PY * Y} - \frac{\psi_0 RS^{\psi_1} Y^{\psi_2} e^{\psi_3 T} (PCW * r)}{PY * Y}$$

The number of relative price measures in this expression can be reduced to three: our measure of real exchange rate and two terms in real commodity

prices using information on trend in relative pricing behavior between different sectors. These pricing trends are given by equations in section A3 price equations. The balance of goods and services as a proportion of nominal GDP can therefore be simplified to:

$$bgs = c_0 RCOMX^{c_1} R^{c_2} S^{c_3} Y^{-1} e^{c_4 T} + c_5 R^{c_6} YW^{c_7} Y^{-1} e^{c_8 T}$$
$$- c_9 RCOMM^{c_{10}} R^{c_{11}} Y^{c_{12}} e^{c_{13} T} - c_{14} R^{c_{15}} Y^{c_{16}} e^{c_{17} T}$$

Where:

$$RCOMX = \frac{PCOMX}{WPXG} \text{ and } RCOMM = \frac{PCOMM}{WPXG}$$

A5 Net Transfers

$$NTRAN = \eta_0 e^{\eta_1 T}$$

A6 IPD Flows

The balance of IPD flows as a proportion of GDP for the historic period can therefore be given as:

$$bipd = \left[1 + \rho * \left(\frac{FEER - R}{R}\right)\right] * (ipdc - ipdd)$$

Where:

$ipdc$ – IPD credits as a percentage of GDP

$ipdd$ – IPD debits as a percentage of GDP

ρ – the proportion of the revaluation effect (1 for both Argentina and Estonia)

A7 The Current Account

The full model of the current account in domestic currency, and as a proportion of nominal GDP, can therefore be given by:

$$cbs = \frac{CA}{PY * Y} = bgs + bipd + ntran$$

Where:

cbs – current account balance (proportion of GDP)

$ntran = \frac{NTRAN}{Y}$ is the balance of net transfers (proportion of GDP)

Appendix B: Estimation Results.

B1. Trade Volumes

This appendix presents the results of the error correction estimations (ECM) of the elasticities for the trade volume equations discussed in Section III. We also present here the results of ECM for the impact of world prices on country's trade prices. The definition of the variables is given in Appendix A. *L* indicates the variable which is presented in natural logarithms and *D* indicates the first difference. See Appendix D for the data sources.

Table B1

ERROR CORRECTION ESTIMATION OF GOODS EXPORT VOLUME ELASTICITIES (DEPENDENT VARIABLE DLXGI)

	Argentina	Estonia
DLRX	-0.55	
	(-0.90)	0.24
	(0.38)	
DLS	2.53	
	(1.73)	2.95
	(1.77)	
Constant	-11.8	
	(-1.86)	-17.9
	(-1.99)	
LXGI-1	-0.31	
	(-1.99)	-0.37
	(-2.39)	
LRX-1	0.37	
	(1.87)	0.32
	(1.75)	
LS-1	1.01	
	(1.83)	1.45
	(2.05)	
SQ1	0.37	
	(1.81)	-0.10
	(-.47)	
SQ2	0.72	
	(9.57)	-0.01
	(-0.09)	
SQ3	0.23	
	(1.58)	0.01
	(0.03)	
Adjusted R2	0.91	0.75
Serial correlation	0.75	2.70
Functional form	0.86	0.79
Normality	0.39	1.81
Heteroskedasticity	1.02	0.89

Note: T-statistics are given in parentheses.

Table B2

ERROR CORRECTION ESTIMATION OF SERVICES EXPORT VOLUME ELASTICITIES (DEPENDENT VARIABLE DLXS)

	Argentina	Estonia
DLRS	-0.42	
	(-0.67)	1.11
	(2.65)	
DLYW	0.96	
	(0.28)	-7.98
	(-1.12)	
Constant	-23.9	
	(-1.86)	-20.0
	(-1.18)	
LXS-1	-0.31	
	(-1.75)	-0.33
	(-1.92)	
LRS-1	-0.48	
	(-1.86)	0.13
	(1.46)	
LYW-1	1.69	
	(1.95)	1.26
	(1.26)	
SQ1	0.14	
	(5.29)	-0.09
	(-2.17)	
SQ2	-0.24	
	(-5.25)	0.24
	(3.91)	
SQ3	0.03	
	(0.93)	0.13
	(3.20)	
Adjusted R2	0.94	0.88
Serial correlation	0.99	0.97
Functional form	2.67	0.37
Normality	0.83	10.19
Heteroskedasticity	0.69	1.19

Note: T-statistics are given in parentheses.

Table B3

ERROR CORRECTION ESTIMATION OF GOODS IMPORT VOLUME ELASTICITIES (DEPENDENT VARIABLE DLMGI)

	Argentina	Estonia
DLR	-2.75	
	(-2.36)	-0.54
	(-0.73)	
DLY	2.72	
	(2.68)	3.37
	(4.14)	
Constant	8.64	
	(0.66)	-12.9
	(-2.86)	
LMGI-1	-0.32	
	(-3.46)	-0.34
	(-2.75)	
LR-1	-1.26	
	(-2.28)	-0.14
	(-1.55)	
LY-1	0.69	
	(2.63)	1.81
	(2.80)	
SQ1	-0.02	
	(-0.32)	-0.01
	(-0.01)	
SQ2	-0.14	
	(-1.51)	-0.10
	(-1.95)	
SQ3	0.14	
	(2.42)	-0.01
	(-0.02)	
Adjusted R2	0.77	0.87
Serial correlation	1.42	2.50
Functional form	1.23	3.47
Normality	0.44	1.09
Heteroskedasticity	1.20	0.54

Note: T-statistics are given in parentheses.

Table B4

ERROR CORRECTION ESTIMATION OF SERVICES IMPORT VOLUME ELASTICITIES (DEPENDENT VARIABLE DLMS)

	Argentina	Estonia
DLRS	1.02	
	(1.58)	0.62
	(1.15)	
DLY	1.11	
	(2.38)	0.66
	(0.77)	
Constant	-3.84	
	(-1.12)	-6.61
	(-1.48)	
LMS-1	-0.42	
	(-2.03)	-0.29
	(-1.87)	
LRS-1	-0.06	
	(-1.27)	0.11
	(1.74)	
LY-1	0.58	
	(1.76)	0.88
	(1.87)	
SQ1	0.33	
	(8.84)	-0.16
	(-1.12)	
SQ2	-0.32	
	(-3.90)	0.02
	(0.41)	
SQ3	0.04	
	(1.18)	-0.01
	(-0.03)	
Adjusted R2	0.97	0.59
Serial correlation	2.40	0.52
Functional form	1.20	0.86
Normality	0.93	0.74
Heteroskedasticity	3.72	3.97

Note: T-statistics are given in parentheses.

Appendix C: Charts

Chart 1:

ARGENTINA REAL EFFECTIVE EXCHANGE RATE AND *R*

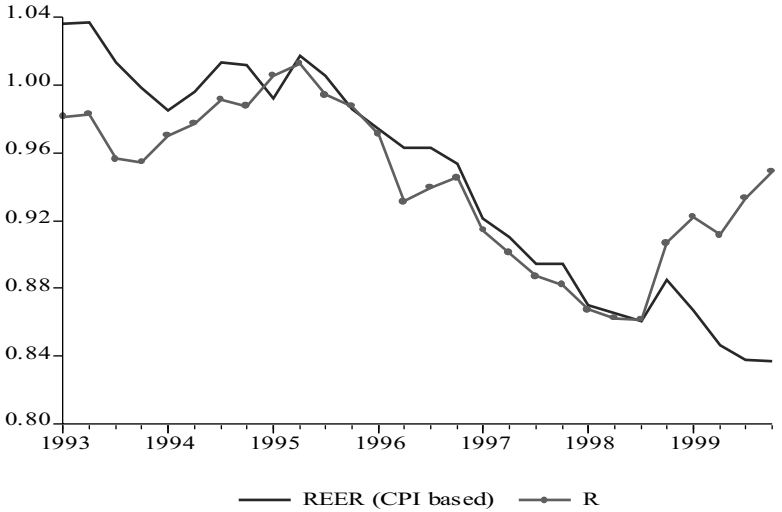


Chart 2

ESTONIA REAL EFFECTIVE EXCHANGE RATE AND *R*

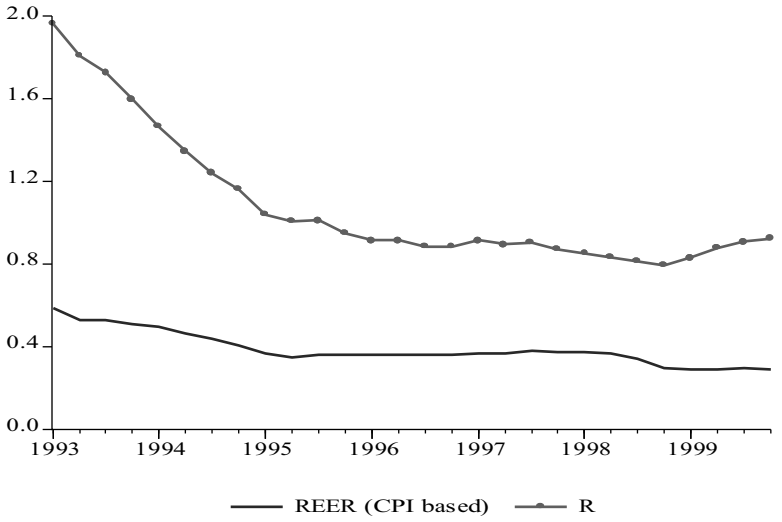


Chart 3

ARGENTINA OUTPUT GAP

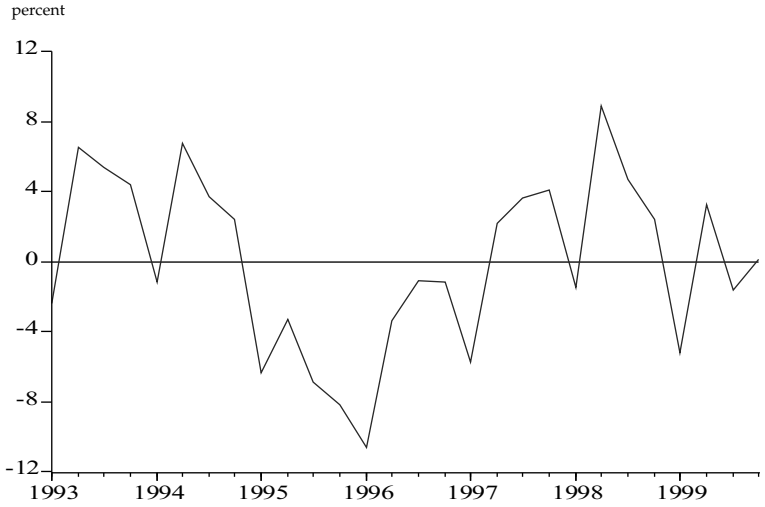
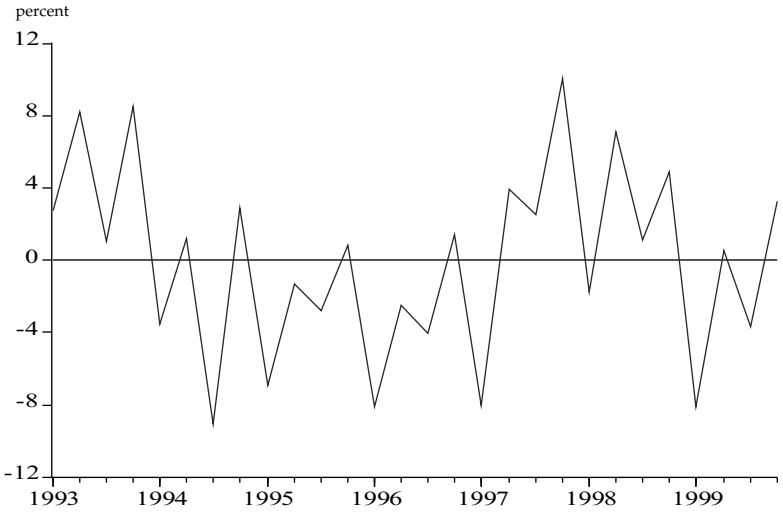


Chart 3

ESTONIA OUTPUT GAP



Appendix D: Data and Data Sources.

Most of the data is obtained from International Financial Statistics (IFS) published by IMF, World Development Indicators 2001 published by the World Bank, and the Quarterly National Accounts (QNA) and Monthly Economic Indicators (MEI) published by OECD. Additional source of information for Argentina is provided by the Ministry of the Economy, Secretariat of Economic Policy (http://www.mecon.gov.ar/prgmacri.htm) and Secretariat of Finance (http://www.mecon.gov.ar/finance/). For Estonia additional data sources used are the Bank of Estonia (http://www.ee/epbe/) and the Statistical Office of Estonia (www.stat.ee). The base period for the constant price series is 1995 and all indices are for 1995 = 100.

XGI: Domestic Goods Export Volume

- IFS line 72, volume of exports for Argentina. For Estonia data is obtained from the Statistical Office of Estonia. Turned from an index into constant price series using 1990 average for merchandise exports in US dollars (IFS line 78aa) converted into domestic currency using 1990 average for *r*. Sample period is 1993:Q1 to 1999:Q4 both for Argentina and Estonia.

WPXG: World Export Prices in US Dollars

- IFS line 74, unit value of world exports in US dollars (1993:Q1 to 1999:Q4).

r: Nominal Dollar Exchange Rate (Local Currency/US Dollars)

- IFS line *rf*, average exchange rate, national currency units per US dollar. For both countries the sample period is 1993:Q1 to 1999:Q4.

S: World Trade Volume

- IFS line 70, total world exports, US dollars current prices (1993:Q1 to 1999:Q4). Deflated using WPXG.

XS: Domestic Export Services Volume

- IFS line 78ad, services credits in US dollars. Converted into domestic currency using *r* and into a volume series by deflating by PC. For both countries the sample period is 1993:Q1 to 1999:Q4.

PCW: World Consumer Prices

- MEI, OECD consumer price index (1993:Q1 to 1999:Q4).

PC: Domestic Consumer Prices, Domestic Currency

- IFS line 64, consumer price index. For both countries the sample period is 1993:Q1 to 1999:Q4.

NEER: Nominal Effective Exchange Rate

- Nominal effective exchange rate index. For Argentina data is obtained from the Ministry of the Economy, Secretariat of Economic Policy. For Estonia data is provided by the Bank of Estonia. For both countries the sample period is 1993:Q1 to 1999:Q4.

YW: World (OECD) Real GDP

- QNA, total OECD GDP at constant market prices in US dollars (adjusted from annual to quarterly rate) (1993:Q1 to 1999:Q4).

MGI: Domestic Import Goods Volume

- IFS line 73, volume of imports, FOB (for Argentina). For Estonia data is obtained from the Statistical Office of Estonia. Turned from an index into constant price series using 1990 average for merchandise imports in US dollars (IFS line 78ab) converted into domestic currency using 1990 average for *r*. For both countries the sample period is 1993:Q1 to 1999:Q4.

PD: Domestic Prices, Domestic Currency

- IFS line 63, producer prices. For both countries the sample period is 1993:Q1 to 1999:Q4.

Y: Domestic Real GDP

- IFS line 69b. For Estonia GDP at 1995 prices in national currency. For Argentina GDP at 1993 prices in national currency. Adjusted from base year 1993 to 1995. For both countries the sample period is 1993:Q1 to 1999:Q4.

MS: Import Services Volume

- IFS line 78ae, services debits in US dollars. Converted into domestic currency using *r* and into a volume series by deflating by PCW converted into domestic currency terms using NEER. For both countries the sample period is 1993:Q1 to 1999:Q4.

WPO: Oil Prices, Dollars

- IFS, index constructed from Saudi Arabian light oil spot price (US dollars/barrel), end period (1993:Q1 to 1999:Q4).

WPFD: World Food Prices, Dollars

- IFS, food commodity price index, market prices, US dollars (1993:Q1 to 1999:Q4).

WPANF: World Agricultural Nonfood Prices, Dollars

- IFS, agricultural raw materials commodity price index, market prices, US dollars (1993:Q1 to 1999:Q4).

WPMM: World Metals and Minerals Prices, Dollars

- IFS, base metals commodity price index, market prices, US dollars (1993:Q1 to 1999:Q4).

PY: domestic GDP Deflator

- For Argentina the source used is the Ministry of the Economy, Secretariat of Economic Policy. Implicit price index calculated as a relation between GDP at current prices and at 1995 prices. For Estonia implicit price index calculated from ***Y*** and GDP at current market prices. For both countries the sample period is 1993:Q1 to 1999:Q4.

NTRAN: Net Transfers, Domestic Currency

- IFS, lines 78aj and 78ak, current transfers credits and current transfers debits, both in US dollars, converted into domestic currency using *r* and into real terms using *PY*. For both countries the sample period is 1993:Q1 to 1999:Q4.

CA: Current Account, Domestic Currency

- IFS line 78al, current account, current prices in US dollars. Converted into domestic currency using *r*. For both countries the sample period is 1993:Q1 to 1999:Q4.

IPDC: Interest, Profits and Dividends Credits

- IFS line 78ag, income credit in US dollars. Converted into domestic currency using *r*, and into real terms using *PY*. For both countries the sample period is 1993:Q1 to 1999:Q4.

IPDD: Interest, Profits and Dividends Debits

- IFS line 78ah, income debit in US dollars. Converted into domestic currency using *r*, and into real terms using *PY*. For both countries the sample period is 1993:Q1 to 1999:Q4.

PXG: Domestic Export Prices

- IFS line 74. Unit value of all exports (for Argentina). For Estonia data is obtained from Statistical Office of Estonia. For both countries the sample period is 1993:Q1 to 1999:Q4.

PMG: Domestic Import Prices

- IFS line 75. Unit value of all imports (for Argentina). For Estonia data is obtained from Statistical Office of Estonia. For both countries the sample period is 1993:Q1 to 1999:Q4.

REER: Real Effective Exchange Rate

- Real effective exchange rate index. For Argentina data is obtained from the Ministry of the Economy, Secretariat of Economic Policy. For Estonia data is provided by the Bank of Estonia. For both countries the sample period is 1993:Q1 to 1999:Q4.

DR: Dependency Ration

- Dependency ratio defined as population younger than 14 and older than 65 as a proportion of the population aged between 14 and 65. Data is obtained from World Bank World Development Indicators 2001.

YPC: GDP per Capita

- GDP per capita, PPP current international US dollars. Data is obtained from World Bank World Development Indicators 2001.

FB: Fiscal Balance

- Fiscal position as a proportion of GDP. Data is obtained from World Bank World Development Indicators 2001.

TY: Taxation

- Taxation as a proportion of GDP. Data is obtained from World Bank World Development Indicators 2001.

WR: US Real Interest Rate

- US real interest rate defined as treasury bill rate minus consumer price inflation. Data for US treasury bill rate and consumer price inflation is obtained from IFS. IFS line 60c treasury bill rate, and IFS line 64 consumer price inflation.

DP/23/2002

Кредитна активност на търговските банки и рационализиране на кредитния пазар в България

Калин Христов, Михаил Михайлов

Резюме. Фактът, че в периода след въвеждането на паричния съвет кредитът за частния сектор не успя да възстанови нивото си отпреди финансовата криза през 1996–1997 г., често се използва като аргумент в полза на твърдението, че кредитната активност на банковата система у нас е слаба. Относително ниските темпове, с които банковият кредит нараства през последните няколко години, поставят въпроса, дали слабата кредитна активност произтича от намален кредитен капацитет на банковата система, консервативна кредитна политика на търговските банки или слабо търсене на кредити от страна на предприятията. Изследването използва два подхода при разглеждането на причините за ниското равнище на кредита за частния сектор: неравновесен модел за търсенето и предлагането на кредитния пазар и анкета, проведена сред търговските банки. Резултатите показват, че макар свиването на кредита в сравнение с нивото преди 1997 г. да е обусловено от динамиката на кредитния капацитет на банковата система, основната причина, ограничаваща засилването на кредитната активност, е консервативната политика на търговските банки.

Abstract. The fact that after the introduction of the currency board, credit for the private sector did not reach the level achieved before the financial crisis of 1996-1997 is often used as an argument for the claim that credit activity in the Bulgarian banking system is weak. The relatively low rate at which bank credit has been increasing in recent years raises the question of whether weak credit activity is a consequence of the reduced creditworthiness of the banking system, the conservative credit policy of commercial banks, or the weakened demand for credit from enterprises. In the study, two approaches were used when considering the reasons for low credit for the private sector: an unbalanced model of credit market demand and supply, and a questionnaire conducted among commercial banks. The results show that despite the fact that the reduction of credit compared to its level before 1997 was due to the dynamics of the banking system's creditworthiness, the main reason limiting the strengthening of credit activity is the conservative policy of commercial banks.

Съдържание

I. Увод

С постепенното възстановяване на търговските банки след финансовата криза от 1996 – 1997 г. интересът към развитието на банковата система започна да се пренасочва от въпросите, свързани със стабилността на банките, към ролята им като финансови посредници и значението им за икономическия растеж. Въпреки стабилното състояние на банковата система от гледна точка на показателите за капиталова адекватност, ликвидност и качество на портфейлите често се изтъква, че в годините след въвеждането на паричния съвет банките у нас не изпълняват достатъчно ефективно функциите си по акумулиране на спестяванията и насочването им към различните сектори на икономиката. Кредитната активност в годините след въвеждането на паричния съвет се определя като далеч по-слаба в сравнение с предкризисните равнища, като това се аргументира със сравнително малкия дял на кредитите за частния сектор в общата сума на активите на търговските банки, както и с ниското равнище на кредита, измерен като процент от БВП. Обикновено като причина за слабата кредитна активност се изтъква силната чувствителност на банките към риска, която намира израз в провеждането на консервативна кредитна политика и инвестирането на преобладаващата част от привлечените средства в нискорискови чуждестранни активи. Същевременно търсенето на кредит от страна на фирмите се определя като значително. Голяма част от фирмите изпитват потребност от банково финансиране, но не са в състояние да отговорят на изискваните от банките условия за отпускане на кредит. Това поставя въпроса, дали може да се говори за неравновесие на кредитния пазар, породено от рациониране от страна на предлагането.

Значението на процесите, протичащи на кредитния пазар, произтича от ролята на банките като финансови посредници и връзката между степента на финансово развитие и икономическия растеж. Това значение е още по-силно изразено в икономиките в преход, където алтернативните форми за привличане на външно финансиране са недоразвити или практически липсват. Добре известно е, че финансовият сектор в България е малък в сравнение с обема на икономиката (финансовите активи са едва 42% от БВП) и е изцяло доминиран от банковия сектор, което определя и акцента на изследването върху търговските банки и

тяхната кредитна политика[1].

В настоящото изследване е направен опит да се идентифицират причините за ниското равнище на кредита за частния сектор, като са използвани алтернативни подходи при проверката на хипотезата за рационално на кредита. Изложението е структурирано, както следва. Във втора част са представени накратко логиката на изследването, както и някои хипотези относно причините за слабата кредитна активност на банковата система. Понататък факторите, влияещи върху равнището на кредита, са разгледани в детайли с помощта на два алтернативни подхода. В трета част тези проблеми са изследвани на базата на резултатите от анкета, която съдържа въпроси за измененията в търсенето на кредит, промяната на кредитните условия и кредитната политика на търговските банки. В четвърта част хипотезата за рационирането на кредита е проверена с помощта на неравновесен модел за търсенето и предлагането на кредитния пазар. Накрая са представени основните заключения от изследването, както и някои насоки при последваща работа върху търсенето и предлагането на кредити.

II. Кредитът за частния сектор

Въпреки стабилизирането на банковата система след въвеждането на паричния съвет равнището на кредита в българската икономика не можа да се възстанови до нивото преди финансовата криза от 1996 – 1997 г.[2] Свиването на дела на кредитите в активите на търговските банки и сравнително ниските темпове на нарастване на кредита след въвеждането на паричния съвет са основните аргументи в полза на твърдението за отслабване на кредитната активност в сравнение с предкризисните равнища[3].

[1] Банковата система в България държи 92% от общите финансови активи в страната.

[2] Използваме предкризисната 1995 г. за сравнение, без това да предполага, че нивото на кредита и темповете на неговото нарастване през този период са били устойчиви. Сравнението по-скоро цели да подчертае рязкото свиване на кредитния капацитет на банковата система след финансовата криза от 1996 – 1997 г.

[3] Общоприето е виждането, че банковото посредничество в страната е много ниско независимо от използваните показатели за оценка на степента на финансово развитие. Общите активи на банковата система са едва 39% от БВП. Търговските банки насочват около една трета от активите си към националната икономика, като същевременно 39% от активите им са депозити в чуждестранни банки. Въпреки това съществуват много малко изследвания, които да адресират

Задачата на това изследване е да идентифицира причините за ниското равнище на кредита за частния сектор, като в неговия обхват включваме кредита за частните фирми и държавните предприятия. В използваната от нас дефиниция не включваме кредита за домакинствата, тъй като търсенето на кредит от страна на домакинствата и фирмите се определя от фактори, различни от тези, детерминиращи търсенето на кредит от страна на фирмите[4].

Въпреки че данните за равнището на кредита сигнализират за отслабване на кредитната активност, те не са достатъчни, за да се посочат причините, които стоят зад това. Официалните данни, представяни в паричния отчет и балансите на търговските банки, дават информация за реалния обем на отпуснатите кредити, но не отразяват реалния обем на търсения от фирмите кредит и предлагането от страна на търговските банки. С други думи – обемът на реално отпуснатите кредити отразява действието както на факторите, които влияят върху търсенето, така и на тези, засягащи предлагането на кредит. Оттук произтича и проблемът за идентификацията на причините, които определят ниското ниво на кредита за частния сектор. Ниските темпове на нарастване на кредита могат да са резултат от слабо търсене на кредит от страна на фирмите, намален капацитет за отпускане на кредити *(ability to lend)* или консервативна кредитна политика *(willingness to lend)* на търговските банки. За да можем да определим дали има по-голямо търсене на кредит и рациониране от страна на банките, се нуждаем от косвена оценка на търсенето и предлагането на кредит.

Причините за наблюдаваното у нас ниско равнище на кредита за частния сектор обикновено се свързват с действието на фактори от страна на предлагането, поради което вниманието тук ще бъде съсредоточено върху ограниченията, поставени от банкова-

проблемите на банковото кредитиране в България. *Koford* и *Tschoegl* (1999) разглеждат проблема за кредитирането в страната въз основа на резултатите от 24 интервюта, проведени между икономисти от търговските банки и централната банка. *Feyzioglu* и *Gelos* (2000) изследват факторите, определящи ниското ниво на кредита за частния сектор, и дискутират възможните стъпки, които биха довели до по-високи темпове на нарастване на кредита за частния сектор.

[4] Разбира се, ние отчитаме факта, че част от потребителските кредити могат да се използват от малки фирми (еднолични търговци) за бизнесцели. Имайки предвид данните, че потребителските кредити са приблизително едва 20% от кредита за частния сектор, описаната по-горе възможност не би довела до големи изкривявания в крайните резултати.

та система. Предлагането на кредит за частния сектор се определя от политиката на управление на портфейлите на търговските банки, която отчита наличните ресурси, институционалните ограничения и лихвената структура в икономиката. Най-общо предлагането на кредит може да се определи като функция на кредитния капацитет на търговските банки и на тяхната склонност да отпускат кредити. Кредитният капацитет на търговските банки *(bank lending capacity)* представлява обемът на наличните ресурси в банковата система, които могат да бъдат отпускани като кредити за частния сектор. По-нататък използваме общоприетата в емпиричната литература дефиниция за кредитния капацитет на търговските банки (*Pazarbasioglu,* 1997; *Ghosh* и *Ghosh*, 1999). Според нея кредитният капацитет на търговските банки се определя като обща сума на пасивите на банковата система (плюс неразпределената печалба) минус минималните задължителни резерви, банкнотите и монетите в касите на търговските банки и собствения им капитал[5].

В тази част от изследването въпросът за ограничената кредитна активност е разгледан на базата на информация от паричната статистика, макар че тя може да послужи преди всичко при оценяване ролята на кредитния капацитет на банките като ограничителен фактор за ниското равнище на кредита. Графики 1 и 2 представят динамиката на кредита за частния сектор и кредитния капацитет на търговските банки за периода от началото на 1995 г. до края на третото тримесечие на 2001 г. И двете серии на графика 1 са представени в реално изражение при база цени от 1995 г. Тъй като високите темповете на инфлация през 1996 г. и началото на 1997 г. в известна степен могат да доведат до изкривяване на сериите в реално изражение, използваме и алтернативно представяне на кредита за частния сектор и кредитния капацитет на търговските банки като процент от БВП[6].

Двата показателя се характеризират с идентична динамика особено в периода след въвеждането на паричния съвет. Те ясно очертават формираната още в началото на 1995 г. тенденция към съкращаване на кредитния капацитет на банковата система[7]. Та-

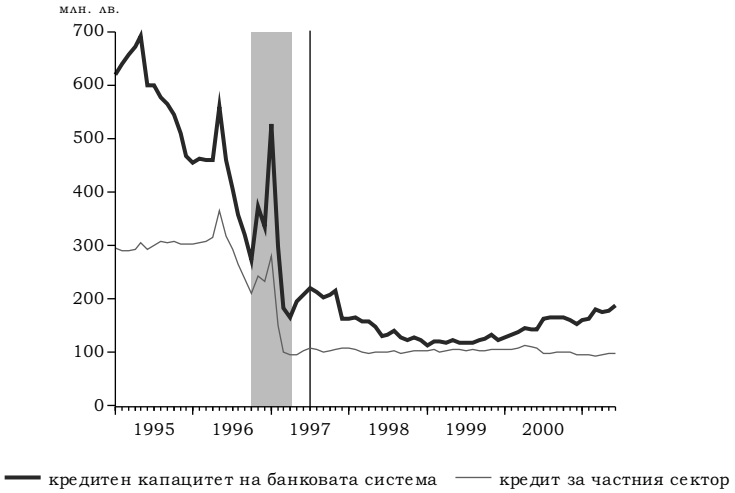
[5] Собственият капитал е изваден от общите пасиви на търговските банки, тъй като те не могат да държат активи под формата на кредити срещу капитала си.

[6] БВП е конвертиран от тримесечни в месечни данни чрез интерполация на действителните наблюдения за БВП.

[7] За извличане на трендовете използваме Hodrick – Prescott Filter.

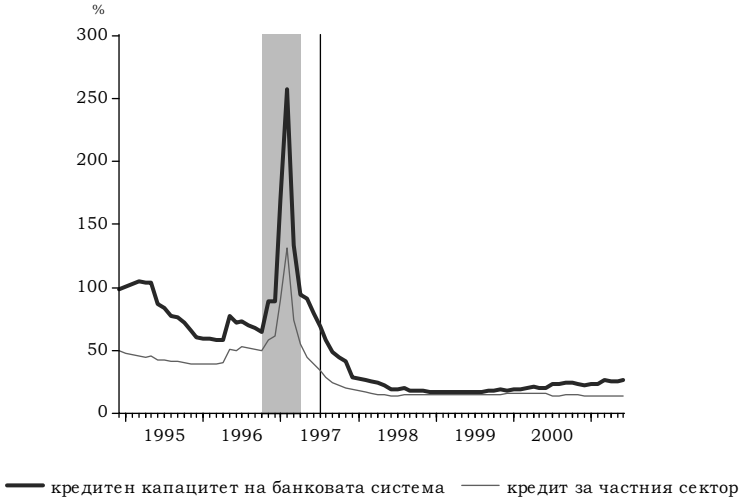
Графика 1

В РЕАЛНО ИЗРАЖЕНИЕ



Графика 2

ДЯЛ ОТ БВП



зи тенденция е задълбочена през 1996 г. със закриването на тринадесет търговски банки. Пълната гаранция, дадена от правителството на държателите на депозити в закритите банки, не спира тенденцията към намаляване на кредитния капацитет на банковата система поради общата загуба на доверие в търговските банки. Временното рязко нарастване на кредитния капацитет на банковата система в края на 1996 г. и началото на 1997 г. се определя изцяло от голямото обезценяване на националната валута през този период. Стабилизирането на валутния курс в края на първото тримесечие на 1997 г. и тегленето на депозити от банковата система с цел валутна субституция водят до съкращаване на кредитния капацитет на банковата система преди въвеждането на паричния съвет до ниво, по-ниско от съществуващото преди кризата. Кредитът за частния сектор в периода преди кризата е относително стабилен както в реално изражение, така и като процент от БВП. Рязкото съкращаване на кредитния капацитет след финансовата криза от края на 1996 г. и началото на 1997 г. води до близко по величина съкращаване на кредита за частния сектор. С други думи – ниското ниво на кредита за частния сектор в периода след въвеждането на паричен съвет в много голяма степен е обусловено от безпрецедентно по мащабите си съкращаване на кредитния капацитет на банковата система.

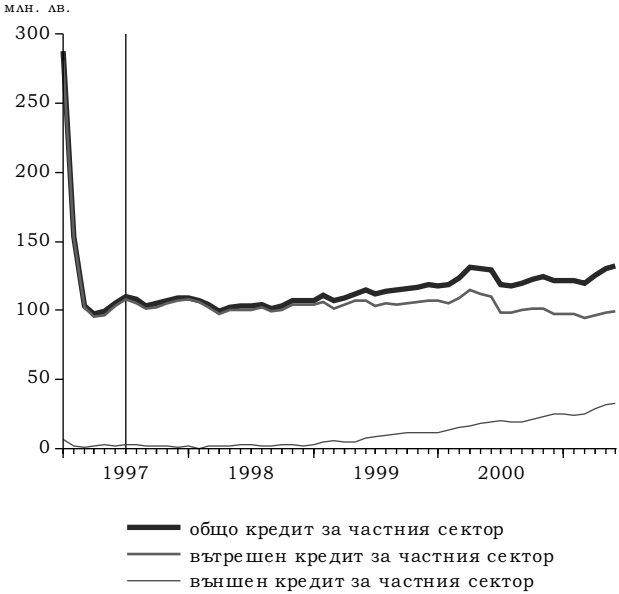
Тук трябва да отбележим, че използването единствено на данни от паричната статистика практически води до подценяване нивото на кредита за частния сектор в страната. Фиксирането на валутния курс, което създава имплицитно гаранция срещу валутен риск, и либерализацията на финансовата сметка след въвеждането на паричния съвет осигуряват достъп на много местни фирми до международните кредитни пазари.

Това позволи на част от българските фирми да получат кредити от чуждестранни банки. На графики 3 и 4 представяме мащаба на външния кредит за частния сектор (в реално изражение и като дял от БВП). В момента на въвеждането на паричния съвет външният кредит за частния сектор е по-малко от 1% от БВП, докато в средата на 2001 г. достига 5% от БВП. С включването на външния кредит за частния сектор общият обем на кредита за частния сектор достига около 19% от БВП.

Преструктурирането на банковата система след 1997 г. чрез приватизацията на търговските банки и привличането на стратегически инвеститори в много малка степен спомогнаха за прео-

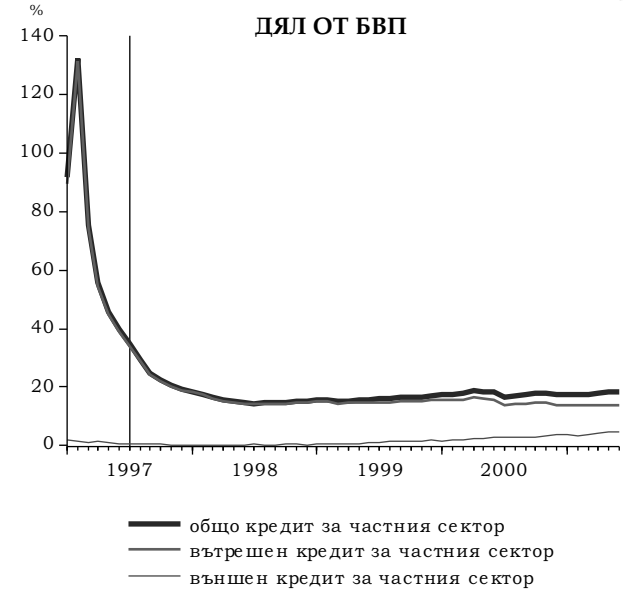
Графика 3

В РЕАЛНО ИЗРАЖЕНИЕ



Графика 4

ДЯЛ ОТ БВП



доляване на проблема с ограничения кредитен капацитет на банковата система. От средата на 1999 г. се формира тенденция към нарастване на кредитния капацитет на банковата система, но тя може да се обясни по-скоро с динамиката на валутния курс евро/долар, отколкото с реално нарастване на потенциала за кредитиране[8]. Практически предпочитанията на населението и фирмите към разплащане и спестяване в банкноти ограничава в много голяма степен нарастването на кредитния капацитет на банковата система. На графики 5 и 6 е представена динамиката на банкнотите в обращение и съотношението на депозитите в банковата система към БВП. В периода преди финансовата криза от края на 1996 г. и началото на 1997 г. се наблюдава устойчив тренд на намаление на банкнотите като дял от БВП. През същия период депозитите в банковата система, изразени като дял от БВП, показват тенденция към намаление, което е следствие от нарастващата несигурност в икономиката и загубата на доверие в банковата система и националната валута. С други думи – намаляването на банкнотите като дял от БВП е съпроводено с бягство от националната валута, а не с нарастване на депозитите в търговските банки и кредитния капацитет на банковата система.

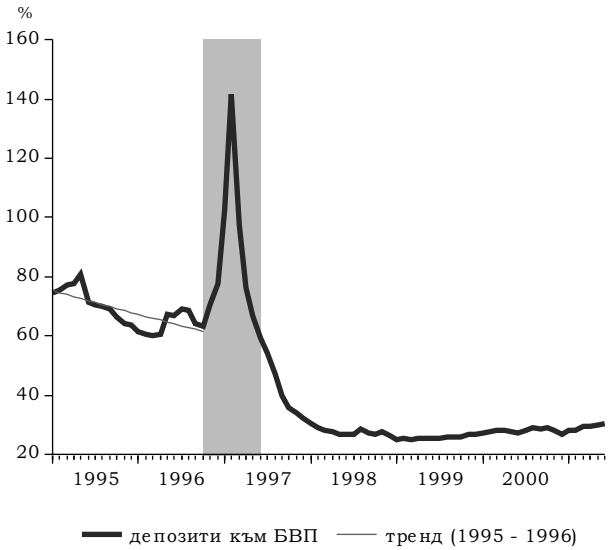
Динамиката на двете серии в периода след въвеждането на паричния съвет до голяма степен отразява ограниченията на банковата система за акумулиране на депозити и нарастване на кредитния ѝ капацитет. Практически в периода след 1997 г. депозитите в банковата система, изразени като дял от БВП, нарастват едва с 2% (вж. графика 5). За сравнение за същия период банкнотите в обращение като дял от БВП нарастват с близо 4% (вж. графика 6)[9]. С други думи – въпреки драстичното подобряване състоянието на банковата система от гледна точка на капиталовата адекватност и ликвидността доверието на населението в

[8] Между 55% и 58% от депозитите в банковата система са деноминирани в чуждестранна валута. От тях 75% са в щатски долари и 24% – в евро. Отчитайки валутната структура на депозитите в банковата система и 27% обезценяване на еврото (лева) спрямо долара от началото на 1999 г., можем с голяма степен на сигурност да твърдим, че нарастването на кредитния капацитет е по-скоро породено от динамиката на валутния курс евро (лев)/щатски долар.

[9] Стандартните модели за търсене на банкноти не могат да обяснят високите темпове на нарастване на банкнотите в обращение в периода след въвеждането на паричен съвет (вж. Неновски и Христов, 2000). Косвените оценки показват, че голяма част от банкнотите се използват за спестяване (което е сигнал за липса на доверие в банковата система) или за разплащане в неформалната икономика.

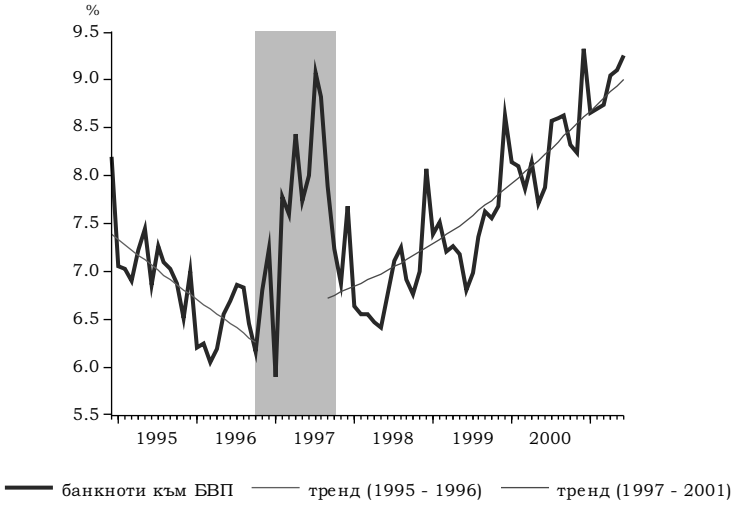
Графика 5

ДЕПОЗИТИ



Графика 6

БАНКНОТИ



търговските банки се възстановява много трудно (депозитите в банковата система са 30% от БВП, а банкнотите в обращение – близо 10%). Населението предпочита да се разплаща и спестява в банкноти, което ограничава кредитния капацитет на банковата система.

Резултатите от анализа показват, че ниското ниво на кредита за частния сектор (измерен като дял от БВП) до голяма степен се определя от ограниченията на предлагането, породени от непълното възстановяване на кредитния капацитет на банковия сектор. Кредитният капацитет на банковата система се съкращава около четири пъти вследствие безпрецедентната финансова криза от края на 1996 г. и началото на 1997 г. (измерен като дял от БВП и в реално изражение). Кредитът за частния сектор намалява със същия размер по време на финансовата криза. Вътрешният потенциал в икономиката за нарастване на кредитния капацитет на банковата система е много малък, като предпочитанията на населението към спестяване и разплащане в банкноти (национални и чуждестранни) са допълнително ограничение[10].

Изложените по-горе аргументи подкрепят виждането, че ниското ниво на кредита за частния сектор до много голяма степен е обусловено от ограничения кредитен капацитет на банковата система. Предлагането на кредит обаче се определя не само от кредитния капацитет, но и от готовността банките да предоста-

[10] Голям потенциал за нарастване на кредитния капацитет на банковата система се крие в големия обем чуждестранни банкноти, които се държат от домакинствата и фирмите с цел спестяване и разплащане. Оценките на Федералния резерв (*Judson and Porter*, 2000) показват, че в българската икономика има около 1 млрд. щ. д. във формата на банкноти. Предварителните оценки на БНБ са за наличието на 500 млн. евро в домакинствата и фирмите. Привличането на тези ресурси в банковата система би довело до близо 45 процентно нарастване на кредитния капацитет на банковата система, като той ще възлезе на 40% от БВП. Друг вътрешен източник за нарастване на кредитния капацитет на банковата система е фискалният резерв на правителството, който се намира в баланса на БНБ. Преместването на тези средства в търговските банки ще доведе до нарастване на кредитния капацитет на банковата система с 30%. Практически относително високите темпове на приток на преки чуждестранни инвестиции след 1997 г. (средно 6% от БВП след 1997 г.) вследствие мащабната приватизационна програма автоматично се стерилизират чрез инвестирането им в чуждестранни ценни книжа. Тъй като това изследване няма за цел изграждане на стратегия за оптимално управление на фискалния резерв, ние не разглеждаме задълбочено ефекта върху банковата система от евентуално пренасочване на средствата на правителството към търговските банки. Ограничаваме се само със споменаването на тази възможност, без да навлизаме в дискусия за положителните и отрицателните ефекти, които биха били породени от тази стъпка.

вят кредити на фирмите. Най-общо склонността (готовността) на банковата система да отпуска кредити се определя от лихвената структура в икономиката, кредитния риск и възможността за бърза реализация на обезпеченията при относително ниски трансакционни разходи.

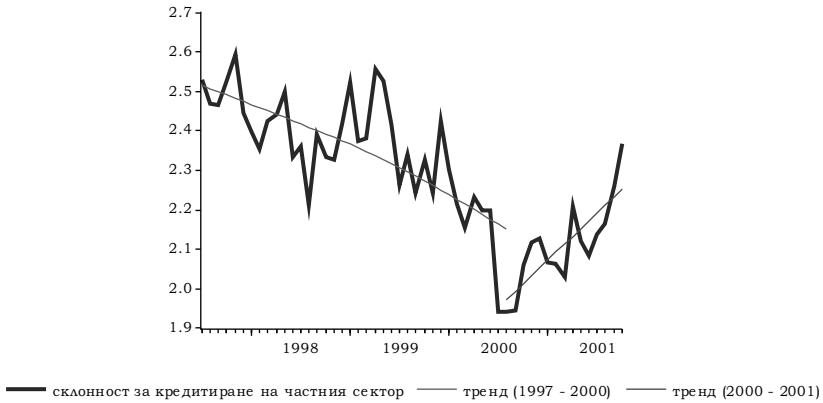
Резултатите от анализа на динамиката на активите и капиталовата адекватност на търговските банки показват, че те водят относително консервативна кредитна политика, като не са склонни да отпускат кредити и да поемат рискове. С други думи – проблемът се крие не само в потенциала за кредитиране, но и в склонността на търговските банки да отпускат кредити и да поемат риск. Търговските банки в страната разполагат с ограничен брой възможности за инвестиране на привлечените от тях средства. Кредитите за домакинствата, инвестирането в държавни ценни книжа и чуждестранни активи изчерпват ограничения брой алтернативи на възможността ресурсите да се използват за отпускане на кредити на частния сектор. Потенциалът за инвестиране в държавни ценни книжа и кредити за домакинствата е ограничен много поради ниските бюджетни дефицити след въвеждането на паричния съвет (в голямата си част финансирани в приходите от приватизация и кредити от международни финансови институции) и строгите изисквания при отпускането на потребителски кредити. Следователно инвестирането в чуждестранни активи е единствената неограничена по обем възможност за търговските банки (липсата на ограничения за откритите позиции в резервна валута и формираният огромен европазар след януари 1999 г.). Реципрочната стойност на инвестициите в чуждестранни активи към общите активи на банковата система може да се разглежда като показател, отразяващ склонността на банковата система да отпуска кредити на частния сектор. Намаляването на този показател изразява по-слабата склонност на търговските банки да отпускат кредити за частния сектор[11]. На графи-

[11] Разбира се, нарастването на външните активи (намаляване на дефинираната от нас склонност към кредитиране на частния сектор) може да бъде за сметка на намаляване на кредита за домакинствата или правителството (намаляване на ДЦК в портфейла на търговските банки). През разглеждания от нас период (след юни 1997 г.) кредитът за домакинствата непрекъснато нараства, а този за правителството намалява в първите две години след въвеждането на паричния съвет, след което се запазва относително постоянен. В началото на 2001 г. изискванията от страна на търговските банки за отпускане на потребителски кредити бяха зна-

ка 7 представяме динамиката на склонността на търговските банки да отпускат кредити на частния сектор. От въвеждането на паричния съвет до август 2000 г. се наблюдава тенденция към нарастване на външните активи на търговските банки като дял от общите активи и съответно намаляване на дефинираната от нас склонност за кредитиране на частния сектор. От септември 2000 г. делът на чуждестранните активи в балансите на търговските банки намалява, като освободените ресурси в голяма степен се използват за отпускане на кредити на домакинствата и в по-малка степен на частния сектор. Това говори за промяна в политиката на търговските банки, които реагират на засиленото търсене на кредит с трансформация на външни във вътрешни активи и облекчаване на кредитните условия.

Графика 7

СКЛОНННОСТ ЗА КРЕДИТИРАНЕ НА ЧАСТНИЯ СЕКТОР



чително облекчени, което доведе до нарастването им с 30%. Тази динамика на двете серии ни дава възможност с относително висока степен на достоверност да използваме реципрочната стойност на отношението на външните активи към общите активи на банковата система като апроксиматор на склонността на търговските банки да отпускат кредити на частния сектор.

Тази тенденция се потвърждава и от резултатите, получени от отговорите на търговските банки при проведената от нас анкета за кредитните условия и кредитната политика на банковата система. В следващата част представяме структурата на въпросника и резултатите за третото тримесечие на 2001 г.

III. Кредитните условия в икономиката

Въпросник за кредитните условия в икономиката и кредитната политика на търговските банки

В предходната глава бяха изложени основните тенденции в динамиката на кредита за частния сектор и бяха направени някои предположения относно факторите за ниското му равнище. Детайлното разглеждане на причините за слабата кредитна активност и проверката на хипотезата за рационирane на кредита обаче налагат използването на косвени оценки за търсенето и предлагането. Тъй като за тяхното получаване е необходима информация, която не се наблюдава директно в паричната статистика и отчетите, предоставяни на надзорните органи, през октомври сред търговските банки бе проведена анкета, съдържаща въпроси относно измененията в търсенето на кредити и кредитната политика. Въпросите покриват единствено периода юли – септември 2001 г., което се обуславя от невъзможността търговските банки да възстановят коректно реалното търсене на кредит и факторите, определящи кредитната им политика за три или четири години назад. При подготовката на изследването бе предвидено анкетата да обхваща всички банки и клонове на чуждестранни кредитни институции в страната. Въпреки че изчерпателно изследване не бе осъществено, преобладаващата част от банковия сектор е обхваната. Отговори изпратиха 25 банки, активите на които формират 79.9% от активите на цялата банкова система, а вземанията по кредити към предприятия – 71.2% от тези на всички банки. Средният размер на активите на взелите участие в анкетата банки е 365.6 млн. лв.

Изпратеният въпросник включваше запитвания относно кредитната дейност, както и обща информация за собствеността, организацията и мениджмънта на банката. Въпросите, свързани с кредитната дейност, бяха разпределени в две части, съдържащи идентични въпроси – първата част обхваща краткосрочните, а втората – дългосрочните кредити (в приложение А представяме

пълния текст на въпросника). Това разделение бе направено, с цел да се провери дали формирането на кредитната политика по краткосрочните и дългосрочните кредити се определя от различни фактори. В рамките на това разграничение отделно бяха разгледани търсенето и предлагането на кредити за големите и малките фирми.[12]

Както бе посочено, за база на изследването е използвана информация за периода юли – септември 2001 г. Краткият период, за който се отнасят набраните данни, ограничава валидността на направените тук заключения. Поради това изводите, формулирани въз основа на получените резултати, могат да послужат поскоро като насоки при бъдещи изследвания на кредитната дейност, отколкото като заключения относно факторите, определящи търсенето и предлагането на кредитния пазар.

Съдържанието на въпросника е въз основа на допускането, че равнището на кредита се определя от комбинираното въздействие на търсенето и предлагането на кредитния пазар. Поради това в анкетата бяха включени въпроси както за измененията в кредитната политика на търговските банки, така и за търсенето на кредит от страна на фирмите. Търсенето е изследвано от гледна точка на промяната в подадените молби за кредит от страна на фирмите и причините, обуславящи тази промяна. Измененията в предлагането на кредитния пазар са изследвани въз основа на въпроси за дела на отказаните кредити, причините за отказ, промените на стандартите при одобряване молбите за отпускане на кредит, измененията на отделните условия по сключените договори, както и причините, стоящи зад промените в кредитните условия и стандарти.

Информацията за измененията в търсенето на кредит бе получена чрез въпрос, предвиждащ пет варианта за отговор (*нараства значително; нараства умерено; остава постоянно; намалява умерено; намалява значително*). Причините, породили нарастването, съответно намаляването в търсенето на кредит, са изследвани в отделен въпрос, в който са посочени няколко възможни фактора (*нужда от оборотни средства; нужда от фондове за финансиране на вземанията от длъжници; потребност от средства за инвестиции в машини и оборудване; изменение на генерираните вътрешнофирмени фондове; пренасочване между бан-*

[12] За целите на изследването като големи фирми се приемат тези, които имат годишен оборот над 75 хил. лв.

ково и небанково финансиране), както и възможност за отговор „Други причини“. Значението на всяка една от изброените причини е оценено въз основа на разпределянето им в три възможни категории (*основен определящ фактор; определящ в известна степен; не е определящ фактор*).

В анкетата бе включен въпрос за броя и стойностния обем на поисканите, одобрените и отказаните през разглеждания период кредити. Това бе направено, за да се определи съотношението между търсенето и предлагането на кредитния пазар. Освен това бе предвидено с информацията, набрана чрез този въпрос, да се установи отношението на отказаните кредити към общо поисканите, което отразява политиката на банките при одобряване на молбите за кредит. Представянето на дела на отказаните кредити като функция от причините за отхвърляне на молбите за кредит дава възможност да се оцени значението на отделните мотиви за отказ.

Отхвърлянето на молбите за отпускане на кредит може да бъде обусловено от редица причини, свързани най-общо с характеристиките на длъжника или предложения от него проект. Тук е изследвана ролята на три възможни причини: ненадежден проект, предложен от кредитополучателя; липса на приемливо обезпечение, недостатъчно прозрачни счетоводни и финансови отчети, като наред с това бе дадена възможност и за посочване на други мотиви. Ролята на всеки един от мотивите за отхвърляне на молбите за кредит се оценява по скалата *основен определящ фактор; определящ в известна степен фактор; не е определящ фактор*.

Тъй като кредитната политика на търговските банки намира обобщено отражение в стандартите при одобряване на молбите за кредит и условията по отпуснатите кредити, промяната на кредитната политика е апроксимирана именно с помощта на въпроси за измененията в кредитните условия и стандарти. Информацията за промяната на стандартите при одобряване на кредит бе предвидено да бъде набрана с въпрос, съдържащ пет варианта за отговор (*значително се затегнаха; затегнаха се в известна степен; останаха постоянни; облекчиха се в известна степен; значително се облекчиха*). Наред с това обект на наблюдение бяха и промените в отделните условия по сключените договори за кредит – ценовите условия (лихви, такси и комисиони; премия, изисквана за по-рискови заеми), и условията, които не са свързани с

цената (максимален размер на кредита; изисквания за обезпечение, други условия).

За изследване на факторите, формиращи предлагането на кредит, в анкетата бе включен въпрос за мотивите, обусловили промените в кредитната политика през разглеждания период. Влиянието на всеки от изброените като възможни фактори трябваше да бъде оценено от анкетираните като *определящо; определящо в известна степен или като незначимо* за затягането/облекчаването на кредитните условия и стандарти. За целите на анализа е удобно тези фактори да бъдат разграничени условно на влияещи върху **кредитния капацитет** или **склонността** на банките да отпускат кредити. Както бе споменато в предходната част на изследването, кредитният капацитет (възможността да се отпускат кредити) зависи от обема на ресурсите, които могат да бъдат инвестирани, както и от надзорните ограничения, засягащи под една или друга форма решенията за инвестиране на набраните средства. Към тази група фактори може да се причислят настоящото и очакваното състояние на капиталовата адекватност, състоянието на други показатели на банката, нарастването на ликвидността в банковата система и промените в надзорните ограничения. Склонността на банките да се ангажират в кредитни отношения с предприятията обикновено се свързва с очакванията за риска и доходността на алтернативните възможности за инвестиции. Като фактори, влияещи върху склонността да се отпускат кредити, могат да се разглеждат тенденциите в икономическата активност (състоянието на макроикономическата среда и равнището на несигурност в икономиката; състоянието на бизнесклимата в определени отрасли; фалитите на компании и равнището на необслужваните кредити), склонността към поемане на риск, както и силата на конкурентния натиск от страна на другите банки и небанкови финансови институции.

Обобщени резултати от отговорите на търговските банки

В приложение Б са представени таблици с обобщените резултати от отговорите на търговските банки за кредитната им политика и кредитните условия в икономиката през третото тримесечие на 2001 г. Резултатите от анкетата показват ясно изразено засилване на търсенето на кредит през разглеждания период (таблица Б1). Преобладаващата част от анкетираните банки са ре-

гистрирали умерено нарастване на търсенето, като същевременно само една от тях е отчела намаление. Прави впечатление, че засилването на търсенето се проявява в еднаква степен както за краткосрочните, така и за дългосрочните кредити, като това се наблюдава при всички фирми, независимо от техния размер. Около 60% от банките са отчели нарастване на търсенето от страна на големите фирми и около половината регистрират посилно търсене от малките фирми.

Таблица Б2 дава обобщена информация за факторите, стоящи зад промените в търсенето на кредитния пазар. Основните причини за засиленото търсене на краткосрочни кредити са нуждата от оборотни средства (посочена от 76% от анкетираните банки); нуждата от фондове за финансиране на вземанията от длъжници (52%); финансирането на инвестициите в машини и оборудване (48%); пренасочването на фирмите от небанково към банково финансиране (36%). Отбелязаното нарастване в търсенето на дългосрочни кредити се дължи главно на необходимостта от средства за инвестиции – 78% от анкетираните банки посочват това като причина за засиленото търсене на дългосрочни кредити, а над половината го определят и като основен фактор за това. Според резултатите от анкетата търсенето на дългосрочни кредити е нараснало и заради по-голямата необходимост от оборотни средства (56%) и фондове за финансиране на вземанията от длъжници.

Липсата на достатъчно пълни отговори на въпроса за поисканите, разрешените и отказаните кредити възпрепятства както установяването на съотношението между търсенето и предлагането на кредитния пазар, така и изследването на зависимостта между дела на отказаните кредити и значимостта на различните мотиви за отказ. Поради това изводите за значимостта на отделните причини за отказ са направени единствено на базата на обобщените резултати, представени в таблица Б3.

Резултатите показват, че макар всички от разглежданите мотиви за отказ да са имали значение при отхвърлянето на молбите за кредит, причините, свързани с асиметрия на информацията (ненадежден проект и недостатъчно прозрачни финансови отчети), са били по-често срещан мотив за отказ, отколкото липсата на приемливо обезпечение. Интересно е да се отбележи, че посочената по-горе констатация за значението на отделните мотиви за отказ е в сила, независимо от срока на исканията кредит и голе-

мината на потенциалния кредитополучател.

Кредитните условия и стандарти отразяват способността и склонността на банките да се ангажират в предоставянето на кредити. Въпреки че през разглеждания период преобладаващата част от анкетираните банки са запазили непроменени, а три от тях са затегнали в известна степен стандартите за одобряване на кредит, като цяло настъпилите изменения са в посока към известно облекчаване на кредитните стандарти (таблица Б4). Промените в условията по договорените кредити са по-слабо изразени. Условията по отношение максималния размер на кредита и изискванията за обезпечение остават като цяло непроменени – преобладаващата част от анкетираните банки не са променили кредитните условия през разглеждания период, а броят на отчелите промяна в противоположните посоки в повечето случаи се компенсира (таблица Б5). Прави впечатление, че облекчаването на условията се изразява главно в цената, дефинирана като лихва по кредита плюс начислените такси и комисиони. Регистрираното облекчаване на ценовите условия вероятно не произтича от намаляването на риска, тъй като се наблюдава известно затягане по отношение на премията, която банките налагат за по-рискови заеми. Това показва високата степен на риск, с която се характеризират кредитните отношения с предприятията, както и политиката на банките да отразяват този риск в цената. Вероятното обяснение за облекчаването на ценовите условия по кредитите през третото тримесечие на 2001 г. се крие във формираната от началото на годината глобална тенденция към понижение на лихвените проценти, което води до намаляване на доходността на търговските банки от държането на външни активи. Това ги принуждава да заменят външни активи с по-високорискови вътрешни активи, което влияе на обема и цената на предлаганите от тях кредити. Известно облекчаване се регистрира в другите условия, които търговските банки определят по договорените кредити.

Обобщените резултати за влиянието на факторите, обусловили промяната в кредитните условия и стандарти, са представени в таблица Б6. Един от изводите, които могат да се направят с голяма степен на сигурност, е свързан с ролята на конкурентния натиск при формирането на кредитната политика. Според резултатите от анкетата конкуренцията сред търговските банки е била основното съображение за настъпилите изменения в кредитната политика – близо 60% от участвалите в анкетата банки са посо-

чили, че силната конкуренция от страна на другите банки е предизвикала облекчаване на кредитните условия и стандарти.

Измененията в текущата и очакваната капиталова адекватност, ликвидността в банковата система и състоянието на други показатели за банката са сред факторите, допринесли за облекчаването на кредитните условия и стандарти, като влиянието им се е проявило в еднаква степен при краткосрочните и при дългосрочните кредити. Същевременно резултатите от анкетата разкриват някои от причините, които ограничават кредитната активност на банките – високата степен на риск и нежеланието на банките да го поемат. За това говори фактът, че по-чувствително облекчаване на кредитната политика не е настъпило най-вече поради констатираното от някои банки влошаване на условията в определени отрасли и умерената склонност да се поема риск.

Въпреки ограничения период, който обхваща, анкетата дава известна представа за факторите, определящи търсенето и предлагането на кредити. Обобщените резултати показват, че се наблюдава засилено търсене на кредит от страна на фирмите, но силната чувствителност на банките към риска в кредитните им отношения ограничава облекчаването на кредитните условия и стандарти. Съществено влияние на конкурентния натиск върху формирането на кредитната политика обаче дава основание да се смята, че конкуренцията сред банките ще стои в основата на понататъшното облекчаване на кредитните условия и стандарти. Редовното провеждане на анкетата би дало възможност за проверка на получените вече резултати и изграждане на широк набор от индикатори, информиращи за търсенето и предлагането на кредит в икономиката, и факторите, определящи динамиката на кредитната активност.

IV. Неравновесен модел на търсене и предлагане на кредит

В третата част на това изследване бе описана конструкцията на въпросника и бяха обобщени резултатите от отговорите на търговските банки за третото тримесечие на 2001 г. Анкетата обаче не дава информация за търсенето на кредит и кредитната политика на търговските банки в периода от въвеждането на паричния съвет до третото тримесечие на 2001 г., поради което получените резултати не позволяват проверка на хипотезата за не-

достатъчно предлагане на кредит *(credit crunch)*.

Традиционно този проблем се решава с прилагането на неравновесни модели *(disequilibrium econometric models)*, в които априори се допуска, че е налице неравенство между търсенето и предлагането на кредит. Тези модели се прилагат към анализа на неравновесията на кредитния пазар още от края на седемдесетте години, като добиха отново популярност през деветдесетте при моделирането на кредитния пазар в европейските, латиноамериканските и азиатските страни след дълбоките банкови кризи[13].

Този подход изисква отделно моделиране на търсенето и предлагането на кредит и оценка на вероятността, с която реалният обем кредит принадлежи на кривата на търсене или предлагане. Случаите, в които има по-голяма вероятност реално реализираните обеми кредит да принадлежат на кривата на търсене, са доказателство за недостатъчното предлагане на кредит. Тогава, когато резултатите показват, че съществува по-голяма вероятност реално наблюдаваните обеми кредит да се намират на оценената крива на предлагане, е налице недостатъчно търсене на кредит от страна на фирмите.

Спецификация на уравненията за търсене и предлагане на кредит

Както вече отбелязахме, предлагането на кредит от страна на търговските банки се определя от политиката на управление на портфейлите им. Спецификацията на уравнението за предлагане на кредит отразява както потенциала за кредитиране на банковата система, така и склонността за отпускане на кредити. Потенциалът на банковата система за кредитиране апроксимираме с вече дефинираната от нас променлива кредитен капацитет на търговските банки. Както предлагането на кредит, така и кредитният капацитет на банковата система са представени в реално изражение[14]. Кредитният капацитет на банковата система

[13] *Laffont* и *Garcia* (1977) и Sealey (1979) оценяват неравновесни модели на кредитния пазар, основани на методологията, предложена от *Maddala* и *Nelson* (1974). Тази методология се налага като конвенционален подход за анализ на неравновесията на кредитния пазар. *Pazarbasioglu* (1997) оценява неравновесен модел на финландския кредитен пазар, *Ghosh* и *Ghosh* (1999) изследват наличието на credit crunch в Индонезия, Корея и Тайланд в периода на азиатската криза (1997 – 1998). *Barajas* и *Steiner* (2001) изследват стагнирането на кредитния пазар в пет латиноамерикански страни (Аржентина, Боливия, Колумбия, Перу и Мексико) чрез неравновесен модел на търсенето и предлагането на кредит.

[14] И двете променливи са дефлирани с индекса на потребителските цени.

трябва да има положителен знак в оцененото уравнение за предлагането на кредит. Доходността, която банковата система получава от отпуснатите кредити, апроксимираме с лихвения процент по кредитите (lending rate), който изграждаме като претеглена средна между лихвените проценти по краткосрочните и дългосрочните кредити в левове, евро и щатски долари[15]. Като допълнителна променлива, контролираща рисковата премия, изисквана от търговските банки, използваме разликата между лихвения процент по кредитите и лихвите на междубанковия пазар. Тази променлива отразява рисковата премия, асоциирана с фазата на бизнесцикъла. При високи темпове на растеж рисковата премия, изисквана от търговските банки, е по-ниска, и обратно[16]. Във функцията на предлагане на кредит включваме две допълнителни променливи, които представят очакванията за общата макроикономическа обстановка в страната. За очакваната инфлация предполагаме, че ще влезе в уравнението с отрицателен знак, тъй като високите темпове на инфлация се асоциират с по-голяма несигурност в икономиката, което прави търговските банки по-предпазливи по отношение на кредитната им политика. Втората променлива е очакваната индустриална продукция, която има положителна връзка с предлагането на кредит. Очакваната инфлация апроксимираме с балансите за ценовите очаквания в промишлеността, получени от бизнесанкетите на НСИ. За измерител на очакваната индустриална продукция използваме балансите за очакванията за бъдещата продукция в промишлеността, получени от бизнесанкетите на НСИ. Във функцията на предлагане на кредит включваме и дъми променлива, отразяваща влиянието на намалението на задължителните резерви на търговските банки в средата на 2000 г.

Функцията на търсене на кредит моделираме като стандартна крива на търсене с променлива, отразяваща алтернативната цена на кредита, променлива, контролираща обема на търсене (scale variable), и променливи, контролиращи влиянието на макроико-

[15] Теглата са определени въз основа на дела на съответните валути в структурата на общия кредит.

[16] Така дефинираната рискова премия отразява разходите, свързани с moral hazard и adverse selection, които произтичат от асиметрията на информация между търговските банки и фирмите. При високи темпове на икономически растеж тези разходи намаляват, с което – и лихвената премия, и обратно. За теоретично извеждане на тази зависимост вж. *Bernanke* и *Gertler*, 1989.

номическите фактори. Цената на кредита се апроксимира с дефинирания от нас лихвен процент по кредитите, като очакванията ни са тази променлива да влезе с отрицателен знак. Като променлива, изразяваща влиянието на икономическата активност върху търсенето на кредит, използваме реално осъществените инвестиции[17]. Използвайки реално осъществените инвестиции, експлицитно допускаме рационално кредита[18]. Във функцията на търсене на кредит включваме две допълнителни променливи, които представят очакванията за общата макроикономическа обстановка в страната. Очакваната инфлация предполагаме да влезе в уравнението с положителен знак, тъй като високите темпове на инфлация се асоциират с намаляване в реално изражение на кредитите на фирмите, което увеличава склонността им към вземане на кредит[19]. Втората променлива е очакваната индустриална продукция, която има положителна връзка с търсенето на кредит.

Оценените функции на предлагане и търсене на кредит имат следната форма:

$$L^s = \alpha_0 + \alpha_1 BLCR + \alpha_2 i_{LR} + \alpha_3 (i_{LR} - i_{MMR}) + \alpha_4 \pi^e + \alpha_5 y^e + d_1$$

$$L^d = \beta_0 + \beta_1 I + \beta_2 i_{LR} + \beta_3 \pi^e + \beta_4 y^e,$$

където:

L^s е предлагането на кредит в реално изражение;

$BLCR$ – кредитният капацитет на банковата система в реално изражение;

i_{LR} – лихвеният процент по кредитите;

i_{MMR} – лихвеният процент на междубанковия пазар;

π^e – очакваната инфлация;

y^e – очакваната индустриална продукция;

[17] Месечни данни за инвестициите получаваме, интерполирайки тримесечните данни за инвестициите в БВП. Като алтернатива на тази променлива използваме БВП, като получените резултати за търсенето на кредит са близки до тези, получени от функцията, използваща инвестициите. Изхождайки от тези резултати, в крайното уравнение използваме инвестициите.

[18] *Laffont* и *Garcia* (1977) препоръчват използването на променлива, която отразява очакваните инвестиции, а не реално осъществените.

[19] Очакваните по-високи темпове на инфлация могат да доведат до намаляване на търсенето на кредит особено в случаите, когато търговските банки отпускат кредитите в чуждестранна валута, което е характерно за доларизирани икономики, където населението предпочита да спестява в чуждестранна валута.

d_1 – дъми променлива, отразяваща намалението на задължителните резерви на търговските банки в средата на 2000 г.;

L^d – търсенето на кредит в реално изражение;

I – инвестициите.

В таблица В1 на приложение В представяме резултатите на оценените уравнения за търсене и предлагане на кредит и статистиките на някои тестове, контролиращи неправилна спецификация на функциите[20].

В уравнението за предлагане на кредит кредитният капацитет на банковата система е статистически значим и е оценен с очаквания положителен знак. Лихвеният процент по кредитите също има очаквания положителен знак и е значим. Разликата между лихвените проценти по кредитите и тези на междубанковия пазар е статистически значима и влиза в уравнението с очаквания отрицателен знак. С други думи – нарастващият диференциал между двете лихви отразява по-големия макроикономически риск, което води до нарастване на рисковата премия и намаляване на кредита за частния сектор. Променливите за очакваната инфлация и очакваната промишлена продукция са статистически незначими. Това може да се дължи на факта, че използваните от нас серии от бизнесанкетите на НСИ не отразяват коректно инфлационните очаквания и очакванията за развитието на промишлената продукция в икономиката. Дъми променливата, контролираща ефекта от намалението в средата на 2000 г. на задължителните резерви на търговските банки, е статистически значима. Отрицателният знак на тази променлива отразява факта, че очакванията за нарастване на кредита за частния сектор след намаляването на минималните задължителни резерви не се оправдават. Търговските банки реагират на политиката на централната банка чрез инвестиране на освободения ресурс в чуждестранни активи.

В уравнението за търсене на кредит лихвеният процент по кредитите влиза с положителен знак. Този резултат е несъвмес-

[20] Тези тестове са за серийна корелация, функционална форма, нормалност и хетероскедастичност. Тестът за серийна корелация е Lagrange multiplier test, за функционална форма – Ramsey's RESET test; за нормалност – Jarque-Bera test и за хетероскедастичност – White's Heteroskedasticity Test. Тези тестове са разпределени като χ^2 и нулевата хипотеза се приема, когато статистиката е по-малка от критичната стойност.

тим с традиционната интерпретация за съществуването на обратна зависимост между цената на кредита и търсените обеми кредит. В голяма степен обаче положителният знак е консистентен с получените резултати от анкетата, където търговските банки отчитат нарастване на търсенето на кредит и същевременно подчертават като основна причина за отказ на кредит представянето на непрозрачни счетоводни баланси и ненадеждни проекти. С други думи – по-високите лихвени проценти по кредитите привличат кредитоискатели, готови да поемат по-голям риск, което би обяснило получения положителен знак за лихвените проценти в уравнението за търсене на кредит. Очакваната инфлация има определения в теорията положителен знак във функцията на търсене на кредит и е статистически значима. Както в уравнението за предлагане, така и в това за търсене на кредит, очакванията за промишлената продукция са незначими. Реално направените инвестиции в икономиката са с очаквания положителен знак и са статистически значими.

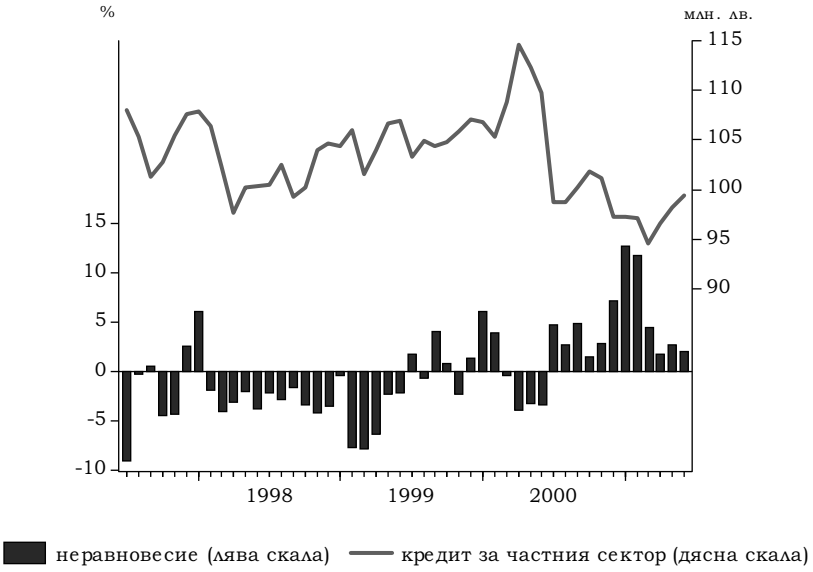
От оценените функции на търсене и предлагане на кредит генерираме серии за търсенето и предлагането на кредит в реално изражение. На графика 8 представяме кредита в реално изражение и процента, с който търсенето надвишава предлагането на кредит[21].

Получените резултати показват, че с някои изключения в периода след въвеждането на паричния съвет до началото на 2000 г. има по-голямо предлагане на кредит в икономиката, отколкото търсене от страна на фирмите. В началото на 2000 г. се наблюдава промяна в кредитната среда, като от ситуация на недостатъчно търсене на кредит се преминава в такава на недостатъчно предлагане. Изключение правят трите месеца след намалението на задължителните резерви на търговските банки, когато се наблюдава свръхпредлагане. Оценката за наличието на недостатъчно предлагане на кредит от банковата система от началото на 2000 г. е консистентна с отчитаното от тях значително нарастване на търсенето на кредит. В допълнение полученият резултат е в унисон и с реализираните по-високи темпове на икономически

[21] Свръхтърсенето на кредит изразяваме като $\left(\frac{L^d - L^s}{L^d}\right)$. Положителният знак изразява свръхтърсене на кредит, отрицателният – недостатъчно търсене на кредит в икономиката.

Графика 8

СВРЪХПРЕДЛАГАНЕ И СВРЪХТЪРСЕНЕ НА КРЕДИТ



растеж през 2000 г. и 2001 г. в сравнение с предходните години, което води до по-голямо търсене на кредит[22]. Това е отразено и в отговорите на анкетата, където търговските банки отчитат нараснало търсене на кредит за оборотни и инвестиционни цели.

V. Обобщение и насоки за последваща работа

В настоящото изследване разглеждаме въпроса за ниското ниво на кредита за частния сектор в българската икономика и правим опит да идентифицираме основните фактори, които пораждат този проблем. Съществуват множество подходи за изследване на факторите, определящи степента на финансово развитие на дадена икономика. Тъй като проблемът с кредита за частния сек-

[22] Тук не разглеждаме въпроса за причинно-следствената връзка между нивото на кредита в икономиката и темповете на икономически растеж. Разбира се, тази връзка може да бъде и обратна на изказаната от нас по-горе интерпретация. За обзор на различните интерпретации на връзката между степента на финансово развитие и икономическия растеж вж. *Levine* (1997).

тор в икономиката ни се разглежда предимно като обусловен от предлагането, ние се ограничаваме до анализ на факторите, влияещи върху кредитния капацитет на банковата система, и склонността им да отпускат кредити на частния сектор.

Получените резултати показват, че рязкото свиване на кредита за частния сектор в периода след финансовата криза от началото на 1997 г. се определя в много голяма степен от свиването на кредитния капацитет на банковата система. След въвеждането на паричния съвет кредитният капацитет на търговските банки нараства с много бавни темпове, като основни фактори са валутната структура на депозитите и движението на валутния курс евро/щатски долар. Същевременно в икономиката съществува голям потенциал за нарастването на кредитния капацитет на банковата система. Той се състои в големия обем национални и чуждестранни банкноти, които се намират у населението и се използват за спестяване и осъществяване на големи по размер плащания в налични пари. Целенасочената политика от страна на търговските банки би могла да привлече голяма част от този ресурс под формата на депозити и разплащателни сметки, което би довело до нарастване с около 45% на кредитния капацитет на банковата система. Той би нараснал с 30% и при преместване на фискалния резерв на правителството от баланса на централната банка в търговските банки. Това обаче няма да доведе до механично нарастване на кредита за частния сектор, тъй като правителството би дефинирало точно активите, в които тези ресурси могат да бъдат инвестирани.

Тъй като данните за нивото на кредита, съдържащи се в паричната статистика, отразяват реално отпуснатия кредит, проверката на хипотезата за неравновесие на кредитния пазар налага използването на косвени оценки за търсенето и предлагането. Прилагаме два подхода, които взаимно се допълват. Първо конструираме въпросник за кредитната политика на търговските банки, който отразява промените в кредитните условия в икономиката. Резултатите показват нарастване в търсенето на кредит, както и облекчаване в кредитните условия и цената на кредита под влияние на силната конкуренция сред търговските банки. Трябва обаче да се има предвид, че резултатите от анкетата носят сравнително ограничен обем информация, тъй като се отнасят само за третото тримесечие на 2001 г. Наред с това в изследването е построен неравновесен модел за търсене и предлагане

на кредит, с което е проверена хипотезата за недостатъчно предлагане на кредит в периода след въвеждането на паричния съвет. Резултатът от този модел показва, че от началото на 2000 г. се наблюдава недостатъчно предлагане на кредит в икономиката, като тази тенденция се запазва и през 2001 г. въпреки по-активната кредитна политика на търговските банки.

Това изследване поставя началото на анкета, целта на която ще бъде отразяване тенденциите на кредитния пазар. Това би позволило изграждането на времеви ред за кредитните условия в икономиката и идентификация на основните проблеми, възпрепятстващи нарастването на кредита за частния сектор. Редовното провеждане на анкетата ще бъде основа за изграждане на набор от индикатори за търсенето и предлагането на кредит в икономиката и за факторите, определящи динамиката на кредитната активност. Бъдеща насока в работата може да бъде прецизирането на въпросника, като се включат въпроси, които не присъстват в настоящата версия на анкетата.

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Приложения

Приложение А

В приложение А представяме въпросите, които бяха зададени на търговските банки по отношение на кредитната им политика през третото тримесечие на 2001 г.

1. Какви са броят и обемът на поисканите от вашата банка кредити за последните три месеца?

А. От средните и големите фирми (фирми с годишен оборот над 75 хил. лв.)

	Брой	Обем (млн. лв.)	В левове (млн. лв.)	В чуждестранна валута (млн. лв.)		
				евро	долар	други
Поискани кредити						
Разрешени кредити						
Отказани кредити						

Б. От малките фирми (фирми с годишен оборот под 75 хил. лв.)

	Брой	Обем (млн. лв.)	В левове (млн. лв.)	В чуждестранна валута (млн. лв.)		
				евро	долар	други
Поискани кредити						
Разрешени кредити						
Отказани кредити						

2. В случай на отказ на молба за отпускане на кредит кои от изброените по-долу фактори бяха определящи при вземане на решението за отказ? (Скала: 1 – не бяха определящи; 2 – бяха определящи до известна степен; 3 – бяха основните определящи фактори.)

А. За средните и големите фирми (фирми с годишен оборот над 75 хил. лв.)

Ненадежден проект, предложен от кредитополучателя	
Липса на приемливо обезпечение	
Недостатъчно прозрачни счетоводни и финансови отчети	
Други причини	

Б. За малките фирми (фирми с годишен оборот под 75 хил. лв.)

Ненадежден инвестиционен проект, предложен от кредитополучателя	
Липса на приемливо обезпечение	
Недостатъчно прозрачни счетоводни и финансови отчети	
Други причини	

3. Как се промениха за последните три месеца стандартите на вашата банка по отношение одобряването на молбите за получаване на кредит?

А. Условия за средните и големите фирми (фирми с годишен оборот над 75 хил. лв.)

Значително се затегнаха	
Затегнаха се в известна степен	
Останаха непроменени	
Облекчиха се в известна степен	
Облекчиха се значително	

Б. Условия за малките фирми (фирми с годишен оборот под 75 хил. лв.)

Значително се затегнаха	
Затегнаха се в известна степен	
Останаха непроменени	
Облекчиха се в известна степен	
Облекчиха се значително	

4. Как се промениха през последните три месеца условията по кредитите, които вашата банка е готова да отпусне на клиентите си? (Скала: 1 – значително се затегнаха; 2 – затегнаха се в известна степен; 3 – останаха непроменени; 4 – облекчиха се в известна степен; 5 – облекчиха се значително.)

А. Условия за средните и големите фирми (фирми с годишен оборот над 75 хил. лв.)

Максимален размер на кредита	
Цена на кредита (лихва плюс такси и комисиони)	
Премия, изисквана за по-рискови заеми	
Изисквания за обезпечение	
Други изисквания	

Б. Условия за малките фирми (фирми с годишен оборот под 75 хил. лв.)

Максимален размер на кредита	
Цена на кредита (лихва плюс такси и комисиони)	
Премия, изисквана за по-рискови заеми	
Изисквания за обезпечение	
Други изисквания	

5. Ако през последните три месеца вашата банка е затегнала или облекчила условията за отпускане на кредит, в каква степен изброените по-долу фактори бяха определящи за тази промяна? (Скала: 1 – не бяха определящи; 2 – бяха определящи в известна степен; 3 – бяха основните определящи фактори.)

А. Фактори, определящи затягането на кредитните условия и стандарти

Влошаване на текущата или очакваната бъдеща капиталова адекватност на вашата банка	
Влошаване на други показатели на вашата банка	
По-неблагоприятна макроикономическа среда и нарастване на несигурността в икономиката	
Влошаване на климата в определени отрасли	
По-слаба конкуренция от страна на другите банки	
По-слаба конкуренция от страна на небанковите финансови институции	
Намалена склонност към поемане на риск	
Намаляване на ликвидността в банковата система	
Нарастване на фалитите на компании и на необслужваните кредити	
Други	

Б. Фактори, определящи облекчаването на кредитните условия и стандарти

Подобряване на текущата или очакваната бъдеща капиталова адекватност на вашата банка	
Подобряване на други показатели на банката	
По-благоприятна макроикономическа среда и намаляване на несигурността в икономиката	
Подобряване на климата в определени отрасли	
По-силна конкуренция от страна на другите банки	
По-силна конкуренция от страна на небанковите финансови институции	
Повишена склонност към поемане на риск	
Нарастване на ликвидността в банковата система	
Намаляване на фалитите на компании и на необслужваните кредити	
Облекчени надзорни ограничения	
Други	

6. Как се промени през последните три месеца търсенето на кредит от страна на фирмите (отчитайки нормалните сезонни колебания)?

А. Търсене на кредит от страна на средните и големите фирми (фирми с годишен оборот над 75 хил. лв.)

Нараства значително	
Нараства умерено	
Остава постоянно	
Намалява умерено	
Намалява значително	

Б. Търсене на кредит от страна на малките фирми (фирми с годишен оборот под 75 хил. лв.)

Нараства значително	
Нараства умерено	
Остава постоянно	
Намалява умерено	
Намалява значително	

7. Ако търсенето на кредит през последните три месеца е нараснало или намаляло, в каква степен изброените по-долу фактори бяха определящи за тази промяна? (Скала: 1 – не бяха определящи; 2 – бяха определящи в известна степен; 3 – бяха основните определящи фактори.)

А. Ако има нарастване на търсенето на кредит, то е предизвикано от:

Нарастване на нуждата от оборотни средства на фирмите	
Нарастване на нуждата от фондове за финансиране на вземанията на фирмите от техни длъжници	
Нарастване на инвестициите на фирмите в машини и оборудване	
Намаляване на генерираните вътрешнофирмени фондове	
Пренасочване на фирмите от небанково финансиране към банково	
Други	

Б. Ако има намаляване на търсенето на кредит, то е предизвикано от:

Намаляване на нуждата от оборотни средства на фирмите	
Намаляване на нуждата от фондове за финансиране на вземанията на фирмите от техни длъжници	
Намаляване на инвестициите на фирмите в машини и оборудване	
Нарастване на генерираните вътрешнофирмени фондове	
Пренасочване на фирмите от банково финансиране към небанково	
Други	

Приложение Б

Таблица Б1

ПРОМЯНА В ТЪРСЕНЕТО НА КРЕДИТ

брой банки

Промяна на търсенето на кредит	Краткосрочни кредити		Дългосрочни кредити	
	големи фирми	малки фирми	големи фирми	малки фирми
значително нарастване	3	1	4	2
умерено нарастване	13	13	12	12
постоянно	7	6	7	6
умерено намаление	0	1	1	1
значително намаление	1	0	0	0

процент от всички отговорили

Промяна на търсенето на кредит	Краткосрочни кредити		Дългосрочни кредити	
	големи фирми	малки фирми	големи фирми	малки фирми
значително нарастване	12.5	4.8	16.7	9.5
умерено нарастване	54.2	61.9	50.0	57.1
постоянно	29.2	28.6	29.2	28.6
умерено намаление	0.0	4.8	4.2	4.8
значително намаление	4.2	0.0	0.0	0.0

Таблица Б2

ФАКТОРИ, ОПРЕДЕЛЯЩИ ПРОМЯНАТА В ТЪРСЕНЕТО НА КРЕДИТИ

брой банки

Фактори, определящи промяната в търсенето на краткосрочни кредити	силно влияние за увеличаване на търсенето	известно влияние за увеличаване на търсенето	няма влияние	известно влияние за намаляване на търсенето	силно влияние за намаляване на търсенето
Нужда на фирмите от оборотни средства	14	5	4	0	0
Нужда от фондове за финансиране на вземанията от длъжници	3	10	9	1	0
Инвестиции на фирмите в машини и оборудване	2	10	11	0	0
Изменение на вътрешнофирмените фондове	0	4	19	0	0
Пренасочване между банково и небанково финансиране	1	8	13	1	0
Други фактори	0	3	3	0	1

брой банки

Фактори, определящи промяната в търсенето на дългосрочни кредити	силно влияние за увеличаване на търсенето	известно влияние за увеличаване на търсенето	няма влияние	известно влияние за намаляване на търсенето	силно влияние за намаляване на търсенето
Нужда на фирмите от оборотни средства	9	5	10	0	0
Нужда от фондове за финансиране на вземанията от длъжници	2	8	13	1	0
Инвестиции на фирмите в машини и оборудване	13	4	6	0	1
Изменение на вътрешнофирмените фондове	1	4	19	0	0
Пренасочване между банково и небанково финансиране	1	6	15	2	0
Други фактори	2	3	8	0	1

процент от всички отговори

Фактори, определящи промяната в търсенето на краткосрочни кредити	силно влияние за увеличаване на търсенето	известно влияние за увеличаване на търсенето	няма влияние	известно влияние за намаляване на търсенето	силно влияние за намаляване на търсенето
Нужда на фирмите от оборотни средства	60.9	21.7	17.4	0.0	0.0
Нужда от фондове за финансиране на вземанията от длъжници	13.0	43.5	39.1	4.3	0.0
Инвестиции на фирмите в машини и оборудване	8.7	43.5	47.8	0.0	0.0
Изменение на вътрешнофирмените фондове	0.0	17.4	82.6	0.0	0.0
Пренасочване между банково и небанково финансиране	4.3	34.8	56.5	4.3	0.0
Други фактори	0.0	42.9	42.9	0.0	14.3

процент от всички отговори

Фактори, определящи промяната в търсенето на дългосрочни кредити	силно влияние за увеличаване на търсенето	известно влияние за увеличаване на търсенето	няма влияние	известно влияние за намаляване на търсенето	силно влияние за намаляване на търсенето
Нужда на фирмите от оборотни средства	37.5	20.8	41.7	0.0	0.0
Нужда от фондове за финансиране на вземанията от длъжници	8.3	33.3	54.2	4.2	0.0
Инвестиции на фирмите в машини и оборудване	54.2	16.7	25.0	0.0	4.2
Изменение на вътрешнофирмените фондове	4.2	16.7	79.2	0.0	0.0
Пренасочване между банково и небанково финансиране	4.2	25.0	62.5	8.3	0.0
Други фактори	14.3	21.4	57.1	0.0	7.1

Таблица Б3

ПРИЧИНИ ЗА ОТХВЪРЛЯНЕТО НА МОЛБИ ЗА ПОЛУЧАВАНЕ НА КРЕДИТ

брой банки

Причини за отказ при краткосрочните кредити	Големи фирми			Малки фирми		
	силно влияние	известно влияние	не е определящ фактор	силно влияние	известно влияние	не е определящ фактор
Ненадежден проект	13	6	0	8	5	1
Липса на приемливо обезпечение	7	11	2	6	7	2
Недостатъчно прозрачни финансови отчети	12	6	2	10	5	0
Други причини	3	3	10	1	2	3

брой банки

Причини за отказ при дългосрочните кредити	Големи фирми			Малки фирми		
	силно влияние	известно влияние	не е определящ фактор	силно влияние	известно влияние	не е определящ фактор
Ненадежден проект	13	5	1	13	4	1
Липса на приемливо обезпечение	7	8	4	6	8	4
Недостатъчно прозрачни финансови отчети	11	7	0	11	7	0
Други причини	2	3	3	2	3	3

процент от всички отговори

Причини за отказ при краткосрочните кредити	Големи фирми			Малки фирми		
	силно влияние	известно влияние	не е определящ фактор	силно влияние	известно влияние	не е определящ фактор
Ненадежден проект	68.4	31.6	0.0	57.1	35.7	7.1
Липса на приемливо обезпечение	35.0	55.0	10.0	40.0	46.7	13.3
Недостатъчно прозрачни финансови отчети	60.0	30.0	10.0	66.7	33.3	0.0
Други причини	18.8	18.8	62.5	16.7	33.3	50.0

процент от всички отговори

Причини за отказ при дългосрочните кредити	Големи фирми			Малки фирми		
	силно влияние	известно влияние	не е определящ фактор	силно влияние	известно влияние	не е определящ фактор
Ненадежден проект	68.4	26.3	5.3	72.2	22.2	5.6
Липса на приемливо обезпечение	36.8	42.1	21.1	33.3	44.4	22.2
Недостатъчно прозрачни финансови отчети	61.1	38.9	0.0	61.1	38.9	0.0
Други причини	25.0	37.5	37.5	25.0	37.5	37.5

Таблица Б4

ПРОМЯНА НА СТАНДАРТИТЕ ПРИ ОДОБРЯВАНЕ НА МОЛБИТЕ ЗА КРЕДИТ

брой банки

Промяна на стандартите за одобряване на кредит	Краткосрочни кредити		Дългосрочни кредити	
	големи фирми	малки фирми	големи фирми	малки фирми
значително се облекчиха	0	0	0	0
облекчиха се в известна степен	6	6	4	6
останаха постоянни	16	13	19	15
затегнаха се в известна степен	2	2	1	1
значително се затегнаха	0	0	0	1

процент от всички отговори

Промяна на стандартите за одобряване на кредит	Краткосрочни кредити		Дългосрочни кредити	
	големи фирми	малки фирми	големи фирми	малки фирми
значително се облекчиха	0.0	0.0	0.0	0.0
облекчиха се в известна степен	25.0	28.6	16.7	26.1
останаха постоянни	66.7	61.9	79.2	65.2
затегнаха се в известна степен	8.3	9.5	4.2	4.3
значително се затегнаха	0.0	0.0	0.0	4.3

Таблица Б5

ПРОМЯНА В УСЛОВИЯТА ПО КРЕДИТИТЕ

брой банки

Условия по краткосрочните кредити	Големи фирми					Малки фирми				
	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане
Максимален размер на кредита	0	3	18	1	1	0	2	18	0	1
Цена на кредита	0	10	13	1	0	0	8	13	1	0
Премия, изисквана за по-рискови заеми	0	4	13	3	1	0	2	14	2	1
Изисквания за обезпечение	0	1	21	1	1	0	3	17	1	1
Други изисквания	0	6	12	2	0	0	6	11	1	0

брой банки

Условия по дългосрочните кредити	Големи фирми					Малки фирми				
	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане
Максимален размер на кредита	0	2	19	1	1	0	1	21	0	1
Цена на кредита	0	8	14	1	0	0	7	15	1	0
Премия, изисквана за по-рискови заеми	0	2	15	3	1	0	1	16	3	1
Изисквания за обезпечение	0	1	19	2	1	0	3	16	3	1
Други изисквания	0	4	11	1	0	0	4	11	1	0

процент от всички отговори

Условия по краткосрочните кредити	Големи фирми					Малки фирми				
	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане
Максимален размер на кредита	0.0	13.0	78.3	4.3	4.3	0.0	9.5	85.7	0.0	4.8
Цена на кредита	0.0	41.7	54.2	4.2	0.0	0.0	36.4	59.1	4.5	0.0
Премия, изисквана за по-рискови заеми	0.0	19.0	61.9	14.3	4.8	0.0	10.5	73.7	10.5	5.3
Изисквания за обезпечение	0.0	4.2	87.5	4.2	4.2	0.0	13.6	77.3	4.5	4.5
Други изисквания	0.0	30.0	60.0	10.0	0.0	0.0	33.3	61.1	5.6	0.0

процент от всички отговори

Условия по дългосрочните кредити	Големи фирми					Малки фирми				
	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане	значително облекчаване	облекчаване в известна степен	непро-менени	затягане в известна степен	значително затягане
Максимален размер на кредита	0.0	8.7	82.6	4.3	4.3	0.0	4.3	91.3	0.0	4.3
Цена на кредита	0.0	34.8	60.9	4.3	0.0	0.0	30.4	65.2	4.3	0.0
Премия, изисквана за по-рискови заеми	0.0	9.5	71.4	14.3	4.8	0.0	4.8	76.2	14.3	4.8
Изисквания за обезпечение	0.0	4.3	82.6	8.7	4.3	0.0	13.0	69.6	13.0	4.3
Други изисквания	0.0	25.0	68.8	6.3	0.0	0.0	25.0	68.8	6.3	0.0

Таблица Б6

ФАКТОРИ ЗА ПРОМЯНАТА НА КРЕДИТНИТЕ УСЛОВИЯ И СТАНДАРТИ

брой банки

Фактори, определящи изменението на кредитните условия и стандарти по краткосрочните кредити	силно влияние за облекчаване	известно влияние за облекчаване	няма влияние	известно влияние за затягането	силно влияние за затягането
Състояние на текущата или очакваната капиталова адекватност	2	5	17	0	0
Състояние на други показатели на банката	1	6	17	0	0
Макроикономическа среда и степен на несигурност	1	6	16	1	0
Условия в определени отрасли	1	5	12	5	1
Конкуренция от страна на другите банки	7	6	9	0	0
Конкуренция от страна на небанковите финансови институции	0	4	19	0	0
Склонност към поемане на риск	0	4	18	2	0
Ликвидност в банковата система	0	4	19	0	0
Фалити на компании и необслужвани кредити	2	4	15	3	0
Надзорни ограничения	0	2	21	0	0
Други фактори	1	2	19	0	0

брой банки

Фактори, определящи изменението на кредитните условия и стандарти по дългосрочните кредити	силно влияние за облекчаване	известно влияние за облекчаване	няма влияние	известно влияние за затягането	силно влияние за затягането
Състояние на текущата или очакваната капиталова адекватност	2	5	16	0	1
Състояние на други показатели на банката	1	5	18	0	0
Макроикономическа среда и степен на несигурност	0	6	16	2	0
Условия в определени отрасли	1	7	13	2	1
Конкуренция от страна на другите банки	8	5	10	0	0
Конкуренция от страна на небанковите финансови институции	0	5	18	0	0
Склонност към поемане на риск	0	3	18	3	0
Ликвидност в банковата система	1	4	18	0	0
Фалити на компании и необслужвани кредити	1	4	16	2	1
Надзорни ограничения	0	3	18	0	0
Други фактори	1	2	11	1	0

процент от всички отговори

Фактори, определящи изменението на кредитните условия и стандарти по краткосрочните кредити	силно влияние за облекчаване	известно влияние за облекчаване	няма влияние	известно влияние за затягането	силно влияние за затягането
Състояние на текущата или очакваната капиталова адекватност	8.3	20.8	70.8	0.0	0.0
Състояние на други показатели на банката	4.2	25.0	70.8	0.0	0.0
Макроикономическа среда и степен на несигурност	4.2	25.0	66.7	4.2	0.0
Условия в определени отрасли	4.2	20.8	50.0	20.8	4.2
Конкуренция от страна на другите банки	31.8	27.3	40.9	0.0	0.0
Конкуренция от страна на небанковите финансови институции	0.0	17.4	82.6	0.0	0.0
Склонност към поемане на риск	0.0	16.7	75.0	8.3	0.0
Ликвидност в банковата система	0.0	17.4	82.6	0.0	0.0
Фалити на компании и необслужвани кредити	8.3	16.7	62.5	12.5	0.0
Надзорни ограничения	0.0	8.7	91.3	0.0	0.0
Други фактори	4.5	9.1	86.4	0.0	0.0

процент от всички отговори

Фактори, определящи изменението на кредитните условия и стандарти по дългосрочните кредити	силно влияние за облекчаване	известно влияние за облекчаване	няма влияние	известно влияние за затягането	силно влияние за затягането
Състояние на текущата или очакваната капиталова адекватност	8.3	20.8	66.7	0.0	4.2
Състояние на други показатели на банката	4.2	20.8	75.0	0.0	0.0
Макроикономическа среда и степен на несигурност	0.0	25.0	66.7	8.3	0.0
Условия в определени отрасли	4.2	29.2	54.2	8.3	4.2
Конкуренция от страна на другите банки	34.8	21.7	43.5	0.0	0.0
Конкуренция от страна на небанковите финансови институции	0.0	21.7	78.3	0.0	0.0
Склонност към поемане на риск	0.0	12.5	75.0	12.5	0.0
Ликвидност в банковата система	4.3	17.4	78.3	0.0	0.0
Фалити на компании и необслужвани кредити	4.2	16.7	66.7	8.3	4.2
Надзорни ограничения	0.0	14.3	85.7	0.0	0.0
Други фактори	6.7	13.3	73.3	6.7	0.0

Приложение В

Таблица В1

ОЦЕНКА НА ФУНКЦИИТЕ НА ТЪРСЕНЕ И ПРЕДЛАГАНЕ НА КРЕДИТ

	Предлагане на кредит (L^s)	Търсене на кредит (L^d)
α_0	1.03 (3.58)	-
β_0	-	1.08 (4.89)
BLCR	0.12 (1.88)	-
i_{LR}	0.1 (6.7)	0.06 (1.77)
$(i_{LR} - i_{MMR})$	-0.03 (-2.19)	-
π^e	0.01 (0.31)	0.01 (4.10)
y^e	-0.01 (-0.35)	-0.01 (-0.89)
d_l	-0.10 (-2.9 1)	-
l	-	0.01 (2.02)
Adj. R^2	0.40	0.37
Serial correlation	6.13	4.9
Functional form	1.38	0.65
Normality	2.19	0.77
Heteroskedasticity	3.05	0.64

Бележка: В скобите са представени Т-статистиките.

DP/24/2002

Ефектът *Balassa – Samuelson* в България

Георги Чукалев

Резюме. В това изследване е направен анализ на влиянието на ефекта на Balassa – Samuelson (BS) върху инфлацията в България и на приноса му върху реалното поскъпване на българския лев спряво валутите на страните– основни търговски партньори на България. Направена е оценка на този ефект върху инфлацията в България през 90-те години на XX век, измерена чрез дефлатора на брутната добавена стойност (БДС).

Abstract. This material analyzes the impact of the Balassa – Samuelson (BS) effect on inflation in Bulgaria and its contribution to the real appreciation of the Bulgarian lev against the currencies of the main Bulgaria's trading partners. This effect on inflation in Bulgaria in the 90s of the twentieth century is estimated through the gross value added deflator.

Съдържание

I. Увод

В това изследване се прави анализ на влиянието на ефекта Balassa – Samuelson (BS) върху инфлацията в България и на приноса му върху реалното поскъпване на българския лев спрямо валутите на страните – основни търговски партньори на България. Направена е оценка на този ефект върху инфлацията в България през 90-те години, измерена чрез дефлатора на брутната добавена стойност (БДС).

В раздел II са представени данните, начинът, по който са направени изчисленията, и използваната методология, като базисна година за тези изчисления е взета 1991 г. Данните са преизчислени при база 1996 г., за да проличи по-големият принос на този ефект върху инфлацията след въвеждането на паричен съвет. Базисна година при изчисляването на реалния ефективен валутен курс (РЕВК) за България спрямо основните търговски партньори е 1995 г. Резултатите от изчисленията за ефекта BS са описани в раздел III. Чрез таблици и графики се доказва, че хипотезата е валидна за българската икономика. Направени са изводи за практическото приложение на тези резултати, като прогнозирането на инфлацията чрез дефлатора на брутната добавена стойност и влиянието на този ефект върху РЕВК. В раздел IV са представени резултатите от изчисляваните в Агенцията за икономически анализи и прогнози (АИАП) относителни цени на търгуемите и нетъргуемите стоки и услуги като част от индекса на потребителските цени (ИПЦ). Относителното нарастване на цените в нетъргуемия спрямо търгуемия сектор се определя не само от изпреварващия прираст на производителността в търгуемия спрямо нетъргуемия сектор, но и от други фактори. Те са изяснени в раздел V. В раздел VI са представени изводите от направените изчисления за РЕВК за България спрямо валутите на основните търговски партньори на страната. Самият модел на BS предполага реално поскъпване на националната валута чрез по-високите темпове на растеж на цените в нетъргуемия сектор.

Авторът работи в Агенцията за икономически анализи и прогнози (АИАП). Разработката е публикувана за първи път в серията „Икономически изследвания“ на АИАП.

Изводите, интерпретациите и позициите, изложени в това икономическо изследване, принадлежат изцяло на автора и не могат по никакъв начин да бъдат приписани на Агенцията за икономически анализи и прогнози и БНБ.

В приложение 1 е дадено описание на модела Balassa – Samuelson. В приложение 2 е включено сравнение на ценовите равнища между страните – кандидатки за членство в ЕС, и 15-те страни от ЕС. В приложение 3 са публикувани резултатите от изчисленията за РЕВК за България и страните – основни търговски партньори на България.

Направените оценки показват, че влиянието на ефекта BS върху инфлацията и РЕВК в България за периода 1995–2000 г., представена чрез дефлатора на брутната добавена стойност (ДБДС), е 2.6 процентни пункта средногодишно. Около 74% от общото реално надценяване на българския лев се дължи на този ефект.

II. Данни и методология

За оценка на влиянието на ефекта BS върху инфлацията и реалния ефективен валутен курс за България са използвани данни за брутната добавена стойност, заетите и компенсацията на наетите лица от Националния статистически институт (НСИ), Организацията за икономическо сътрудничество и развитие (ОИСР)[1] и Руския държавен комитет по статистика. Данните на НСИ са годишни (от 1991 г. до 2000 г.) и тримесечни (от 1996 г. до 2001 г.). Данните за страните от ОИСР и Русия са годишни (от 1995 г. до 2000 г.).

Годишните данни за БДС са изчислени в съпоставими цени при база 1996 г. = 100. След тази година НСИ използва нова класификация на отраслите по Производствената сметка на брутния вътрешен продукт (БВП). Използваното ниво на агрегация на данните за целите на този анализ даде възможност за изчисляване от база 1996 г. на база 1991 г. = 100 чрез изменението във физическите обеми на отраслите. Тримесечните данни за БДС за България са преизчислени в съпоставими цени, като 1996 г. = 100. При същата база са и тримесечните ценови индекси – дефлатори. Дефлаторите са имплицитни – получени са чрез отнасяне на БДС в текущи цени към БДС в съпоставими цени.

За изчисляването на реалния ефективен валутен курс данните за БДС и дефлаторите за България са пребазирани при 1995 г. = 100. Изчисляването на общите показатели за БДС, дефлаторите и техните компоненти за търговските партньори е извършено

[1] OECD, National Accounts of OECD Countries, 2001, Vol. II.

чрез претегляне с осреднените дялове на тези страни във външната търговия на България за периода 1995–2001 г.

Отраслите по производствената сметка на БВП бяха разпределени в два основни сектора – търгуем и нетъргуем. Средната производителност на труда е изчислена като съотношение на БДС (в съпоставими цени) и броя на заетите съответно за двата сектора (A_t и A_n).

Относителните дялове на труда α_t и α_n са изчислени по сектори като отношение на компенсацията на наетите лица (работна заплата плюс социалноосигурителни вноски) към общата добавена стойност за двата сектора – търгуем и нетъргуем.

Използваната формула[2] при изчисленията на ефекта BS е:

$$\frac{P_n}{P_t} = \frac{\left(A_t\right)^{\frac{\alpha_n}{\alpha_t}}}{A_n} \qquad (1),$$

където

P_n и P_t са съответно индексите на цените на нетъргуемите и търгуемите стоки и услуги,

α_n и α_t – делът на труда съответно в нетъргуемия и търгуемия сектор,

A_t и A_n – индекси на производителността съответно в търгуемия и нетъргуемия сектор, изчислени по съпоставими цени.

От нея чрез логаритмуване се получава формула (П1), която е дадена в приложение 1.

Най-често срещаната класификация в икономическите изследвания е определянето на индустрията като търгуем сектор, а услугите като нетъргуем. Критерий, който се използва в международните изследвания при определянето на търгуемия сектор, е когато над 10% от общата продукция е предназначена за износ[3]. По производствената сметка общата БДС е представена като сума от добавената стойност за трите основни подотрасъла: селско и горско стопанство, индустрия и услуги.

[2] Същата формула се използва от Международния валутен фонд при изчисляването на ефекта BS за България. IMF Staff Country Report № 00/54, p. 21.

[3] *De Gregorio, Giovanni and Wolf* (1993) International evidence on tradables and nontradables inflation, NBER, August 1993, WP 4438.

Таблица 1

Селско и горско стопанство
Селско стопанство
Горско стопанство, лов и риболов
Индустрия
Добивна индустрия
Преработваща индустрия
Строителство
Услуги
Транспорт
Съобщения
Търговия
Финанси, кредит и застраховки
Други услуги

McDonald и *Ricci* (2001) определят вътрешната търговия като особено важен сектор със специфични, различни от другите сектори характеристики, който може да бъде включен към търгуемия или нетъргуемия сектор. Производителността във вътрешната търговия има два ефекта. Първо, когато търговията доставя стоки за междинно потребление (*inputs*), повишаването на производителността води до намаляване цената на търгуемите стоки, нараства относителната заплата и се повишава реалният валутен курс, каквато е динамиката на производителността на търгуемия сектор като цяло. Второ, когато търговията доставя стоки за крайно потребление, повишаването на производителността намалява потребителските цени на търгуемите стоки и предизвиква обезценяване на реалния валутен курс подобно на ефекта от повишаването на производителността в нетъргуемия сектор[4].

Подходът при разпределението на секторите по производствената сметка в търгуем и нетъргуем първоначално се основаваше на оценката за дела на износа в брутната продукция за всеки един от тях. Една от използваните конфигурации беше следната:

[4] *McDonald, R. and L. Ricci*. PPP and Balassa – Samuelson Effect: The Role of the Distribution Sector, 2001. IMF WP/01/38.

Таблица 2

Търгуем сектор	Нетъргуем сектор
Селско и горско стопанство	Добивна индустрия
Преработваща индустрия	Строителство
Транспорт	Съобщения
Търговия	Финанси
Електроенергия, топлоенергия, газ, вода	Други

Сектор „Търговия“ беше включван и към нетъргуемия сектор, също така в някои изчисления сектор „Електроенергия, топлоенергия, газ, вода“ беше включван в нетъргуемия сектор заради контролираните от правителството цени на електроенергията, топлоенергията и водата. Износът на селскостопанска продукция заема дял, по-малък от 10% в брутната продукция. Въпреки това той беше определен като търгуем, защото динамиката на цените на хранителните стоки (като част от ИПЦ) в периоди на ниски международни цени и/или силна германска марка (евро) показва доста ниски, а за 1998 г. и 1999 г. и отрицателни стойности. Но като цяло при тези изчисления не се получаваха надеждни резултати за връзката между производителността и относителната цена на нетъргуемите стоки и услуги.

Най-добри резултати се получиха с разглеждането на индустрията като търгуем сектор и на услугите като нетъргуем (таблица 1). Селското стопанство първоначално беше изключено от тези изчисления, но за определянето на връзката между производителността и цените за цялата икономика то беше обединено заедно с индустрията в търгуемия сектор.

При изчисляването на показателя *реален ефективен валутен курс* е използвана формулата:

$$REER = \frac{P}{eP_f} \qquad (2),$$

където

REER е реален ефективен валутен курс,

P – общ ценови дефлатор на БДС за България,

P_f – общ ценови дефлатор на БДС за страните – основни търговски партньори на България,

e – номинален ефективен валутен курс (лв. за единица национална валута на страните – търговски партньори).

За да се проследи отделно влиянието на ефекта BS върху REBK, горната формула беше разложена на три компонента. Приемаме, че общият дефлатор представлява средно геометрично претеглена величина от индексите на търгуемите и нетъргуемите стоки:

$$P = P_T^{\alpha} P_N^{1-\alpha} \quad (3),$$

където

P е общ ценови дефлатор на БДС за България,

P_T – ценови индекс на търгуемите стоки,

P_N – ценови индекс на нетъргуемите стоки,

α – относителен дял на търгуемите стоки в БДС за България.

По подобен начин ценовият индекс за чужбина ще бъде:

(4),

където

β е делът на търгуемите стоки в БДС за другите страни.

Чрез заместване на формули (3) и (4) в (2) и след преобразуване се получава[5]:

(5).

Компонентите на дясната част на формула (5) са следните:

- Търгуем компонент – относителна цена на търгуемите стоки или реален ефективен валутен курс за търгуемите стоки: $\frac{P_T}{eP_{Tf}}$;

[5] *Simon, A., A. Kovacs*. Components of the Real Exchange Rate in Hungary, 1998.

- Нетъргуем компонент – относителна цена на нетъргуемите стоки в България спрямо тази на основните търговски партньори:

$$\left[\left(\frac{P_N}{P_T}\right)\Big/\left(\frac{P_{Nf}}{P_{Tf}}\right)\right]^{(1-\alpha)};$$

- Компонент, представящ разликата в теглата: $\left(\frac{P_{Nf}}{P_{Tf}}\right)^{(\beta-\alpha)}$.

Определянето на селското стопанство и индустрията като търгуеми, а услугите като нетъргуеми позволява да се проследи връзката между производителността и цените. Поради наличието на висок относителен дял на стоки и услуги с контролирани цени (особено до въвеждането на паричен съвет) не можем да приемем, че относителната цена на нетъргуемите стоки зависи изцяло от разликите в производителността в двата сектора и от дела на труда в нетъргуемия сектор.

Изключването на секторите с контролирани цени значително би затруднило анализа, тъй като не разполагаме с толкова подробна информация за БДС по отделни дейности. До средата на 1997 г. с контролирани цени бяха основните хранителни стоки, енергията, значителна част от изкупните цени на селскостопанската продукция, съобщителните услуги и други. За други сектори като образование и здравеопазване нямаше либерализация в цените. Промишлените стоки, които са обект на международна търговия, бяха с високи мита, с често променящи се разрешителни режими при техния внос и износ, т.е. съществуваха административни бариери за доста стоки.

С определянето на селското стопанство и индустрията като търгуеми, а на услугите като нетъргуеми, може да се сравняват получените резултати за България с тези за другите страни. Това групиране беше използвано при изчисляването на РЕВК за България спрямо валутите на нейните основни търговски партньори.

III. Практически резултати

В графики 1 и 2 са представени динамиките на производителността на труда по години в търгуемия спрямо нетъргуемия сектор и на относителната цена на нетъргуемия спрямо търгуемия сектор. В графика 1 търгуемият сектор е представен само от индустрията, а в графика 2 индустрията и селското стопанство определят този сектор.

Двете графики показват сходна динамика между относителните стойности на производителността и цените, което доказва съществуването на този ефект в нашата икономика.

От графиките се вижда, че през 1995 г. има прекъсване на тенденцията за непрекъснато увеличаване на относителната производителност в търгуемия/нетъргуемия сектор и на относителната цена в нетъргуемия/търгуемия сектор.

През 1995 г. е отчетен спад в БДС за индустрията (в съпоставими цени). Този спад продължи и през 1996 г. и 1997 г. През 1997 г. цените в индустрията, и особено в селското стопанство, нараснаха съответно 9.8 пъти и 12.1 пъти, което е по-високо, отколкото поскъпването при услугите (9.5 пъти). Тогава страната беше изпаднала в сериозна политическа и икономическа криза, а цените на хранителните стоки се повишават най-бързо при такива шокове.

Влиянието на търсенето и предлагането в преходния период към пазарна икономика заедно с непрекъснатото номинално обезценяване на националната валута (до въвеждането на паричен съвет) бяха факторите, които пречеха за пълното проявяване на този ефект. В България стабилизационната политика беше неуспешна до средата на 1997 г. В другите страни от Централна и Източна Европа постигнатата икономическа стабилизация доведе още в средата на 90-те години до умерени стойности на инфлацията, като оттогава цените на нетъргуемите стоки и услуги в тези страни нарастват по-бързо, отколкото тези на търгуемите.

Като цяло можем да приемем резултатите за надеждни, показващи в числово изражение влиянието на този ефект. За изследвания период 1991–2000 г. в групировката без селското стопанство средногодишният темп чрез производителността (8.7%) е много близък до действителното съотношение на цените между нетъргуемия и търгуемия сектор (8.8%). При втората групировка (с включването на селското стопанство в търгуемия сектор) раз-

Графика 1

ИНДЕКСИ НА ПРОИЗВОДИТЕЛНОСТТА И НА ОТНОСИТЕЛНАТА ЦЕНА НА НЕТЪРГУЕМИТЕ СТОКИ И УСЛУГИ

(1991 г. = 100)

Източник: АИАП.

Графика 2

ИНДЕКСИ НА ПРОИЗВОДИТЕЛНОСТТА И НА ОТНОСИТЕЛНАТА ЦЕНА НА НЕТЪРГУЕМИТЕ СТОКИ И УСЛУГИ

(1991 г. = 100)

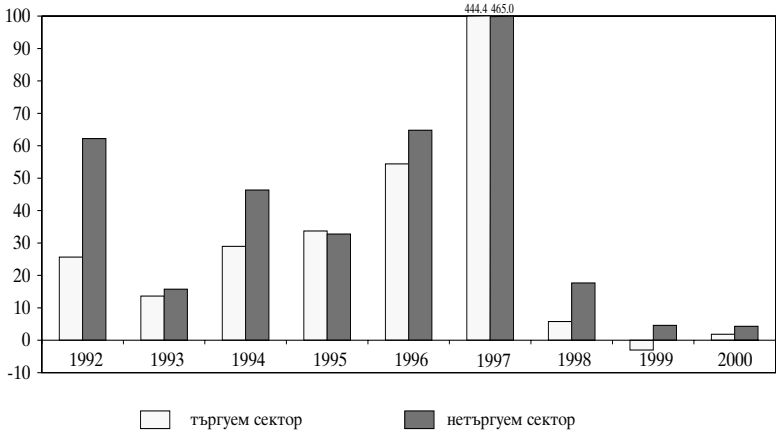
Източник: АИАП.

ликата в средногодишните темпове е по-голяма, но отново може да се приеме за добра – 8% срещу 8.7%.

Графика 3

ПРИНОС НА ТЪРГУЕМИТЕ И НЕТЪРГУЕМИТЕ СТОКИ В ОБЩИЯ ДЕФЛАТОР НА БДС

(процентни пункта)



Източник: АИАП.

Повишаването на цените на нетъргуемия сектор е определящо (около 60%) за общия дефлатор на БДС за периода 1991–2000 г. Особено след въвеждането на паричен съвет от средата на 1997 г. приносът на нетъргуемия сектор в общата инфлация нараства значително. Например за 1999 г. поради значителния спад в цените на селското стопанство (с 15%) и минималното увеличение на цените в индустрията (с 1%) търгуемият сектор има отрицателен принос във формирането на общия дефлатор.

Периодът след въвеждането на паричен съвет заслужава да се разгледа отделно поради настъпилата финансова стабилизация, която предполага по-силно проявление на този ефект като част от общата инфлация. Също така фиксираният валутен курс предполага близка динамика на цените в търгуемия сектор в страната и в чужбина. Тогава разликата в инфлацията в България и в нейните основни търговски партньори ще се дължи в много по-голяма степен на действието на ефекта BS.

Таблица 3

ИЗМЕНЕНИЕ НА ПРОИЗВОДИТЕЛНОСТТА И НА ОТНОСИТЕЛНИТЕ ЦЕНИ В ПРОЦЕНТИ

(1996 г. = 100)

	Групировка невкл. селско стопанство		Групировка вкл. селско стопанство	
	Производителност търг./нетърг. *At*/*An*	Относителна цена нетърг./търг. *Pn*/*Pt*	Производителност търг./нетърг. *At*/*An*	Относителна цена нетърг./търг. *Pn*/*Pt*
1997	13.0	-2.4	28.1	-11.3
1998	20.7	11.2	36.8	11.6
1999	20.5	20.0	36.4	29.7
2000	26.8	27.0	33.9	34.0
Средногодишен темп на растеж	**6.1**	**6.2**	**7.6**	**7.6**

При сравняване на средногодишните темпове за периодите 1991–2000 г. и 1996–2000 г. се вижда тенденция към свиване на разликата между относителната производителност и относителните цени.

Оценката за ефекта BS се приема, че действа в дългосрочен период, т.е. от таблица 3 може да използваме числата 6.1% (невкл. селско стопанство) или 7.6% (за цялата икономика), показващи изменението на относителната цена на нетъргуемия към търгуемия сектор.

$$\frac{P_n}{P_t} = 6.1\%, \text{ или } \frac{P_n}{P_t} = 7.6\% \qquad (6)$$

Ползваме числата от колоните в таблица 3 чрез производителността, тъй като в модела на BS се предполага влиянието на производителността върху цените. От тези съотношения съвсем грубо можем да пресметнем общия дефлатор на БДС за цялата икономика, ако имаме прогноза или ползваме международни прогнози за инфлацията на търгуемите стоки. Тогава чрез това съотношение изчисляваме дефлатора за нетъргуемия сектор (услугите) и чрез относителните дялове на двата сектора (търгуем и нетъргуем) правим оценка за общия дефлатор на БДС. Например, ако прогнозата за инфлацията на стоките (заедно със селскостопанските продукти), търгувани на международните пазари, е 1%, то прогнозата за инфлацията на нетъргуемите сто-

ки (услуги) в България ще бъде 101∗107.6/100 = 108.7, или 8.7%. През 2000 г. относителните дялове на добавената стойност в търгуемия и нетъргуемия сектор бяха съответно 44% и 56%. Тогава прогнозата за общия дефлатор на БДС е (1∗44+8.7∗56)/100 = 5.3%, като приносът на търгуемия сектор е само 0.4, а на нетъргуемия – 4.9 процентни пункта. При по-висока инфлация в търгуемия сектор според това изчисление излиза, че общият дефлатор ще бъде по-висок в сравнение с числата за дефлатора на БВП, заложени в макрорамката през следващите 2–3 години.

Възниква въпросът, доколко можем да вярваме на така получените резултати. Съотношенията в (6) можем да ползваме като историческа характеристика на влиянието на производителността върху относителната цена на нетъргуемите стоки. Има няколко причини да предполагаме, че влиянието на този ефект в действителност е по-слабо. Не трябва да забравяме съществуващата тенденция, която също е към намаление на този ефект в общата инфлация. На тези фактори ще се спрем по-нататък. Те са странични и са свързани най-вече със структурните промени в икономиката.

IV. Ролята на ефекта Balassa – Samuelson за инфлацията в България през 90-те години

Годишната инфлация в страните от бившия социалистически блок, стремящи се да покрият изискванията за членство в ЕС, е по-висока в сравнение с инфлацията в страните от ЕС или от европейския Икономически и валутен съюз. Една от причините за това са промените в относителните цени, които изпитват страните в преход. За тях е характерно повишаването на относителната цена на нетъргуемите стоки и услуги (изчислена като съотношение между индексите на цените на нетъргуемите и търгуемите стоки). Повишаването на относителната цена на нетъргуемите стоки е свързано със съществуването на ефекта BS.

Промените в относителните цени водят до постепенно приближаване на общото равнище на цените към това в страните от ЕС и в САЩ.

Таблица 4

ИНДЕКСИ НА СРАВНИТЕЛНИТЕ РАВНИЩА НА ЦЕНИТЕ (ППС/ОФИЦИАЛЕН ВАЛУТЕН КУРС)[6]

(САЩ = 100)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
България	44.6	19.3	21.7	26.6	23.0	29.3	23.6	25.7	30.4

По данни от Програмата за европейски сравнения през 1999 г. сравнителните равнища на цените по страни спрямо ЕС 15 = 100 са следните: България 25, Естония 40, Латвия 41, Литва 36, Полша 44, Румъния 29, Словакия 30, Словения 63, Унгария 39, Чехия 37[7].

Сравнителните равнища на цените по компоненти на крайно използвания БВП показват по-ниски стойности за групите на услугите. Именно от страна на услугите в дългосрочен период може да се очаква по-висок принос в натрупаната инфлация (приложение 2).

За тези от страните в преход, които са в режим на паричен съвет, нарастването на цените на търгуемите стоки се определя както от прираста на производителността, така и от действието на закона за единната цена. Според този закон еднаквите стоки би трябвало да имат една и съща цена в различните страни при наличието на конкурентен пазар и при отсъствието на транспортни разходи и други пречки за търговията. Либерализацията на цените и на външнотърговския режим осигурява сходна динамика на цените на търгуемите стоки в различните страни. Но като цяло инфлацията, изчислена чрез индекса на потребителските цени, остава по-висока в страна с паричен съвет в сравнение със страните от ЕС.

Натрупаната инфлация в България за четиригодишния период от въвеждането на паричен съвет до декември 2001 г. е 45.2%, като средномесечното повишение на общото равнище на потребителските цени се изчислява на 0.7%. По отделни компоненти (групи) от потребителската кошница за изчисляване на инфлацията изменението на цените е различно. Най-високо е повишението на цените при услугите (120.5%) за разлика от това на стоките – хранителни (24.3%) и нехранителни (34.2%).

[6] По данни на НСИ.

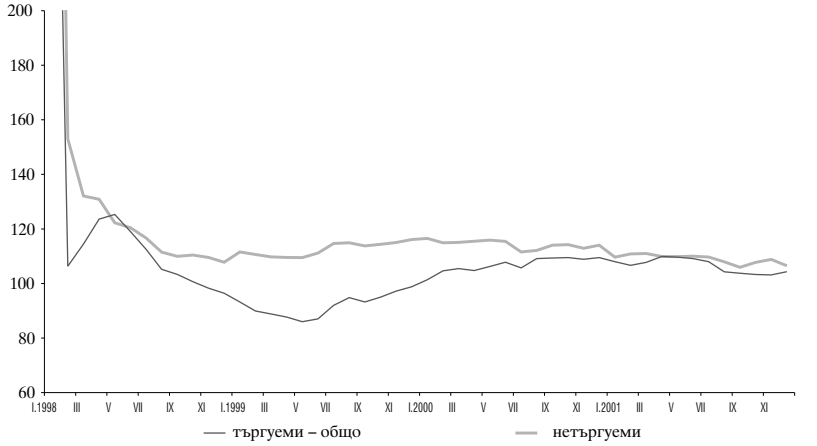
[7] Eurostat, The European Comparison Programme, Sept. 2001.

Разликата в повишението на цените за трите групи се дължи на промените в структурата на относителните цени. В АИАП се изчисляват отделни индекси (групировки) с цел по-пълното анализиране на процесите на инфлация в страната. Индексът на относителните цени при база декември 1992 г. = 100 показва изменението на споменатите по-горе три основни потребителски групи спрямо общото изменение на цените. До въвеждането на паричен съвет (юли 1997 г.) относителните цени при база декември 1992 г. = 100 бяха следните: хранителни стоки (100.7), нехранителни стоки (89.7) и услуги (107.8), т.е. поскъпването при хранителните стоки е с 0.7% по-високо от общата инфлация, а при услугите – със 7.8%, докато поскъпването при нехранителните стоки е с 10.3% по-ниско от общата инфлация. След четири години и половина изменението в относителните цени за декември 2001 г. спрямо декември 1992 г. е следното: хранителни стоки – отрицателно (-15.1%), нехранителни стоки – отрицателно (-15.7%), а при услугите относителната цена спрямо общата инфлация за целия изследван период е положителна (57%).

Графика 4

ИНДЕКСИ НА ПОТРЕБИТЕЛСКИТЕ ЦЕНИ НА ТЪРГУЕМИТЕ И НЕТЪРГУЕМИТЕ СТОКИ И УСЛУГИ

(по месеци спрямо съответния месец на предходната година)



Източник: АИАП.

Повишенията в цените на услугите са основният източник на инфлация след въвеждането на паричен съвет. По своята същност услугите са нетъргуеми, т.е. те не са обект на международна търговия, и техните цени преди всичко се определят от вътрешното търсене и предлагане.

В АИАП се изчисляват индекси на търгуемите[8], потенциално търгуемите[9] и нетъргуемите стоки и услуги, които съставляват общия ИПЦ. За нуждите на анализа групата на потенциално търгуемите стоки беше агрегирана към търгуемите и тяхната обща група ще наричаме търгуеми стоки.

При анализа на общото изменение на цените на услугите трябва да се има предвид, че с голям принос (като относителен дял и равнище на повишение) са цените на административните услуги (електроенергия, топлоенергия, водоснабдяване, телефонни и пощенски услуги). Останалата част от услугите, чиито цени се определят от пазара, са обект на високо вътрешно търсене. Например цените на лекарските и стоматологичните услуги и образованието са с ясно изразена тенденция към поскъпване.

От графика 4 се вижда, че изчислената относителна цена за нетъргуемите към търгуемите стоки е 8.6% средногодишно за периода 1996–2000 г. Това число не може да се сравнява пряко с резултата от 7.6% от таблица 3, но и двете числа показват, че инфлацията в нетъргуемия сектор е по-висока от тази в търгуемия, без значение дали разглеждаме ДБДС, или ИПЦ. Резултатите от раздел III показаха, че разликата в темповете на производителността на труда в двата сектора е източник на инфлация.

При изследване на ефекта BS с тримесечни данни за БДС и дефлаторите отново проличават сходните динамики между производителността и цените. В графики 5 и 6 данните са по тримесечия за пе-

[8] В групата „търгуеми“ влизат всички стоки, за които не съществуват административни бариери, транспортни затруднения или други причини, за да бъдат внесени. За административни бариери се смятат митнически ставки от и над 25% или разрешителен режим по вноса, а транспортни затруднения съществуват за стоките с голям обем и високи разходи за транспорт, както и продукти, които се консумират пресни и губят качеството си при транспорт. Някои от стоките, които попадат в групата на търгуемите, са: хранителни – яйца, месни продукти с ниско ниво на преработка, цитрусови плодове и др., нехранителни – домакински електроуреди, автомобили, електронна техника и др. Общото тегло на групата в ИПЦ е 19%.

[9] Потенциално търгуеми са всички стоки, за които съществуват само административни бариери за вноса им. Това са: свинско и птиче месо, млечни произведения, хранителни продукти с висока степен на преработка, облекло и обувки, природен газ, лекарства и др. Общото им тегло в ИПЦ е 36.6%.

риода 1996 г. – трето тримесечие на 2001 г. Недостатък при тримесечните данни е, че информацията за заетите не е изчерпателна, а извадкова. По този начин показателят *производителност на труда* за дадена година има различни стойности, когато е изчислен от годишни или тримесечни данни за заетите. Но тъй като крайните резултати се представят в относителни числа (проценти), то и при тримесечните данни се проследява доста добре връзката между производителността и цените.

Извършваните в страната структурни реформи увеличават възможността за постигането на траен икономически растеж чрез повишаване на производителността. Постигането на по-висок растеж за страната в режим на паричен съвет в сравнение с темпа на растеж за страните от ЕС ще предизвиква промени в относителните цени, което ще се отрази в по-високи ИПЦ и ДБДС.

От приложение 2 се вижда, че от всички 10 страни в преход България има най-ниски БВП и общо равнище на цените през 1999 г. При икономическите сравнения между отделните държави е известна силната връзка между БВП на глава от населението и общото равнище на цените. Колкото дадена страна има по-малък БВП, толкова и общото равнище на цените е по-ниско. Тази връзка проличава от таблицата в приложение 2. Следователно чрез механизма на ефекта на BS в дългосрочен период производителността в търгуемия сектор определя реалните заплати в икономиката. Страна, която има по-ниска производителност в търгуемия сектор, има и по-ниско общо равнище на цените.

V. Други фактори, влияещи върху разликата в ценовата динамика между търгуемите и нетъргуемите стоки

Връзката между производителността и цените е доста силна, но не можем да обясняваме по-високата инфлация в нетъргуемия в сравнение с търгуемия сектор само с ефекта BS, т.е. с по-високата производителност в търгуемия в сравнение с нетъргуемия сектор.

Ефектът BS се основава на предположението, че заплатите в търгуемия и нетъргуемия сектор са равни. В България това не е така, но съществува тенденция към тяхното приближаване като равнище.

Графика 5

ИНДЕКСИ НА ПРОИЗВОДИТЕЛНОСТТА И НА ОТНОСИТЕЛНАТА ЦЕНА НА НЕТЪРГУЕМИТЕ СТОКИ И УСЛУГИ

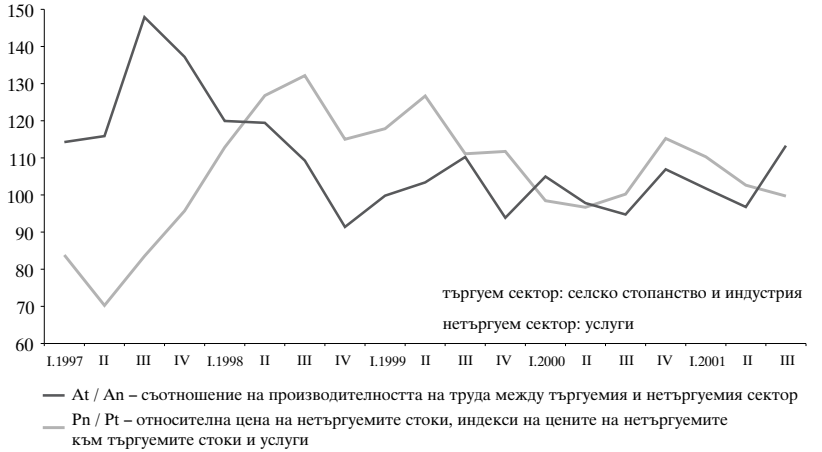
(по тримесечия при база съответно тримесечие на предходната година)

Източник: АИАП.

Графика 6

ИНДЕКСИ НА ПРОИЗВОДИТЕЛНОСТТА И НА ОТНОСИТЕЛНАТА ЦЕНА НА НЕТЪРГУЕМИТЕ СТОКИ И УСЛУГИ

(по тримесечия при база съответно тримесечие на предходната година)

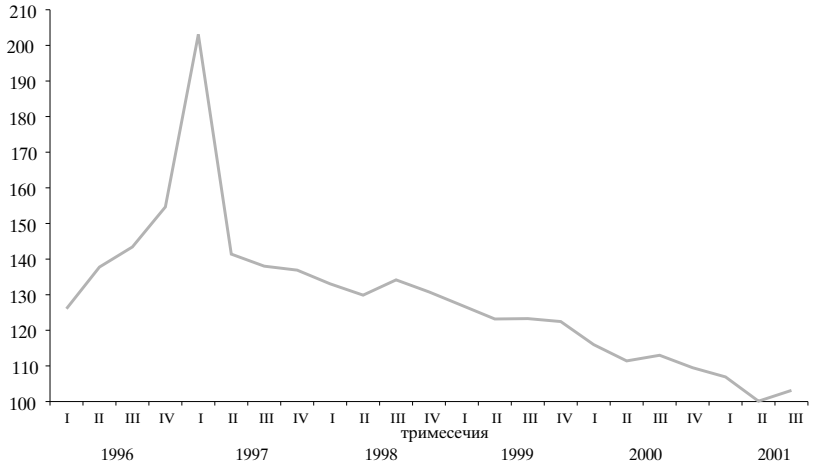


Източник: АИАП.

Средната заплата в индустрията е по-висока от тази в услугите. На графика 7 е показана относителната заплата на търгуемия към нетъргуемия сектор. За изчисляването на номиналните средни заплати в двата сектора са използвани данни за начислените средства за работни заплати в индустрията и услугите, разделени на броя на заетите в двата сектора.

Графика 7

ОТНОСИТЕЛНА ЗАПЛАТА: ИНДУСТРИЯ/УСЛУГИ



Източник: АИАП, НСИ.

Като изключим голямото отклонение в заплатите за двата сектора през кризисния период от 1996 г. до началото на 1997 г., тенденцията е към доближаване равнището на номиналните средни заплати в двата сектора. От въвеждането на паричен съвет разликата в заплатите между двата сектора е около 25%. За страните от Централна и Източна Европа вариацията е около 15% и се оценява като много малка.[10] По-големите отклонения в България се дължат на структурните промени в икономиката през последните 4 години.

От втората половина на 1997 г. темпът на повишение на номиналната средна работна заплата (НСРЗ) в нетъргуемия сектор е по-висок от този в търгуемия сектор. Тази динамика отговаря на хипотезата, че по-високият темп на растеж на производител-

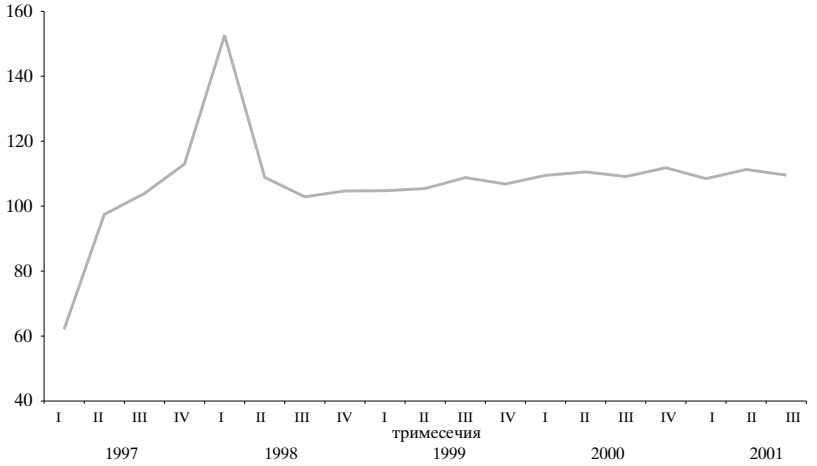
[10] ECE, Economic Survey of Europe, 2001/1, p. 232.

ността в търгуемия сектор води до повишаване на относителните цени на нетъргуемите стоки и услуги чрез нарастване на номиналната заплата в нетъргуемия сектор.

Графика 8

ДИНАМИКА НА ОТНОСИТЕЛНИТЕ ЗАПЛАТИ: УСЛУГИ/ИНДУСТРИЯ

(спрямо съответното тримесечие на предходната година)



Източник: АИАП, НСИ.

По-бързите темпове на нарастване на НСРЗ в нетъргуемия сектор (услугите) не се дължи само на ефекта BS, защото относителният дял на БДС на услугите има тенденция към увеличаване[11]. При по-високи темпове на производителност в търгуемия сектор би трябвало предлагането в нетъргуемия сектор да намалява поради отлив на работна сила и капитал от този сектор. Но делът на нетъргуемия сектор нараства, което означава, че действат фактори от страна на търсенето, което води до по-голямо увеличаване на заплатите в този сектор. Нарастващият дял на услугите в брутната продукция (БП) и в БДС е предизвикан от първоначално ниския дял на услугите в общото предлагане в началото на 90-те години. По-ниските темпове на производителност и

[11] Ако сравняваме само индустрията и услугите, тази тенденция към увеличаване дела на услугите в БДС не е толкова силно изразена, колкото когато се разглежда техният дял спрямо индустрията и селското стопанство. Относителният дял на селското стопанство в общата БДС намалява.

по-голямото търсене на работна сила в сферата на услугите води до по-висок растеж на номиналната заплата и следователно до по-висока инфлация. Тази тенденция в България води до приближаване равнището на номиналните заплати в индустрията и услугите, което отговаря на теорията на изследвания ефект.

Връзката заплати – инфлация може да се проследи чрез изчисляването на показателя цена на единица труд (ЦЕТ). Той е изчислен, като номиналното изменение на СРЗ е разделено на изменението на производителността на труда по сектори – търгуем и нетъргуем. Източник на инфлация за цялата икономика ще има, когато прирастът на заплатите в търгуемия сектор постоянно изпреварва нарастването на производителността на труда в този сектор. През последните 4 години в България механизмът на формиране на заплатите работи доста добре.

От графика 9 се вижда, че факторът ЦЕТ не е източникът на инфлация за търгуемия сектор. До средата на 1999 г. темповете на ЦЕТ са по-високи от темпа на инфлация в търгуемия сектор. След този период тенденцията се променя, като цените растат по-бързо от ЦЕТ, което може да се обясни със започналото възстановяване равнищата на международните цени в този период. През 1999 г. и 2000 г. средногодишните темпове на индексите на цените на производител (ИЦП) бяха по-високи от ИПЦ.

Докато при нетъргуемия сектор връзката ЦЕТ – цени е много по-силна. Коефициентите на корелация между ЦЕТ и инфлацията по сектори за периода 1998 г. – трето тримесечие на 2001 г. са 0.56 и 0.97 съответно за търгуемия и нетъргуемия сектор.

Таблица 5

ПОКАЗАТЕЛИ СРЕДНО ЗА ПЕРИОДА 1998–2001 г.

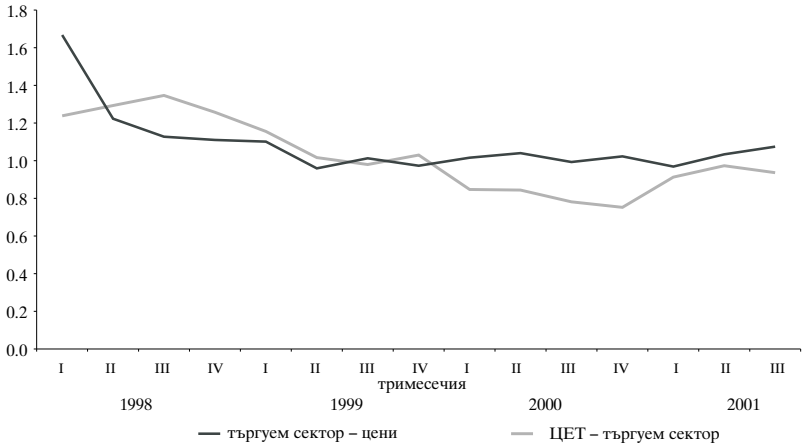
(%)

	Производителност	**Заплати**	**ЦЕТ**	**Инфлация**
Търгуем сектор	10.7	11.6	0.8	7.8
Нетъргуем сектор	4.2	23.3	18.3	17.0

В България равнището на заплатите и на цените (включително и за търгуемия сектор) е доста по-ниско от това в ЕС, затова е много важно увеличението на заплатите, особено в търгуемия сектор, да бъде обвързано с производителността, за да може приспособяването на равнището на доходите и цените към това на развитите страни да става без загуба на конкурентоспособност.

Графика 9

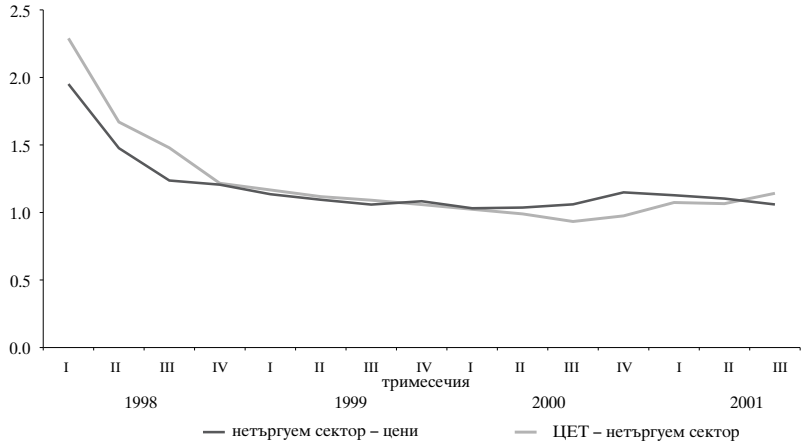
ИЗМЕНЕНИЕ В ЦЕНАТА НА ЕДИНИЦА ТРУД И ИНФЛАЦИЯТА В ТЪРГУЕМИЯ СЕКТОР



Източник: АИАП.

Графика 10

ИЗМЕНЕНИЕ В ЦЕНАТА НА ЕДИНИЦА ТРУД И ИНФЛАЦИЯТА В НЕТЪРГУЕМИЯ СЕКТОР



Източник: АИАП.

В някои сектори на икономиката се упражнява контрол от правителството по отношение на цените. Такива са секторите „Производство и разпределение на електроенергия, топлоенергия, газ и вода“, „Съобщения“, а в началото на 90-те години имаше правителствен контрол и върху някои хранителни стоки от особено значение за жизненото равнище на населението и икономиката на страната.

Административният контрол изкуствено задържа стабилно равнището на цените на стоките и услугите за определен период, което пречи за пълното проявление на хипотезата на BS. Върху тези стоки и услуги вместо арбитража на закона за единната цена действа контролът от страна на правителството. В някои изследвания за страните в преход тези сектори от икономиката се изключват при изчисляването на ефекта BS. В това изследване, както бе посочено по-горе, е обхванатa цялата икономика.

От средата на 1997 г. правителственият контрол върху цените е сведен до малък брой стоки и услуги и техните корекции засягат почти изцяло цените за населението, а не производствените цени или цените за стопански нужди. При повишаване цените на електроенергията за стопански нужди се увеличават цените на производител поради калкулираните разходи от това увеличение, т.е. увеличават се цените на търгуемите стоки, което е свързано със загуба на конкурентоспособност за нашите стоки. В бъдеще не могат да се очакват големи увеличения на цените на електроенергията за стопански нужди поради факта, че в началото на 2002 г. тяхното равнище е по-ниско от средното за ЕС с около 20%. Едни бъдещи повишения с няколко процента няма да предизвикат сериозна загуба на конкурентоспособност и висока инфлация.

Преди либерализацията на енергийния пазар ценовата политика трябва да е насочена към създаване на условия за покриване на всички експлоатационни разходи и за финансиране на инвестиционната програма в този сектор. В плана на Комитета по енергетика за преструктуриране, премахване на субсидиите и финансово оздравяване на предприятията от енергийния отрасъл за периода 1998–2001 г. беше заложено изравняване равнището на цените на електроенергията за населението с това за стопански нужди. През март 2000 г. правителството в своята актуализирана програма „България 2001“ реши да замрази нарастването на цените на електро- и топлоенергията заради високата социална цена, която домакинствата бяха платили в периода 1997–2000 г.

По този начин се отложи изравняването равнището на цените на електроенергията за домакинствата с тези за стопански нужди. През октомври 2001 г. новото правителство повиши цените за домакинствата, като неговите намерения са изравняването на двата вида цени да стане през 2002 г.

Цената на електроенергията за населението в България значително изостава от средното равнище за ЕС[12]. Според доклад на Европейската банка за възстановяване и развитие (ЕБВР) от ноември 2001 г. страните от Източна Европа трябва да увеличат двойно цената на електроенергията с цел предотвратяване разхищението на енергия и привличане на чуждестранни стратегически инвеститори. От приложение 2 може да се види, че равнището на цените на електроенергия, газ и други горива в България е 7.7 пъти по-ниско от това в ЕС 15.

В краткосрочен период повишенията на енергийните цени за населението ще продължават да оказват значително влияние върху общия ИПЦ. Възможно е да се предизвика нарастване на цените в търгуемия сектор (като част от дефлатора на БДС) чрез претенции за по-високи заплати в енергийния сектор. Тогава това увеличение на заплатите от търгуемия ще се пренесе и към нетъргуемия сектор, а следователно и към цените.

През периода 1998–2000 г. темповете на инфлация в търгуемия сектор са по-ниски от общия дефлатор на БДС. Даже през 1999 г. и 2000 г. ДБДС в търгуемия сектор е по-нисък от нарастването на производителността в този сектор. Постигането на ниска инфлация в търгуемия сектор е от голямо значение за конкурентните позиции на българската икономика и за стабилността на валутния курс.

VI. Ролята на ефекта Balassa – Samuelson върху реалния валутен курс през периода 1995–2000 г.

Както беше отбелязано по-горе, по-високите темпове на нарастване на производителността в търгуемия спрямо нетъргуемия сектор водят до повишаване на относителната цена на нетъргуемите стоки и оттук – до по-висока инфлация в България в сравнение с нарастването на цените в ЕС.

[12] Средното равнище на цената на електроенергията за населението в ЕС за 2000 г. е 0.0942 евро за 1 квтч. През октомври 2001 г. средната цена за България е 0.043 евро (0.04 USD). Разликата е 2.2 пъти.

По теория ефектът BS води до реално надценяване на местната валута. Разлагането на формула (5) на три компонента позволява да се проследи от кой компонент идва надценяването.

В някои изследвания, например на *Cihak* и *Holub* (2001), се приема, че търгуемият компонент като част от реалния ефективен валутен курс няма принос в реалното надценяване, защото цените на търгуемите стоки в страната и в чужбина би трябвало да се изменят с един и същи темп според закона за единната цена. Това допускане се прави, за да се подчертае приносът на втория компонент (нетъргуемия) в РЕВК.

Анализът на РЕВК за България е доста подробен. Използвани са трите сектора като част от БДС – селско стопанство, индустрия и услуги за България и нейните търговски партньори. Трябва да се подчертае, че допускането, което беше направено за България по отношение на това, че селското стопанство и индустрията представляват търгуемият сектор, а услугите – нетъргуемият, беше направено и за страните – основни търговски партньори на България.

Реалният ефективен валутен курс за България беше изчислен с използването на данни за 16 страни, които в периода 1995–2001 г. съставляват 70.5% от външната търговия на страната (вж. приложение 3)[13].

[13] От приложение 3 могат да се направят следните изводи за България в сравнение с търговските партньори през изследвания период (1995–2000 г.):

• Нашата страна има най-високото номинално обезценяване спрямо щатския долар – 31.6 пъти. От това следва, че левът се обезценява номинално спрямо националните валути на всичките изследвани страни.

• България има най-високата инфлация, изразена чрез общия дефлатор на БДС в сравнение с другите страни. За изследвания период цените са се повишили 29.9 пъти.

• От всички изследвани страни България има най-голям стокообмен с Русия (16.6%); следват Италия (9.8%), Германия (11.7%), Гърция (6.3%), Турция (5.2%). Обхванатите в тази извадка страни от ЕС са 9 и съставляват 42.3% от общия стокообмен на България, докато общият стокообмен с всички страни от ЕС съставлява 51.7%.

• За изследвания период българският лев реално е поскъпнал с 19.1% спрямо валутите на търговските партньори. Левът е поскъпнал спрямо валутите на почти всички търговски партньори на България при база 1995 г. = 100, с изключение на Великобритания, САЩ, Турция и Полша.

• При търгуемите стоки България също има най-високата инфлация – повишението е 25.4 пъти.

• Реалното ефективно поскъпване на националната валута, изразено чрез индексите на цените на търгуемите стоки, е 5.7%. Това е резултатът от първия компонент на формула (5).

• Относителната цена на нетъргуемите към търгуемите стоки за България се е

Реалният ефективен валутен курс се е повишил с 19.1%, като в това число търгуемият компонент е поскъпнал с 5.7%, а нетъргуемият – с 13.8%. При представяне на тези данни като индекси за третия компонент (получен като резултативен от общия РЕВК и останалите два компонента) се получава изменение от -0.1%, което се различава незначително от директното изчисление на третия компонент -0.5%, представено по-горе. Тогава можем да изчислим, че средно за периода 1995–2000 г. РЕВК поскъпва с 3.6%, като в това число влиянието на търгуемия компонент е 1.1%, на нетъргуемия – 2.6%, и на третия компонент – -0.2%.

Таблица 6

РЕВК СПРЯМО ОСНОВНИТЕ ТЪРГОВСКИ ПАРТНЬОРИ

(1995 г. = 100)

	РЕВК	Търгуем компонент	Нетъргуем компонент	Разлика в теглата
1996	-22.8	-22.9	0.2	-0.1
1997	-11.4	-5.3	-5.8	-0.7
1998	12.1	10.5	2.2	-0.7
1999	24.1	17.2	8.1	-2.1
2000	19.1	5.7	13.8	-1.0
Средногодишен темп	**3.6**	**1.1**	**2.6**	**-0.2**

В раздел III изследвахме влиянието на ефекта BS върху инфлацията в България. Числата за производителността в търгуемия/нетъргуемия сектор и относителната цена на нетъргуемия/търгуемия сектор бяха доста близки. При база 1995 г. средногодишният темп на нарастване на относителната производителност е 6.9%, на относителната цена на нетъргуемите стоки – 6.2% за България, а за основните търговски партньори темповете са съответно 2.5% и 1.6%.

повишила с 35.1% за периода 1995–2000 г. и има най-високата стойност с изключение на Полша (42.7%). Относителната цена на нетъргуемите стоки общо за търговските партньори е 8%.

• Влиянието на относителната цена на нетъргуемите стоки върху РЕВК за България е 13.8%, което е изчислено въз основа на втория компонент на формула (5).

• Изчисляването на третия компонент на формула (5) е представено в таблица П10. Той почти няма влияние върху РЕВК. За изследвания период неговото изменение е -0.5%.

Таблица 7

ЕФЕКТ BS И НЕГОВОТО ВЛИЯНИЕ ВЪРХУ РЕВК ЗА БЪЛГАРИЯ

(1995 г. = 100)

	Производителност търгуем/нетъргуем сектор			Относителна цена нетъргуем/търгуем сектор			България/ партньори, претеглено
	България	партньори	България/ партньори	България	партньори	България/ партньори	
1996	4.2	1.4	2.8	0.8	0.5	0.3	**0.2**
1997	33.4	5.6	26.3	-10.6	2.0	-12.4	**-5.8**
1998	42.6	6.4	34.0	12.5	7.8	4.4	**2.2**
1999	42.1	10.1	29.1	30.8	13.7	15.0	**8.1**
2000	39.6	13.1	23.4	35.1	8.0	25.1	**13.8**
Средногодишен темп	**6.9**	**2.5**	**4.3**	**6.2**	**1.6**	**4.6**	**2.6**

Оттук изчислените отношения за тези два показателя за България спрямо търговските партньори са съответно 4.3% и 4.6%. Чрез втория компонент на формула (5) се изчислява приносът на нетъргуемия компонент в РЕВК, който е представен в последната колона на таблица 7. Поради по-големия дял на търгуемите стоки в БДС в България в сравнение със страните от ЕС приносът на нетъргуемия компонент в РЕВК става 2.6%.

Това число може да бъде използвано като краен резултат за влиянието на ефекта BS върху инфлацията и РЕВК за периода 1995–2000 г. При средногодишен темп на растеж на производителността в търгуемия към нетъргуемия сектор от 4.3% (спрямо търговските партньори) РЕВК поскъпва с 2.6% заради този ефект. Нашата страна е с фиксиран валутен курс и промените в РЕВК се дължат само на разликите в инфлацията в страната и в чужбина. Тогава поскъпването на РЕВК с 2.6%, дължащо се на ефекта BS, може да се приеме и като влияние на този ефект върху инфлацията в България, изчислена чрез ДБДС.

При използване на ИПЦ и ИЦП за изчисляване на РЕВК стойностите за периода 1995–2000 г. са съответно 32.4% и 42%, а с дефлатора на брутния вътрешен продукт (ДБВП) – 23.2%.

Направените изчисления дават възможност за сравняване на отделните компоненти на РЕВК. Реалното надценяване на валутата идва в по-голямата си част от нетъргуемия компонент – относителната цена на нетъргуемите към търгуемите стоки, чието

нарастване е предизвикано от по-бързите темпове на производителност в търгуемия спрямо нетъргуемия сектор. По-бързият растеж на производителността в търгуемия сектор за България спрямо търговските ѝ партньори води до реалното поскъпване на РЕВК. Според *Halpern* и *Wyplosz* (2001)[14] за страните в преход растежът на производителността в индустрията води до реално поскъпване, а растежът на производителността в услугите – до реално обезценяване на местната валута.

За страните, които са в режим на паричен съвет, РЕВК зависи само от разликата в инфлацията в страната и в чужбина. Тогава поголямото реално поскъпване на националните валути за тези страни ще зависи не само от ефекта BS, но и от това, че номиналният валутен курс не може да бъде обезценяван. Според доклад на Европейската комисия (ЕК)[15] за периода 1995–2000 г. от всички страни – кандидатки за членство в ЕС, най-голямо реално поскъпване на националната валута има Литва (над 80%) заради фиксирания валутен курс към щатския долар. Тяхната оценка за България показва реално поскъпване на РЕВК с 40% (на база ИПЦ) спрямо ЕС, което съвпада с нашата оценка (38.6%) при свеждане на търговските партньори само до тези от страните от ЕС.

Цените на търгуемите стоки оказват пряко влияние върху конкурентоспособността. След въвеждането на паричен съвет темповете на нарастване цените на търгуемите стоки са по-ниски от общата инфлация (ДБДС). Оттук и РЕВК, изчислен за търгуемите стоки, показва само 5.7% реално поскъпване на лева. Този показател се подобрява значително през 2000 г., когато РЕВК показва реално обезценяване от 9.8% спрямо предходната година. През 1999 г. и 2000 г. РЕВК за търгуемите стоки показва подобрение на условията на търговия спрямо голяма част от нашите търговски партньори. Тези две години се свързват с ускоряване растежа на световната икономика и възстановяване равнището на цените на стоките, търгувани на международните пазари, които оказаха положително влияние върху икономиката на България.

Ефектът BS има значително влияние за реалното поскъпване на българския лев през периода 1995–2000 г., като след въвеждането на паричен съвет то е още по-силно изразено, а също и вли-

[14] *Halpern and Wyplosz. Economic* Transformation and Real Exchange Rates in 2000s: The Balassa – Samulson connection, *Economic Survey of Europe*, 2001, 1.

[15] European Commission. Real Convergance in Candidate Countries, 16 November 2001, ECFIN/708/01-EN.

янието на изследвания ефект. Реалното поскъпване на лева е най-силно изразено през 1997 г. и 1998 г., а през 2000 г. се отчита реално обезценяване спрямо предходната година. През 2000 г. общото реално обезценяване се дължи на номиналното обезценяване на лева спрямо щатския долар (15.6%).

Поскъпването на българския лев показва влошаване на конкурентоспособността на българската икономика, доколкото РЕВК е индикатор за това. Задълбочаващият се дефицит в търговския баланс и текущата сметка в периода след въвеждането на паричен съвет съвпадат като тенденция с реалното надценяване на националната валута. Върху дефицита в текущата сметка оказват влияние много фактори, затова не може фиксираният валутен курс да бъде проблем за конкурентоспособността.

VII. Заключение

По-високият темп на производителност в търгуемия сектор в България осигурява приспособяване на доходите и цените към равнището на страните от ЕС. Чрез механизма на ефекта BS този процес ще продължава да предизвиква по-висока инфлация в сравнение с инфлацията на ЕС. Допълнително към инфлацията в България влияние ще оказва приключването на процеса на либерализация на цените и хармонизацията на акцизите.

Този модел предполага, че стабилност на общото ценово равнище е възможна само ако валутният курс поскъпва заради нетъргуемия компонент на РЕВК, като поскъпването е предизвикано от по-високите темпове на производителност в търгуемия в сравнение с нетъргуемия сектор. Тогава нарастването на цените на нетъргуемите стоки не би предизвикало влошаване на конкурентоспособността на страната, а само по-високо равнище на относителните цени.

РЕВК ще продължи да поскъпва с темп, който се очаква да бъде по-нисък от средния за изследвания период, тъй като тенденцията е към намаляване приноса на ефекта BS върху инфлацията и оттам – върху РЕВК.

Другите страни в преход също изпитват реално надценяване на техните валути в резултат от по-високите темпове на растеж на производителността в търгуемия сектор, но това не може да се разглежда като проблем на прехода към присъединяване към ЕС. Това са промени в относителните цени и те не могат да бъдат обект на правителствено регулиране или намеса.

Приложение 1

МОДЕЛЪТ BALASSA – SAMUELSON

Повишаването на производителността в търгуемия сектор предполага повишаване на реалните заплати в този сектор. Нарастването на цените на стоките, произвеждани в търгуемия сектор, е ограничено от арбитража на закона за единната цена. По този начин не се губи конкурентоспособност. Но повишаването на заплатите в търгуемия сектор се пренася и в нетъргуемия с цел предотвратяване на евентуален отлив на работна сила от нетъргуемия към търгуемия сектор, т.е. предполага се съществуването на пълна мобилност на работната сила.[16] В нетъргуемия сектор повишаването на заплатите е възможно чрез повишаване на номиналните цени на произвежданите в този сектор стоки и услуги. По този начин относителната цена на нетъргуемите стоки нараства. Тази хипотеза е известна в теорията с названието *ефект на BS*.

Balassa (1964) и *Samuelson* (1964) заключават, че по-бързият растеж на производителността в търгуемия сектор, отколкото в нетъргуемия, при равни заплати в двата сектора води до намаляване на относителната цена на търгуемите стоки.

Равенството на BS за промяната на относителната цена на нетъргуемите стоки и услуги е изведено от производствената функция на *Cobb – Douglas* за малка отворена икономика.

В някои изследвания[17] връзката между изменението на производителността и цените на нетъргуемите стоки е представено по следния начин:

$$\log P_n - \log P_t = \frac{\alpha_n}{\alpha_t} * \log A_t - \log A_n \qquad (П1),$$

където

P_n и P_t са индексите на цените съответно на нетъргуемите и търгуемите стоки и услуги,

[16] Свободно движение на работната сила между географските райони в страната, между различните сектори на икономиката и между различните професии.

[17] *De Gregorio, Giovanni and Wolf*. International Evidence on Tradables and Nontradables Inflation, NBER, August 1993, WP 4438.

α_n и α_t – делът на труда съответно в нетъргуемия и търгуемия сектор,

A_t и A_n – съответно индекси на производителността в търгуемия и нетъргуемия сектор.

В производствената функция на *Cobb – Douglas*[18] α е постоянно число между 0 и 1, което измерва дела на труда в дохода, а $(1–\alpha)$ – какъв дял от дохода идва от капитала. Следователно α е доходът от труда (*labor income*), който в теорията се определя като компенсация на наетите лица и в дългосрочен период неговото число към общия доход остава относително постоянно.

Производителността A се отнася за общата факторна производителност, но в изчисленията ползваме производителността на труда поради липсата на данни за капитала.

Предположението на BS, че ако в двата сектора (търгуем и нетъргуем) делът на труда е равен ($\alpha_n = \alpha_t$), то връзката между нарастването на производителността в търгуемия сектор и повишаването на относителната цена на нетъргуемите стоки и услуги е правопропорционална. Ако $\alpha_n > \alpha_t$, то относителната цена на нетъргуемите стоки отново ще се повиши даже ако имаме изравнена производителност в двата сектора $A_t = A_n$.

По-голямата производителност в търгуемия сектор води до реално поскъпване на националната валута, тъй като повишаването на цените на нетъргуемите стоки и услуги води до повишаване на вътрешните цени или на общата инфлация.

[18] $Y = A * L^{\alpha} * K^{1-\alpha}$

Приложение 2

ИНДЕКСИ НА СРАВНИТЕЛНИ РАВНИЩА НА ЦЕНИ

(EU15=100)

	EU15	BG	CZ	EE	HU	LV	LT	PL	RO	SK	SI
1. **Крайно потребление на домакинствата**	**100**	**25**	**37**	**40**	**39**	**41**	**36**	**44**	**29**	**30**	**63**
2. Храна и безалкохолни напитки	**100**	42	49	61	53	67	59	55	43	50	95
3. Храна	**100**	42	48	60	52	66	58	53	42	49	94
4. Хляб и зърнени храни	**100**	15	41	48	49	49	43	53	33	43	98
5. Месо и месни продукти	**100**	49	42	62	43	62	56	43	36	44	99
6. Риба и рибни продукти	**100**	77	54	67	74	81	71	57	61	55	87
7. Мляко, сирене и яйца	**100**	65	50	59	63	71	66	51	57	52	90
8. Растителни и животински мазнини	**100**	66	61	78	56	82	79	60	49	61	92
9. Плодове, зеленчуци, картофи	**100**	45	51	62	50	72	55	59	40	52	86
10. Други храни	**100**	72	57	69	64	84	71	65	52	57	105
11. Безалкохолни напитки	**100**	48	63	71	66	76	78	80	69	64	99
12. Алкохолни напитки и тютюн	**100**	33	58	62	55	77	66	62	42	44	64
13. Алкохолни напитки	**100**	46	82	112	75	134	117	95	60	53	87
14. Тютюн	**100**	25	42	31	40	36	23	39	27	37	48
15. Облекло и обувки	**100**	40	58	65	57	85	65	58	25	45	74
16. Облекло и услуги за облеклото	**100**	39	57	63	54	90	68	62	24	49	76
17. Обувки и услуги	**100**	46	64	70	70	74	62	48	27	35	66
18. Наеми, горива и енергия	**100**	20	26	28	32	17	21	31	28	19	60
19. Наеми за жилище	**100**	20	16	23	24	8	13	23	32	14	56
20. Услуги за поддържане на жилището	**100**	55	35	55	41	28	53	39	23	22	57
21. Електричество, газ и друга енергия	**100**	13	65	30	51	35	32	52	25	33	80
22. Мебели, обзавеждане и поддръжка	**100**	27	54	57	55	60	54	59	32	48	65
23. Мебели, подови покрития, текстил	**100**	28	69	58	63	61	54	52	34	50	61
24. Домакински уреди и поправка	**100**	36	39	43	46	53	49	85	28	40	72
25. Други домакински стоки и услуги	**100**	26	54	66	54	66	60	56	34	52	68
26. Здравеопазване	**100**	23	23	30	23	23	23	36	19	16	46
27. Лекарства и медицински уреди	**100**	133	45	77	47	63	53	78	41	49	62
28. Лекарски услуги	**100**	13	19	23	18	17	18	27	13	11	42
29. Транспорт	**100**	44	57	57	71	69	55	64	47	44	76
30. Лични превозни средства	**100**	82	84	87	85	100	88	80	111	75	89
31. Поддръжка на транспортни средства	**100**	53	71	59	89	68	61	75	42	73	79
32. Купени транспортни услуги	**100**	13	20	28	33	45	27	37	18	14	53

	EU15	BG	CZ	EE	HU	LV	LT	PL	RO	SK	SI
33. Съобщения	**100**	12	85	60	76	202	39	71	37	48	40
34. Култура и развлечения	**100**	23	41	46	40	48	46	53	36	32	69
35. Оборудване за развлечения	**100**	26	62	53	60	72	61	92	57	55	84
36. Развлекателни и културни услуги	**100**	18	33	33	32	31	31	40	23	23	56
37. Книги, вестници, списания	**100**	40	36	85	39	91	84	44	28	32	94
38. Образование	**100**	8	20	19	20	17	16	21	11	17	47
39. Ресторанти, кафенета, хотели	**100**	29	42	58	46	64	47	59	43	39	64
40. Други стоки и услуги	**100**	29	36	40	33	38	36	41	23	29	62
41. Нетен туризъм	**100**	100	100	100	100	100	100	100	100	100	100
42. **Колективно потребление**	**100**	**12**	**29**	**25**	**29**	**23**	**23**	**31**	**14**	**21**	**50**
43. **Брутно образуване на основен капитал**	**100**	**39**	**58**	**74**	**63**	**71**	**68**	**61**	**41**	**57**	**77**
44. Машини и оборудване	**100**	61	79	89	79	84	82	82	66	78	91
45. Неелектрически машини	**100**	49	75	92	81	90	82	78	53	70	84
46. Електрически машини	**100**	77	82	90	75	74	81	90	71	93	107
47. Транспортни средства	**100**	77	85	85	77	85	78	82	110	79	87
48. Строителство	**100**	25	40	63	52	59	58	45	27	41	65
49. Жилищни сгради	**100**	26	34	69	51	58	55	36	22	34	59
50. Нежилищни сгради	**100**	25	44	73	51	62	58	47	26	43	63
51. Друго строителство	**100**	24	44	47	55	57	60	54	36	51	81
52. Други изделия	**100**	57	87	77	69	83	77	78	44	67	84
53. **Изменение на запасите**	**100**	**50**	**65**	**71**	**68**	**78**	**69**	**70**	**50**	**61**	**88**
54. **Нетен износ (салдо)**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
55. **Брутен вътрешен продукт**	**100**	**25**	**40**	**43**	**42**	**43**	**39**	**46**	**29**	**33**	**65**

Приложение 3

Таблица П1

Номинален валутен курс – национална валута на търговските партньори и на България за 1 щатски долар

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	94.7	105.0	103.9	102.5	105.0	101.6	101.1	105.0	105.0	177.6	100.0	115.6	111.2	102.3	103.2	112.3	**264.8**
1997	104.6	121.0	117.9	116.9	121.3	117.4	96.4	121.1	121.5	331.3	100.0	128.6	135.2	119.4	113.1	126.9	**2504.4**
1998	106.6	122.8	127.6	118.2	123.1	119.8	95.3	122.8	123.5	568.7	100.0	139.2	143.3	121.6	118.6	212.9	**2621.1**
1999	111.6	128.1	138.1	123.3	128.4	125.3	97.5	128.1	128.8	913.5	100.0	121.1	163.6	130.2	139.2	540.0	**2734.0**
2000	129.0	148.1	159.7	142.6	148.5	144.8	104.1	148.1	149.0	1363.8	100.0	114.6	179.2	145.4	154.9	617.0	**3160.9**

Таблица П2

Номинален валутен курс – лева за единица национална валута на търговските партньори

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1996	279.6	252.2	254.9	258.4	252.2	260.7	262.0	252.2	252.2	149.1	264.8	229.0	238.2	258.9	256.7	235.8
1997	2395.3	2069.8	2124.7	2141.7	2063.8	2132.8	2598.4	2068.8	2060.9	756.0	2504.4	1947.0	1852.0	2096.9	2213.6	1973.8
1998	2459.1	2134.7	2054.7	2217.7	2128.7	2187.6	2750.5	2134.6	2121.6	460.9	2621.1	1883.3	1828.9	2155.0	2210.4	1231.3
1999	2450.4	2134.3	1980.3	2216.5	2128.6	2182.8	2802.9	2134.1	2122.3	299.3	2734.0	2257.6	1671.2	2099.1	1964.0	506.3
2000	2450.0	2133.9	1979.9	2216.1	2128.2	2182.4	3036.0	2133.7	2121.9	231.8	3160.9	2758.9	1763.7	2173.5	2040.2	512.3

Таблица П3

Общ дефлатор на брутната добавена стойност

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	105.3	100.8	107.3	101.0	101.3	103.4	103.1	101.2	100.6	182.4	101.9	99.3	119.2	107.6	104.7	149.1	**219.2**
1997	107.4	101.4	113.7	102.3	102.1	105.6	105.9	101.7	102.3	331.9	103.7	99.5	137.3	116.5	111.8	172.6	**2229.4**
1998	109.6	102.0	119.2	103.2	104.1	107.9	108.2	102.4	104.2	590.2	104.7	99.3	154.1	129.5	117.3	203.3	**2750.6**
1999	111.3	102.0	122.6	103.7	105.1	110.5	110.1	103.4	105.9	912.7	105.9	97.8	163.8	131.9	124.7	354.3	**2808.3**
2000	113.4	101.1	128.5	104.7	106.5	114.3	112.1	104.6	110.0	1347.1	108.1	97.2	175.3	133.1	132.7	461.0	**2989.8**

Таблица П4

Тегла на страните – основни търговски партньори на България, средно за периода 1995–2001 г.

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България
Тегла	9.8	11.7	6.3	4.0	2.3	1.7	2.5	2.0	1.9	5.2	3.2	0.7	0.9	1.0	0.4	16.6	**70.5**

Таблица П5

Реален ефективен валутен курс: България спрямо търговските ѝ партньори

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	Общо партньори
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	74.4	86.2	80.2	84.0	85.8	81.3	81.1	85.9	86.4	80.6	81.2	96.4	77.2	78.6	81.6	62.3	**77.2**
1997	86.7	106.3	92.3	101.7	105.8	99.0	81.0	106.0	105.8	88.8	85.9	115.1	87.7	91.2	90.0	65.4	**88.6**
1998	102.0	126.3	112.4	120.2	124.2	116.5	92.4	125.8	124.4	101.1	100.2	147.0	97.6	98.6	106.1	109.9	**112.1**
1999	103.0	128.9	115.7	122.2	125.6	116.4	91.0	127.2	125.0	102.8	96.9	127.2	102.6	101.4	114.7	156.6	**124.1**
2000	107.6	138.6	117.5	128.9	131.9	119.9	87.8	133.9	128.1	95.8	87.5	111.5	96.7	103.4	110.4	126.6	**119.1**

ИЗЧИСЛЕНИЕ НА КОМПОНЕНТ 1 ОТ ФОРМУЛАТА ЗА РЕВК

Таблица П6

Дефлатор на търгуемите стоки

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	103.7	101.9	105.7	99.6	98.7	102.2	104.4	100.3	101.0	180.5	100.6	94.7	113.4	105.9	106.3	150.8	**218.2**
1997	104.3	101.3	109.2	100.2	97.6	102.9	105.1	100.2	103.5	318.5	100.5	98.0	123.5	113.0	111.0	176.7	**2347.8**
1998	106.0	102.5	112.6	100.2	97.8	103.3	104.4	101.2	103.9	563.6	99.7	98.7	132.1	128.9	114.5	185.7	**2595.4**
1999	106.6	102.1	116.5	100.2	95.6	104.3	105.0	101.6	103.0	845.6	99.4	96.0	138.3	130.2	120.8	295.0	**2437.6**
2000	108.6	101.9	121.0	101.6	96.5	107.5	108.5	102.5	109.2	1260.2	99.9	95.0	143.9	132.9	128.3	432.3	**2540.6**

Таблица П7

Реален ефективен валутен курс на търгуемите стоки: България спрямо търговските ѝ партньори

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	Общо партньори
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	75.3	84.9	81.0	84.8	87.7	81.9	79.8	86.3	85.7	81.0	81.9	100.7	80.8	79.6	79.9	61.4	**77.1**
1997	94.0	111.9	101.2	109.4	116.6	107.0	85.9	113.3	110.1	97.5	93.2	123.0	102.6	99.1	95.6	67.3	**94.7**
1998	99.6	118.6	112.2	116.8	124.7	114.8	90.4	120.1	117.8	99.9	99.3	139.7	107.4	93.4	102.5	113.5	**110.5**
1999	93.3	111.8	105.7	109.7	119.7	107.1	82.8	112.5	111.5	96.3	89.7	112.4	105.5	89.2	102.7	163.2	**117.2**
2000	95.5	116.9	106.0	112.8	123.8	108.3	77.1	116.1	109.6	87.0	80.5	96.9	100.1	87.9	97.1	114.7	**105.7**

ИЗЧИСЛЕНИЕ НА КОМПОНЕНТ 2 ОТ ФОРМУЛАТА ЗА РЕВК

Таблица П8

Относителна цена (нетъргуеми към търгуеми стоки)

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България	Общо партньори
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**	100.0
1996	102.5	98.5	102.2	102.1	103.8	101.8	98.2	101.4	99.5	102.0	102.2	107.4	109.6	103.1	97.1	98.0	**100.8**	100.5
1997	104.6	100.1	106.2	103.0	106.7	104.1	101.1	102.3	98.4	107.8	105.5	102.3	121.2	105.9	101.3	95.9	**89.4**	102.0
1998	105.3	99.2	108.5	104.3	109.2	106.8	105.4	101.8	100.5	108.9	108.8	101.0	132.0	100.8	104.1	116.6	**112.5**	107.8
1999	106.8	99.9	107.7	104.8	114.2	109.2	107.1	102.8	103.9	114.5	111.7	102.7	134.9	102.3	105.4	136.2	**130.8**	113.7
2000	106.9	98.8	109.7	104.2	115.1	109.8	104.8	103.1	101.0	112.5	114.8	103.4	142.7	100.2	105.8	112.2	**135.1**	108.0

Таблица П9

Относителна цена (нетъргуеми към търгуеми стоки): България спрямо търговските ѝ партньори

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	Общо партньори
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
1996	98.4	102.3	98.7	98.8	97.2	99.1	102.7	99.4	101.4	98.9	98.6	93.9	92.0	97.8	103.8	102.9	**100.2**
1997	85.4	89.3	84.2	86.8	83.8	85.9	88.4	87.4	90.9	82.9	84.8	87.4	73.7	84.4	88.2	93.2	**94.2**
1998	106.9	113.4	103.7	107.9	103.0	105.3	106.8	110.5	111.9	103.4	103.4	111.4	85.3	111.6	108.1	96.5	**102.2**
1999	122.5	130.9	121.4	124.8	114.5	119.8	122.2	127.3	125.9	114.2	117.1	127.3	96.9	127.9	124.1	96.0	**108.1**
2000	126.4	136.7	123.2	129.7	117.4	123.1	129.0	131.0	133.7	120.1	117.7	130.7	94.7	134.9	127.7	120.4	**113.8**

ИЗЧИСЛЕНИЕ НА КОМПОНЕНТ 3 ОТ ФОРМУЛАТА ЗА РЕВК

Таблица П10

Относителен дял на търгуемия сектор в БДС по страни

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България	Общо партньори	Разлика в теглата
1995	0.36	0.33	0.32	0.30	0.30	0.34	0.34	0.33	0.31	0.48	0.41	0.35	0.46	0.47	0.45	0.45	0.46	0.38	**-0.08**
1996	0.35	0.33	0.31	0.29	0.29	0.34	0.33	0.33	0.31	0.47	0.41	0.33	0.44	0.48	0.45	0.45	0.46	0.37	**-0.08**
1997	0.34	0.32	0.31	0.28	0.30	0.34	0.32	0.33	0.30	0.45	0.41	0.34	0.43	0.47	0.42	0.43	0.55	0.36	**-0.18**
1998	0.34	0.32	0.30	0.28	0.29	0.33	0.31	0.34	0.29	0.45	0.41	0.33	0.41	0.45	0.40	0.43	0.50	0.36	**-0.14**
1999	0.33	0.31	0.31	0.28	0.28	0.33	0.30	0.34	0.29	0.43	0.41	0.32	0.40	0.43	0.40	0.45	0.44	0.36	**-0.08**
2000	0.33	0.31	0.31	0.28	0.28	0.33	0.30	0.34	0.29	0.43	0.41	0.33	0.43	0.44	0.39	0.46	0.42	0.36	**-0.06**

Таблица П11

Динамика на производителността на труда (търгуем към нетъргуем сектор) по отделни страни

(1995 г. = 100)

	Италия	Германия	Гърция	Франция	Белгия	Испания	Велико-британия	Австрия	Холандия	Турция	САЩ	Япония	Полша	Чехия	Словакия	Русия	България	Общо партньори
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**	100.0
1996	101.5	100.0	98.5	101.0	104.8	101.4	100.0	105.7	101.1	99.3	102.8	102.6	101.8	111.3	102.9	102.3	**104.2**	101.4
1997	102.0	102.6	102.3	103.4	112.4	101.7	95.9	114.7	97.7	101.3	106.8	103.3	112.9	112.3	96.7	113.0	**133.4**	105.6
1998	102.6	102.6	103.7	106.6	112.0	101.7	98.2	115.9	99.0	105.1	110.2	101.9	120.6	100.4	98.3	112.6	**142.6**	106.4
1999	105.6	103.3	106.2	108.5	114.0	101.0	100.3	117.4	100.1	101.8	113.3	102.6	120.7	100.6	106.8	124.0	**142.1**	110.1
2000	108.0	105.9	107.8	111.0	115.1	101.3	102.1	122.1	102.1	107.3	116.4	103.2	126.5	104.3	109.4	127.9	**139.6**	113.1

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DP/26/2002

Regarding the Unilateral Euroization of Bulgaria

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Abstract. This paper was written as part of the debate that has developed in Bulgaria regarding the unilateral "euroization" as a possible way out of the currency board arrangement. The authors are analyzing macroeconomic context, financial costs, but are mainly focused on the long-term political implications and effects of such a decision on the national interest of the country.

The loss of monetary sovereignty that in European tradition is part of the national sovereignty for a long period of time will strip Bulgaria of the right to become a full-fledged member of the zone of the single European currency and the single market. Such a decision would make impossible the full integration of the country into the ESM.

The authors' conclusion is that the unilateral introduction of the euro is not free admission to the euro system. On the contrary, it is very expensive, as it has been explained above. Bulgaria successfully defended its position when Chapter 11 "Economic and Monetary Union" was closed and should not retreat. According the authors, that position is the platform for the discussion on how to make the transition from the Currency Board to the introduction of the euro.

Резюме. Тази статия е част от дебата, развил се в България, за и против едностранната „евроизация", като възможен изход от режим на паричен съвет. Оценката на авторите за едностранната „евроизация", преминава през анализ на макроикономическият контекст, финансовите разходи, но основно се концентрира върху политическите последствия в дългосрочна перспектива и ефекти върху националният интерес на страната.

Доброволен отказ на монетарен суверенитет, който е неразделна част от националния суверенитет, според авторите ще отнеме правото на България да стане пълноценна част от зоната на единната европейска валута и пазар. Такова действие би направило невъзможно пълноценното интегриране на страната в ЕМС.

Заключението на авторите е, че самоволното въвеждане на еврото не е влизане гратис в евросистемата-напротив—струва много скъпо. България затвори гл.11 „Икономически и валутен съюз", като успя да защити своите тези. Според авторите, това е платформата, от която следва да започне дискусия за това, как да се премине от валутен борд към евро.

Contents

The Euroization

The euroization was recommended to Bulgaria at the Bulgaria and Europe Conference in July. The ex presidential adviser Prof. Jeffrey Sachs called to start preparations to dismantle the Currency Board and introduce the euro. "Bulgaria must be ready to introduce the euro if the Currency Board fails. This should not be done unilaterally. Your country should reach an agreement with the IMF and the ECB on future actions in unforeseen circumstances ... If Argentina had dollarized its economy, the crisis would not have hit it."[1] Alfred Schipke, a lecturer at Harvard University, reiterated this idea in a stronger manner. "Bulgaria can become one of the countries that have introduced the euro before joining the European Union." Ilian Mihov from the European Institute of Business Administration went to extremes claiming that "The ECB does not have at least one economic argument against the unilateral euroization of our country."

Definition

The official euroization and dollarization is the withdrawal of the national monetary unit and the introduction of the euro or the US dollar as the only legal tender. The Central Bank ceases to issue money, to be a lender of last resort and to control inflation and the interest rate. Thus a country is stripped of its independent monetary policy and its Central Bank's monetary sovereignty is abolished.

There are two factors needed and sufficient for success from the perspective of pure macroeconomic logic: an official reserve, which is large enough to replace the national currency and a good level of integration with the country (region) whose monetary unit is introduced.

[1] It is a brave assumption that authorities on the matter have strong doubts about.

It is just a hypothesis of official replacement of the money that is being considered. The uncontrolled eviction of the national currency by a foreign currency is a different matter. After many financial crises and devaluation of assets that are denominated in a local currency, the economic agents in most East European countries in transition keep some of their savings in US dollars, euro or Swiss francs. Real estate is quoted in a foreign currency. There had been periods when the large-scale use of the US dollar was called uncontrollable dollarization and thought to be an attribute of an extremely grave crisis. Once displaced, the national currency is slow in regaining position. The repetition of a monetary crisis is never to be ruled out but it is not what this article is about.

What Is the Reason for Recommended Euroization?

The short answer is: to do away with the monetary risk. With a Currency Board Arrangement in place, the risk has been reduced to a very low level, in other words, it is economically irrelevant. Other arguments are the structural compatibility and the high extent of integration of the Bulgarian economy into the eurozone. As the lev is pegged to the dollar, people won't find the replacement difficult. And finally, there are the assumptions that should the Currency Board be removed, the official introduction of the euro would parry certain negative developments, that the turbulence experienced by the Bulgarian economy are symmetrical to the turbulence in the eurozone, that the ECB's monetary policy would be optimal for Bulgaria as well. These allegations, most of which are disputable, are all the arguments. Further we will prove that for a country with a project to join the EU and its Economic and Monetary Union (EMU) these arguable pluses cannot make up for the losses.

Let's return to the idea. As the authors realize, they are making an illegitimate call (that the EU law does not provide for) to introduce the single currency in Bulgaria, they recommend reaching an agreement first and then introducing it. The only additional "argument" they recommend to the country is the need to save the Currency Board Arrangement (?!).

Why Does the European Union Object the Unilateral Introduction of the Euro?

During the negotiation process the European Commission reminded the candidate countries of the three pre-accession stages in the way to the single monetary unit. The stages start with accession. In the first stage, the new member country is judged whether it meets the Maastrich criteria of similarity and all requirements of the Treaty on European Union. In the second stage, the new member country announces that subject to the assent of all other members it starts the procedures that precede the introduction of the euro; the new member country pegs its national currency to the euro and given the consent of the European System of Central Banks fixes a central exchange rate and a deviation margin and sticks to a special Exchange Rate Mechanism (ERM II)[2] in the course of two years. In the third stage, an evaluation is made of the ERM II performance, a final exchange rate is fixed for the national currency to the euro – a conversion rate, and the redenomination is done over a certain period of time.[3] If successful, these three stages are considered a "key factor for the success of the European monetary integration" and are called its "functional culmination" as "ERM II structures the right balance between the liabilities and flexibility"[4] of the EMU member countries.

It is evident the above-mentioned authors suggest that Bulgaria should not go through the compulsory stages and should not apply the ERM II. The warning of ECOFIN should be emphasized: "It should be clear that any unilateral introduction of the single currency by means of euroization will be contrary to economic rationale that underlies the EMU in the Treaty. Therefore, unilateral euroization could not be the way to bypass the stages that are provided for in the Treaty on the introduction of the euro."[5]

[2] The probable deviation margin will be +/- 15 percent.

[3] Maastricht Treaty, Article 109 J (1); Article 1 of its Protocol No. 6. A two-year period was fixed for the full redenomination of the EMU member countries.

[4] Eugenio Domingo Solans, Member of the Governing Council and of the Executive Board of the European Central Bank. Exchange rate policies in the accession process. At the conference on "Alternative Exchange Rate Regimes in the Globalized World" marking the 10th anniversary of the Currency Board in Estonia, Tallinn, 11 June 2002.

[5] ECOFIN Council, Conclusions on exchange rate strategies for accession countries, COUNCIL OF THE EUROPEAN UNION, Brussels, 7 November 2000.

What is to be deduced from the Treaty? 1) The euro shall be introduced by the countries only after they join the European Union and after a successful exchange-rate procedure. The introduction of the single currency is a "common interest" of the EU and the country that introduces it; 2) It is not possible to breach the European Treaty for the sake of one country and introduce the euro by way of exception. Therefore from now on we will use just the term "unilateral euroization," i.e. the introduction of the euro without the consent and commitment of the ECB. This shall not make a country qualify for EMU membership. It is evident that the crisis is an "argument" that the EU won't take. The introduction of the euro is the crowning event in the European integration of a country and not a safety belt in the event of a crisis.

The Agreement Problem

It would be good to mention them who disobeyed the rules of euro introduction and explain why. These are Kosovo and Montenegro, i.e. *autonomous territories, not states.* They did not lose their monetary sovereignty as they did not have any, and introduced the euro to become less dependent on Serbia. In other words, they played on the political effect to disengage from the mother state. Moreover, they make no preparations for full EU membership and therefore do not feel bound to stick to the EU rules.[6]

The unilateral introduction of a foreign currency is different from the introduction subject to an agreement. Unilateral euroiziation is a unilateral decision. No negotiations are held. There is no possibility for a less strict regime. All the burden of the process and all the responsibility are borne by the government that decides to proceed with euroization. If it is agreed introduction, as a rule it is possible that the country whose monetary unit is introduced might opt to offer privileged treatment to the new monetary regime. A bill submitted to the US Congress intended to provide for official dollarization, including Argentina, tried to do that.[7] Unlike this bill

[6] The Republic of Ecuador, the Republic of Panama, the Republic of El Salvador, the British Virgin Islands, East Timor and other smaller countries have introduced the US dollar unilaterally.

that was not enacted, Montenegro and Kosovo never tried to negotiate nor have they negotiated any obligations on the part of the ECB.[8] Their monetary regime enjoys no privileges and the burden and responsibility is all theirs.

The EU officials use the term "unilateral euroization" consistently and unambiguously to emphasize there is no chance to negotiate an exception to the Maastricht Treaty. Their argument is that equal treatment of all members is the underlying principle of the Treaty and an exception shall not be made for anyone. Conversely, the replacement of a local currency by the US dollar is more likely to be negotiated as this won't be a breach of multilateral treaties and the consent of the United States is all that is needed.

The Currency Board Has Taken Over Some of the Bulgarian National Bank's Key Functions

The Currency Board has taken over some of the Bulgarian National Bank's key functions that the BNB should regain. In addition to being completely independent of the Government, the Central Bank should prove its competence to employ all monetary instruments to execute the monetary policy that is binding on the member countries. It is completely wrong to surmise that the Currency Board alone can be a proof of such competence. The Currency Board is a proof of independence and discipline but is incompatible with the ERM II. The BNB should produce proofs of capability to be a full-fledged member of the European System of Central Banks (ESCB) during the compulsory stages. It is only in this way that the BNB and the Bulgarian financial system can be integrated in the eurozone.

[7] A BILL to promote international monetary stability and to share seigniorage with officially dollarized countries. H.R. 2617, July 21, 2001 (referred to the Committee on Financial Services).

[8] Tommaso Padoa-Schioppa, Member of the Executive Board of the European Central Bank, The Euro Goes East, 8th Dubrovnik Economic Conference, 29 June 2002.

Why is it that a country aspiring to full European integration is denied the free option of unilateral euroization? To answer the question, we have to think of the EU in general and of the EMU in particular as clubs whose rules are binding on all who want to join them. The European model is based on the principle of equality, i.e. all members are equal, there are no first-rate and second-rate members, and all members have produced evidence of being capable of enjoying the same rights and of bearing the same responsibilities. The EMU members have replaced their national currencies with the euro (some made a "sacrifice"[9]) after producing firm evidence to persuade each other that they have highly developed and disciplined national monetary systems and fully independent and sovereign institutions that can meet the agreed criteria of exchange rate, inflation control, interest rate control, external debt management and budget deficit management.

If Bulgaria renounces the lev and refuses to pursue an independent monetary policy in future, these will be signs of non-eligibility for the club. In addition to exposing the Bulgarian political inadequacy, the unilateral euroization will create an institutional problem, about the manner in which Bulgaria will be represented in the ESCB and the ECB. Let us remember that the BNB has not even one function typical of a central bank and if it exists at all, it won't be admitted as a member. The question is who is to act on behalf of Bulgaria once it unilaterally replaces the lev with the euro? Even if, hypothetically, the strategic need of EU enlargement may accept a unilaterally euroized Bulgaria, then the Greek or the Romanian central bank would have to agree to represent the Bulgarian interest.

[9] "Let me pay tribute to the German Government for the courage to sacrifice the Deutsche mark, the emblem of German identity, and to give its support to the euro which was an unknown at the time, in the interest of the peace and prosperity of Europe." Reply by Dr. Willem F. Duisenberg, President of the European Central Bank, on the occasion of receiving the Grand Cross 1st class of the Order of Merit of the Federal Republic of Germany, Frankfurt am Main, 24 July 2002.

Cons at Home

In a country with a Currency Board Arrangement it is difficult to understand all pros of a monetary policy as a key instrument for financial stability and sound economic growth, as the board is a **temporary renunciation** of free monetary policy. It is easy to understand that the unilateral introduction of the euro is tantamount to **final renunciation** of whatever monetary policy. It is a big sacrifice in a country with non-competitive economy and low-income levels, as it leaves it with very few instruments to strengthen competitiveness to withstand the pressure of the free European market and to attract capital. It takes time, perseverance and phased integration to meet the Maastrich criteria of similarity and the ERM II. This is time of development and adjustment. Let us remember that none of the eurozone member countries met these conditions at once.

Loss of Seigniorage

The strongest cons at home are of monetary nature. When the euro is normally introduced, i.e. when all requirements are met, the BNB joins the ESCB and acquires a quota in the ECB capital. This allows the BNB to replace the lev notes and coins in circulation with the euro and transform the lev demand deposits and all other forms of lev debt outstanding into a euro debt using the conversion rate. This exchange rate that Bulgaria will successfully maintain two years after the application of the ERM II will be announced as inalterably fixed and valid for the redenomination of the whole outstanding debt.[10]

The unilateral euroization leads to the loss of the seigniorage (the net income from money issuing) for the past period. Bulgaria will have to provide the euro for circulation unassisted. With a Currency Board Arrangement, the levs withdrawn will have to be replaced by some of the euro reserves maintained to balance the levs in circulation and the demand deposits. This simple operation seems to have misled many people who fail to see that if the single Euro-

[10] Council regulation (EC) No. 974/98 of 3 May 1998 on the introduction of the euro.

pean currency is normally introduced, the 2.2 billion euro backing is not needed for the circulation and is released for other purposes.

In the event of an official unilateral substitution of the lev with the euro, the Government will have to substitute some 30 percent of all time and special deposits, the lev deposits. The sum amounts to over 2.1 billion levs or 1.1 billion euro. This is the indicative worth of the fiscal reserve. If the euro is normally introduced, then the redenomination is the operation proper.

This is not the whole loss from unilateral euroization. The normal introduction of the single European currency will give Bulgaria the right to share in the distribution of the ECB cash income and net profit.[11] In 2001 the seigniorage in the eurozone was some 150 billion euro. Further, if, hypothetically, Bulgaria was free of a Currency Board Arrangement and had met the Maastrich criteria, the national seigniorage would have been approximately 2 percent of the GDP, or 300 million euro. A unilateral euroization will forever strip Bulgaria of the right to claim such future earnings.

Arguments so far show why the monetary policy of the candidate countries is a matter of mutual interest with the EU member countries and why the ERM II procedure is so stringent and binding. The rate of the euro redenomination in Bulgaria and the BNB's share in the ECB is highly in the interest of the ESCB. Therefore, serious arguments are needed for the lev conversion rate.

In conclusion, as of today that will cost the country: 1) onetime sum of approximately 3.3 billion euro; 2) annual loss of seigniorage – at least 2 percent of the GDP; 3) renunciation of monetary sovereignty; 4) elimination of the BNB; and 5) loss of reputation. The last three losses are not measured in terms of money but the political implications are exorbitant.

[11] Protocol (No. 18) (ex. No. 3) on the Statute of the European System of Central Banks and of the European Central Bank, Article 32 and Article 33.

[12] Political economy generalizes the macroeconomic, institutional and political aspects of the national and multinational economic projects.

Unilateral Political Decision

In terms of political economy[12] apart from the macroeconomic conditions, there are many other relevant parameters of which the national interest is paramount. In that case the national interest is very clearly defined: Bulgaria aspires to be a full member of the eurozone, which is the world's largest market. The replacement of the national currency with a foreign currency requires an extremely hazardous political decision from the Government, which must take all the responsibility for the abolition of the national monetary unit and for the renunciation of the country's monetary sovereignty. Bulgaria's EU membership cannot justify such a decision as it will be a unilateral decision that breaches the Maastricht Treaty. The Bulgarian monetary and fiscal institutions won't have passed the harsh test nor will they have met the criteria of institutional compatibility, that is, the advantages of membership won't be absorbed. The unreformed and uncompetitive Bulgarian economy and the immature Bulgarian society will be hit by the difficulties of integration to which they are not adjusted.

The unilateral political decision to introduce the euro will foster to agents unrealistically high expectations on the part of the Bulgarian economic agents. Life will show all the time that the expectations had been unfounded and this will cause disappointment. Companies will get a misleading strategic idea of local conditions and of the potential of local monetary and financial institutions.

The loss of monetary sovereignty that in European tradition is part of the national sovereignty for a long period of time will strip Bulgaria of the right to become a full-fledged member of the zone of the single European currency and the single market. Full integration in the newly emerged economic giant that the eurozone has become will be impossible and the prosperity of the region will continue to be unattainable.

Let us ask one final question: Is there a political party to venture unilateral euroization under such circumstances? And when we are answering the question, let us consider whether a public debate on it is still on the Bulgarian agenda.

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The unilateral introduction of the euro is not free admission to the euro system. On the contrary, it is very expensive, as it has been explained above. Bulgaria successfully defended its position when Chapter 11 "Economic and Monetary Union" was closed and should not retreat. That position is the platform for the discussion on how to make the transition from the Currency Board to the introduction of the euro. A dispute of pros and cons related to unilateral euroization won't help.

DP/28/2002

Improving Monetary Theory in Post-communist Countries – Looking Back to Cantillon

Nikolay Nenovsky

Abstract. The experience of post-communist countries has contributed little or almost none to the development of monetary theory. One of the main reasons for this is application of mainstream holistic monetary theory, which does not concentrate on the microeconomic effect of money. The Austrian Monetary School and one of its predecessors, Cantillon, is a good starting point to new approaches to monetary theory. This article attempts: (i) to extend and develop the microeconomic analysis of the effect of money on individual economic agents, or the 'Cantillon effect', by defining the basic set of categories of this effect money paths and channels, money networks, arbitrage of money paths, money entrepreneurs, etc., (ii) to link the Cantillon effect with the 'theory of redistribution groups and the theory of bandits' of Mancur Olson by analyzing the strategies of money bandits, (iii) to seek a relationship between the Cantillon effect and some of Douglass North's ideas of institutional change (North explains the latter predominantly with changes in relative prices and property rights), and (iv) to underscore the analytical potential of the theory of networks (and possibly the graph theory) in the microeconomics of money.

Резюме. Опитът на посткомунистическите страни допринесе малко или почти никак за развитието на теорията на парите. Една от главните причини за това е прилагането на преобладаващата цялостна парична теория, която не се съсредоточава върху микроикономическия ефект на парите. Австрийската монетарна школа и един от нейните предшественици – Кантийон (също Кантилон и Кантильон), представлява подходяща отправна точка за нов подход към монетарната теория. Това изследване се опитва: 1) да разшири и доразвие микроикономическия анализ на ефекта на парите върху отделните икономически агенти, или т.нар. ефект на Кантийон, чрез дефиниране на базисен набор от категории за този ефект – движение и канали на парите, парични мрежи, арбитраж на движението на парите, валутни предприемачи и т.н.; 2) свързване на ефекта на Кантийон с теориите на Мансър Олсън за преразпределящите групи и за стационарния бандит; 3) да търси зависимост между ефекта на Кантийон и някои идеи на Дъглас Норт за институционалната промяна (Норт обяснява последната предимно с промени в относителните цени и в правата на собственост); и 4) да подчертае аналитичния потенциал на теорията на мрежите (а възможно и на графичната теория) в микроикономиката на парите.

Contents

1. Introduction – the Transformation[1] and the Monetary Theories

Any profound change in the economic system leads to significant changes in monetary theory and in economics in general. This statement is not new and has been repeatedly emphasized. In one of his first books, *Prices and Production*, published in 1931, Friedrich Hayek states: "In the past, periods of monetary cataclysms had always been periods of great progress in the field of economics" (*Hayek*, 1975, 61).[2] If we follow this line of reasoning, deep changes in former socialist countries should give impetus to monetary theory or at least should raise new issues of the role of money in the economic system. However, this did not happen. Something much simpler happened. Both changes in Eastern Europe and what should have been suggested as practical action for reforms were reduced (and still are) to mechanical application of mainstream monetary theory, whether monetary theory in which discretion holds a central place or the quantity theory and the neutrality of money.[3]

Undoubtedly the scale of changes in former socialist economies can serve: (i) as a competition ground for different monetary theory schools, i.e. as a test of their efficiency; and (ii) as a starting point of refining both existing theoretical statements and developing new approaches to monetary theory.

In my view, one of the reasons for the lack of quality leap in the monetary theory of transforming economies (TE) is the elimination (or let's call it disregard) of the Austrian Monetary School and its methodology in the competition of monetary theories. However, it is the Austrian School that concentrates on the microeconomic fundamentals of money and first and foremost on: (i) the demand for money at an in-

[1] The commonly used term 'transition economy' is infelicitous as an economy is always in transition: "It is a poor makeshift to call any age an age of transition. In the living world there is always change. Every age is an age of transition" (*Mises*, 1996, p. 860). The term 'transforming economy,' though facing similar problems, is more flexible. I think it is better to use the term 'post-communist countries.'

[2] Schumpeter holds the same view. Hayek also notes that progress in economics has *always* been due to the proper application of subjectivist methodology.

[3] Attempts at analyzing the monetary events of transition with the tools of institutional economics and the new political economy are few (apart from underscoring some institutional aspects of the monetary system). As a rule, however, these do not pay attention to the microeffects of money dynamics on different individuals and groups but rather concentrate on the macroeconomics of transition. See the reviews in *Murrell* (1995), *Rodrik* (1996), *Kornai* (2000) and *Roland* (2001, 2002).

dividual level, (ii) the dynamics of relative prices as information signals, (iii) the importance of time and uncertainty in the analysis of monetary events, (iv) the channels of money impact on the economic system, (v) the relationship between money and property rights, entrepreneurship, *etc*. All these phenomena represent the bearing systemic elements of TE.

The continuation of the above citation from Hayek is eloquent. It reads like this: "This did not happen (there was no progress in monetary theory in the early 1930s – author's note, N.N.) probably because of the change in the behaviour of most economists with regard to methodology used in economics (all accept the 'holistic methodology' – author's note N.N)" (*Hayek*, 1975, 61). As if nothing has happened since Hayek's time when the holistic methodology was expounded. However, nowadays the lack of progress can be explained by the opposite – its preservation. Modern mainstream monetary theory provides almost no tools to understand what is happening in Eastern Europe (EE). Neither the orthodox paradigm of discretionary monetary policy nor the quantity theory can provide satisfactory explanations besides some trivial and sometimes incorrect statements like: (i) "sooner or later money supply growth will evolve in prices growth (by prices it is usually meant the general level of prices – author's note, N.N.)"; (ii) "if the supply of money exceeds demand for it, this leads to changes in interest rates and prices"; (iii) "if money supply grows, interest rate will fall and this will stimulate growth"; (iv) inflation redistributes incomes, *etc*. In the holistic theory, channels through which money affects economic activity are aggregated, limited and extremely simplified[4]. Such aggregation of channels can describe and explain (i) neither the deep change evolving over the last decade in EE involving significant and constant processes of wealth redistribution among different newly emerging economic agents, (ii) nor the lack of substantial economic progress in these economies.

To deal with this 'deadlock' situation, we should focus on the *microeconomic channels of money impact in the economy*. Hence the main task of this article. To show the importance and role of money in a transition economy, I shall attempt (i) to extend and develop the

[4] See the list of channels in Mishkin's textbook (*Mishkin*, 2000). In my view, aggregation and schematization of channels can be explained by the need to legitimize discretionary monetary policy pursued by central bank. On the whole, these channels are mechanical in their framework and different individuals and groups of individuals, especially their interests, are not visible.

microeconomic analysis of the effect of money on different economic agents or generally called the 'Cantillon effect' (CE) by (ii) defining the basic set of categories of this effect – money roads and channels, money networks, arbitrage of money roads, money bandits, *etc*., (iii) to link the Cantillon effect with the 'theory of bandits' of Mancur Olson by defining the main strategies of money agents, (iv) to seek a relationship between the Cantillon effect and some of Douglas North's ideas of institutional change (North explains the latter predominantly with changes in relative prices and property rights), and (v) to underscore the analytical potential of the theory of networks and the graph theory in constructing the future microeconomics of money.

The above research program would allow not only to answer the question of why no progress was made in monetary theory based on the experience in TE but it could also suggest possible new directions for monetary theory development *in general.*

The paper is structured as follows. *Part One* defines the working concepts and presents major theoretical hypotheses. *Part Two* deals with the basic theoretical elements of a positive theory of "money roads and money networks" in the economic system. *Part Three*, from the perspective of the already stated theory of money roads and networks, presents the hypotheses of economic agents' strategies for best positioning in money networks. In *Part Four* an attempt is made at linking money dynamics with the specifics of transition, especially property rights. This is illustrated with the Bulgarian case (1990–2000). The *Conclusion* summarizes issues that need to be addressed and directions of monetary theory development based on the hypotheses stated.

2. Theoretical Concepts

To lay the beginnings of a positive theory of 'money paths and networks' or 'the microeconomics of money' I need to define the set of categories used.

The Cantillon Effect

The Irish born banker Richard Cantillon (1680–1734) is probably the first[5] who in his book "Essai sur la nature et du commerce en

[5] Similar texts on the impact of money on individual economic agents could also be found in Hume's works but on the whole his approach is rather macroeconomic. And, according to Hayek, Hume has actively used Cantillon's book (*Hayek*, 1975). According to Bordo and Salerno, J. E. Cairnes first matched the Cantillon's ideas, a century after the publications of the ***Essaie*** (*Bordo*, 1984, *Salerno*, 1985).

générale," published in 1755,[6] focuses on the complex and diverse effect that money supply change has on the state of individual economic agents depending on their position in the economic system (temporal and spatial[7]). Later, as we know, this idea of Cantillon was incorporated in the bearing body of the Austrian approach to money.[8]

Let me recall in brief Cantillon's ideas presented mainly in Part II of his book, particularly chapters 6–8.

In his criticism of John Locke, Cantillon defines the task of examining the role of money as follows: "Locke ... has been well aware that excess of money makes everything more expensive, but he has *not sought to see how this happens*. The great difficulty of the research is to understand how and in what proportion money growth causes price rises in everything" (*Cantillon*, 1755, 212–213 – underscored by N.N.).[9] Then: "money circulates through so many a channel that it seems *impossible* not to lose sight of it" (*Cantillon*, 1755, 213). The author questions the main postulate of the quantity theory in the following eloquent way: "From all this I conclude that doubling the quantity of money in a country does not double the prices of food and goods. *A river that flows and whirls in its bed does not run at twice as fast speed if the quantity of its waters doubles*" (*Cantillon*, 1755, 235 – underscored by N. N.).

[6] The birth date and the year of publishing of Cantillon's book are not clear. For details see *Murphy* (1985).

[7] Cantillon is considered one of the founders of spatial economics (economics of location).

[8] Hayek's lectures, collected in his book ***Prices and Production***, are directly inspired by Cantillon's ideas of the impact of money on the economic cycle. It is not by accident that Hayek begins with a motto from Cantillon. Perhaps Hayek is one of the first to acknowledge Cantillon's contribution to monetary theory (of course, Jevons had similar observations). Classical (in Cantillon's tradition) statements of the impact of money on the economic system are made by Ludwig Mises (*Mises*, 1996, chapter XVII) and Murry Rothbard (*Rothbard*, 1976), as well as by other, modern representatives of the Austrian School (*White*, 1995, 1999). There were attempts to reject the originality of Austrian analysis stressing the specific effect of money on the system of relative prices and to consider that representatives of the quantity theory have taken account of this (*Humphrey*, 1984). Of course, this statement is partially true. It is true that *Fisher* (***The Purchasing Power of Money***, 1911) and *Keynes* (***Treatise of Money***, 1930) have also mentioned the effects of money injection on relative prices. However, they contented themselves by just declaring that fact, whereas in the monetary system of Mises and Rothbard the Cantillon effect is system forming and differentiating in the process of comparing the efficiency and functioning of alternative monetary systems. In my view, the Cantillon effect is 'open' and provides new opportunities for analysis due to the fact that *even* the Austrian School has studied it in a rather general and abstract way or it has not concentrated enough efforts on its technical improvement.

[9] I have used a French edition with its original pagination.

One of Cantillon's fundamental ideas (although he does not formulate it explicitly) is to show the *redistribution power* that changes in money supply (in volume and structure) provoke in individual economic agents wealth. This power is materialized through movements in relative prices over time and space.[10] Hence the importance he placed on the entry points through which money (money in the author's system is gold and silver, and bank money is money substitutes) enters the economy, the channels through which it flows, the position of individual groups of agents on the money path, the type of agents at entry, *etc*. Cantillon lists a sequence of entry points. He classifies them by money source, which can be summarized roughly into two groups: internal to a country and external in respect of the balance of payments.[11]

Among *entry points* that later determine to a great extent the path of money Cantillon lists: (i) mines in which gold and silver are extracted (parallels could be made with a modern central bank), (ii) the trade balance (here Cantillon distinguishes the effect as a result of consumption of tradable and nontradable goods), (iii) incomes paid from other countries, embassies, *etc*., (iv) external loans to entrepreneurs, individuals and the government, (v) import of money by foreigners (capital inflow in modern sense), (vi) changes in money supply as a result of violence, war or payment of reparations, *etc*.[12] Economic agents nearest to the entry points benefit most from a possible money supply growth as they buy goods at the old prices, before their rise. Thus at the beginning of the money chain money has the greatest purchasing power which diminishes over time and space. Next, of crucial importance for CE to manifest itself are (i) relative prices, (ii) demand for money by economic agents along the chain, both in terms of volume and direction (what goods and services are demanded, consumer or investment goods, *etc*.), (iii) the elasticity of supply of demanded goods and services, *etc*. As a result of the overall CE dynamics some lose and others win. In a specific case (that of higher output in gold mines), Cantillon shows that owners and workers in gold and silver

[10] After injecting the new amount of money the economic system changes its structure significantly. In this line of reasoning we ask ourselves whether it is methodologically correct to compare the economic system before and after money injection.

[11] In Cantillon's system entry points and money paths are *natural,* inherently linked to the system of property rights. They are not artificially constructed and managed as in the regime of the discretionary central bank or even in the currency board regime (where the entry points are restricted in order to limit the sources of money as much as possible).

[12] Bordo identifies seven entry points (*Bordo*, 1984).

mines benefit most, followed by related economic agents (craftsmen, farmers, *etc*.).[13] Losers are landlords as well as those that do not participate in the money network which had received impulse from gold and silver mines (*Cantillon*, 1755, 215–217).

One of Cantillon's discoveries, which was subsequently embedded in the Austrian theory of the cycle, is the impact of money supply growth on interest rate. Cantillon is among the first to show that depending on whether money is injected in economic agents that consume, invest or lend, the effect on the interest rate is different. If money gets into the hands of households, they spent it, prices rise and this leads generally to higher interest rate. Only when money gets into the hands of moneylenders, a prototype of commercial banks, a fall in interest rates could occur. In modern monetary theory this relationship is known as the liquidity effect.

Thus, we provide a broadly general definition of the Cantillon effect in view of the purposes of our analysis.

Definition 1. Cantillon effect (CE): a theoretical statement according to which changes in the volume and structure of money supply cause differentiated, complex and difficult to analyze changes in the system of relative prices, thus bringing about differentiated and complex redistribution processes in the wealth and social status of individual economic agents and groups of agents.

The above definition of CE allows us to construct a definite set of categories. Essentially, all theoretical statements presented below attempt to extend and develop theoretically the CE.

Entry and Exit Points, Money Path and Money Network

Definition 2. Entry point of money: the place where a certain amount of money enters for the first time (or is injected in) the world of goods and services (we could speak of money creation[14]). This is the starting

[13] Fernand Braudel has a different observation. He claims that in Latin America (in XV–XVII centuries) every rise of gold and silver production brings benefit in the first place and primarily to the person who invests in the mines, buys mercury *etc*., and secondly and marginally to the owner of the mines and the miners themselves. Very often, Bordel reminds us, miners spend all money gambling (*Braudel*, 1986, ch. 2).

[14] When the money is injected for the first time, the nominal money creation is identical with a real money creation, which is an exception rather than a rule. When prices go down (for various reasons) we could observe real money creation without nominal money creation.

point of the money amount as a purchasing power and the first monetary impulse. At this point the purchasing power is maximal and can be defined as 100%. Certain type and number of economic agents that get the money on hand or on bank accounts personify the entry point. To simplify analysis, by money I mean only the money that represents liabilities of the central bank (CB), not the total money supply.[15] In this case the number of entry points is small and can be reduced to a finite number, for instance, through various entry points in CB liabilities: (i) entry points of commercial banks (different types of refinancing, *etc*.), (ii) entry points of the government (purchase of government securities or direct financing), (iii) entry points of commercial banks and the government arising from the balance of payments, *etc*. Within the framework of commercial bank refinancing, different types and groups of banks as well as individual banks (taken on an individual basis) can be differentiated. In the latter case we can define entry point 'bank X,' entry point 'bank Y,' *etc*.

Definition 3. O*utput point of money:* the place where the money amount ends its path in the realm of goods and services and ultimately loses its purchasing power, i.e. its purchasing power is zero (we could speak of money destruction). In this case I am reasoning in a world of inflation, i.e. for one-way reduction of the purchasing power from 100% to 0%.[16] Symmetrical (but opposite) is the reasoning in a world of deflation. When both processes are in place (inflation and deflation), the chain of reasonings becomes more complex but the basic logic does not change generally. The loss of purchasing power is not a simple linear process but a complex and non-linear one.

Furthermore, it is logical to suppose that the process of money destruction is one and the same for all currency in circulation – new and old. In contrast to entry points, exit points are numerous and it is difficult to count or classify them. But whereas the entry points are specific

[15] This limitation does not change the essentials but only simplifies presentation. Actually, the theoretical approach presented in the paper applies to the remainder of the money supply that is created by the commercial banks. In real world there are entry points on behalf of commercial bank liabilities, i.e. when commercial banks make a loan to a firm. Commercial banks credit the firm's account with the bank and the firm can begin spending it on goods and services. The abstraction of interim entry points is close to the original Cantillon's understanding of money where bank money is seen as money substitutes. The difference is that in Cantillon's days bank money did not have the meaning that it has today.

[16] I set aside productivity dynamics, wages and other factors determining price movements.

for the different monetary systems and regimes, the exit points are more similar, if not indentical for all monetary systems and regimes.

It is important to note that entry and exit points have temporal and spatial characteristics (position). This makes it possible to define money paths in terms of their spatial length and time period.

Definition 4. Money path (money chain): this is an abstract spatial distance (or abstract time period from a perspective of time)[17] that money passes from its entry point to its exit point (see Chart 1).[18] As time goes by and distance increases, the purchasing power of the injected money amount decreases and ceases to exist because prices of goods and services increase generally (the general price level[19]). The loss of purchasing power spreads over the money that is already in circulation.[20] The purchasing power of money is maximal at entry point (in the hands of the economic agents that got it first) because prices of goods and services remain at the level of the previous money supply volume (before injecting the additional quantity of money). Hence the logical explanation of the fight among economic agents for entry points and closer position (temporal and spatial) to entry points.[21]

Money paths and chains can be classified into *short-term* and *long-term* (in terms of time) and *short* and *long* (in terms of space[22]). Generally short and short-term money paths are directed primarily to con-

[17] In economics time and space are not interchangeable concepts as it is in physics.

[18] So far we are not concerned with the shape of the money path. Usually it is circle-cyclical and it is also possible one and the same agents to be located many times on the money path, i.e. money could pass several times through their hands.

[19] In this paper there is another simplification as well. I assume that a general price level exists. This statement is dubious because any currency unit owned by a given economic agent has its purchasing power according to the *subjective* assessment of the latter regarding its utility. In actual fact, this simplification makes reasoning clearer without blocking methodologically the path. Another assumption is the causal direction from nominal money to price, whereas the inverse causality also holds. Furthermore, there is a kind of cyclical causality. The new money enters the economic process – the prices rise (the purchasing power of all monetary signs – old and new – decreases), and this provokes acceleration of purchasing power destruction and so on.

[20] Here is a new line of reasoning. As old money is already allocated to particular goals according to a particular preferences set, every new injection of money is an exogenous shock for the economic agents. Their preferences are disturbed and their plans are not realized.

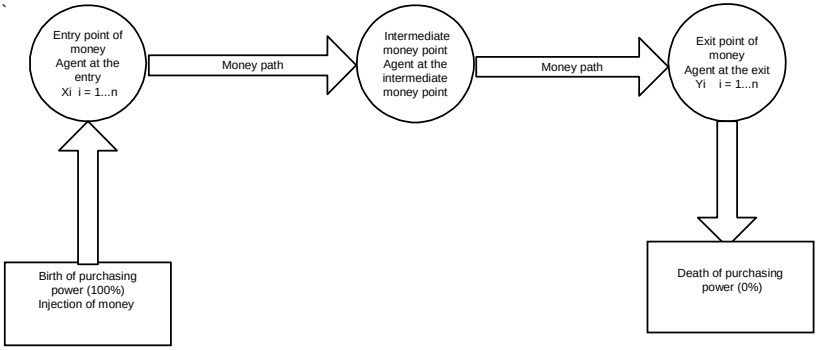
[21] In the event periods of deflation are in place, reasoning is opposite to that in inflation. Then extension of the path of money is possible. Economic agents strive to be farther in the chain. Different individuals assess exit points subjectively.

[22] It is possible for this combination to produce *four* combinations of money paths (from the perspective of time and space).

sumer goods, while long and long-term, to investment goods.[23] In the former case money rapidly loses its purchasing power whereas in the latter this process is slower.[24] Shortening of the path involves fast depletion of the purchasing power of a certain abstract money amount. Hyperinflation, for example, is a process of sharp shortening of money paths. This is of primary importance in attempting application analysis and especially in studying post-communist countries.

Chart 1

SIMPLIFIED (STYLIZED, ABSTRACT) MONEY PATH (MONEY CHAIN)



The above simplified, benchmark money path serves as a graphical illustration of the life cycle of money and its purchasing power.[25] Agents at entry points are designated as X, and those at output points as Y.

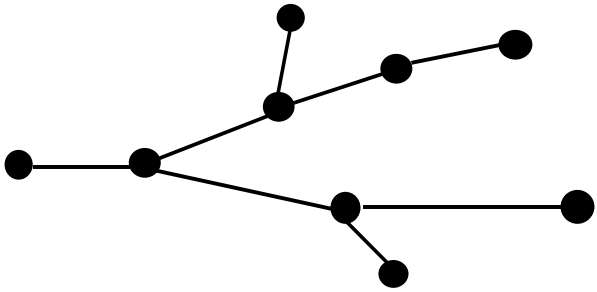
[23] This distinction 'matches' Hayek's explanation of the cycle. Here again I make 'tactical' concessions to the holistic and aggregated theory. Actually, there is a multiple of consumer and investment goods, which makes analysis even more complex.

[24] This could be due to the particular combination of supply and demand elasticity of consumer and investment goods.

[25] A parallel with 'the life cycle of property rights,' analyzed by *Ellerman* (2000, 2002) can be made immediately. The original approach of *Ellerman* (2002), using the graph theory in the analysis of property rights and especially its transfer is extremely suitable for describing the purchasing power of money over time and space. This issue is treated briefly at the end of the paper.

Chart 2

MORE COMPLEX MONEY PATH (MONEY CHAIN)



Although the terms 'money path' and 'money chain' sound alike, 'money chain' makes it possible to focus on the characteristics of the very agents (distributed along the money path). The *money chain can be defined as:* a sequence of related economic agents situated one after the other (or/and next to the other) along the money path. For example, if bank X is at the entry point, next to it are the owners (shareholders) and managers of the bank, the bank's employees, companies related to the bank, other banks related to the bank, other companies related to the bank, *etc*. Another example: if the Ministry of Finance (MF) is at the entry point, next come the companies related to the MF, then civil servants, *etc*. till we get to pensioners, *etc*.

In addition, money paths *have such characteristics as*: *(i) density* of the chain (the number of economic agents on it and the distance between them), (ii) *velocity of movement* of money along the path, *etc*. The analysis could be extended but we stop here.

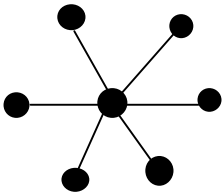
Definition 5. Money network: a set (multitude) of economic agents with specific monetary relations (direct and indirect) holding economic agents together within a certain framework (see Chart 3).[26] The money network could be formed around a money path leading to the emer-

[26] See the definition of network in sociology, *Wasserman and Faust* (1994), *Steiner* (1999). It is also possible to speak of a *money group*. The money group protects the interests of its participants by providing a club service – in this case a certain level of purchasing power – at the expense of the other members of society. Within the network (the group) there exists a regulated distribution and redistribution of this service. Small money groups in which there is asymmetric power are much more efficient and stable. See the research in *Olson* (1982). Actually the higher efficiency of small groups in achieving their goals is a basic thesis in social psychology (*Moscovici*, 1995).

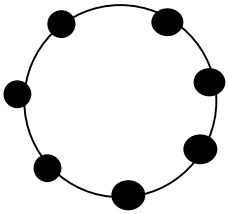
gence of branches, or a complex interweaving of money paths. In this sense, we could speak of complexity of the money path (see Chart 2).

Chart 3

SOME TYPES OF MONETARY NETWORKS

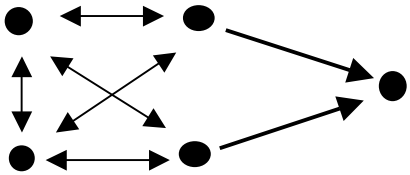


A



B

C



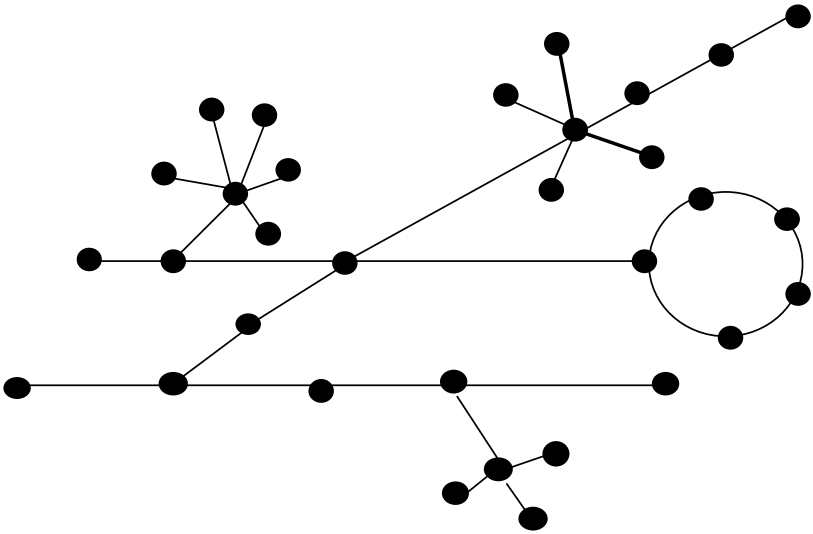
D

Every money network has structure: density, centering of agents, *etc*. Different participants in the network have different positions in this structure of relations. For example, in the first type of network (A) the agent in the center is systemic, all other agents are linked through it. In the second type of network (B) agents have identical positions, and in the third one (C) the first and last economic agents differ from the rest. The last, fourth network (D) illustrates the analytical capacity of the graph theory in the analysis of networks (arrows represent the directions of influence).

As a result of all this complex analytical configurations of money paths and networks are formed which are difficult to present graphically. If this is possible at all, it could be illustrated similarly to Chart 4.

Chart 4

A SAMPLE SET OF MONEY PATHS AND MONEY NETWORKS



Let's examine the next theoretical step – the *agents* that participate in money paths and networks.

Money Entrepreneurs, Money Bandits and Money Arbitrage

We saw that the purchasing power of money changes over time and space from 100% to 0% (in the hypothesis of a long-term increase in prices). We mentioned that changes in the purchasing power bring about changes in the wealth of economic agents distributed in money paths and networks (agents outside the network are also affected). Therefore, it is logical that economic agents, to one extent or another, should strive to transfer and move along these paths and networks (i.e. we proceed with behavioral characteristics of the agents). Thus the economic categories 'money entrepreneur,' 'money bandit,' and 'money arbitrage' emerge. Let's define them.

Definition 6. Money entrepreneur: an economic agent (an individual or a group of individuals) that strives to take advantage of the difference in the purchasing power of money in space and time in order to get profit. The basic strategy of the money entrepreneur is simple – to move along money paths and networks from points and sections of lower purchasing power of money (where money buys less goods and services) to points of higher purchasing power.[27] Money entrepreneurs are those who strive to get richer and their action leads to constant and never ending redistribution of wealth among individuals and groups of individuals.

The above definition is very close to Kirzner's definition of the entrepreneur. According to Kirzner: "The pure entrepreneur, on the other hand, proceeds by his alertness to discover and exploit situations in which he is able to sell for high prices that which he can buy for low prices. Pure entrepreneur profit is the difference between the two sets of prices... The discovery of a profit opportunity means the *discovery of something obtainable for nothing at all*. No investment at all is required; the free ten-dollar bill is discovered to be already within one's grasp." (*Kirzner*, 1973, 48) Similarly to Kirzner's entrepreneur, the money entrepreneur makes use of the lack of knowledge and information asymmetry in order to profit. Likewise, similarly to Kirzner's entrepreneur, to accomplish his action the entrepreneur of money paths does not need any start-up capital, initial own assets or initial investments.

[27] In a future study it will be interesting to analyze agents' behavior as a rational or non-rational process.

The above reasoning makes it possible to proceed with defining the 'arbitrage of money paths and networks.'

Definition 7. Arbitrage of money paths and networks: a process through which the purchasing power of money tends to equalize over time and space. This process is carried on by money entrepreneurs and could also be called 'purchasing power arbitrage.' Purchasing power arbitrage should be interpreted as a constant process of purchasing power balancing without ever reaching equilibrium.

Specifically, money entrepreneurs (hence money arbitrage) take action within a given defined system of property rights.[28] That is, they do not violate it but use the differences in its structure. Also, they observe the principle of voluntary contracts (defined by Hume and later permanently embedded in the Austrian view of property rights). However, there are other groups of economic players for which the above principles do not apply. These are money bandits.

The term 'bandit' is associated mostly with its traditional meaning in everyday language to refer to violations of the system of rights in a country (thefts, robberies, *etc*.). Mancur Olson is one of the first economists that attempted to introduce this term in economics (1995, 2000), assigning it theoretical meaning.[29]

Definition 8. Money bandit: an economic agent (an individual or a group of individuals) that strives to halt or accelerate (or hinder) movement of the purchasing power of money in space and time in order to maximize his wealth and reputation in the system. The money bandit stops and blocks particular money points and paths.[30] He does so by violating and manipulating the property rights system (creating fictive property rights), stopping and changing the flow of information on the purchasing power of money, *etc*. Thus he obstructs the normal (i.e. efficient) redistribution of wealth among economic agents.

Money bandits use as a means to their ends *the political system and the democratic procedure*. There is a great number of political levers –

[28] Property rights are closely related to money movements and changes in purchasing power. It is not possible to transfer efficiently purchasing power of money over space and time without voluntary and efficient transfer of property rights.

[29] Interestingly, the problems of post-communist countries are at the root of Olson's attempt at improving his theory of bandits (*Olson*, 2000). The term 'bandit' is a logical continuation of the term 'interested group' which Olson had introduced long before.

[30] In line with the above reasoning, it is possible that the money bandit himself would determine the points through which money is injected by capturing the money supply. In this sense, money supply is endogenous since it depends on interested groups.

part of these are formal and legally framed (i.e. property rights are observed), while another part (and maybe a more significant one) is not formalized (corruption, *etc*.). Money bandits both break rules and do not observe the system of property rights and *create themselves formal rules or deformalize them.* The term 'deformalization of rules'[31] is an original contribution of the Russian economist Vadim Radaev, studying the economy of post-communist Russia (*Radaev,* 2001). According to Radaev, deformalization of rules (i.e. their transformation into informal norms of behavior) is a result of the institutional compromise when a ritual (ostensible) observance of the rules is in place and they, in turn, are used to conceal complex and hidden informal strategies.

Next, if we make use of Olson's classification, bandits are two types – stationary and roving. In our case, *stationary bandits* are those who maximize their monopolistic rent in the long run (intertemporally) trying to stay as long as possible in a given money position in a given money network.[32] These bandits are capable of having elements of money entrepreneurship. They operate within the framework of a well-defined system of property rights. They know that by leaving purchasing power to the rest they could increase their rent as funds will be allocated for investment and growth. Stationary bandits have interest in that the purchasing power of money should not decrease too fast; they even have interest in that it should stay relatively stable.[33]

On the other hand, *roving bandits* strive to maximize their rent as quickly as possible by leaving their money position (they even disappear as agents) effecting as much purchasing power as possible (spending the money immediately after they get it – or even before they get it). In this case, they aim at leaving as little as possible to the other members of society. All this, of course, is possible by violating the system of property rights. Moreover, this type of bandits is capable of creating temporary property rights in order to legalize their consumption and afterwards these rights are modified. This was and still is large-scale practice in Russia and Eastern Europe.[34]

[31] A process opposite to the procedure proposed by Hernando De Sotto for formalization of informal norms.

[32] The behavior of this kind of bandits could be explained by the conception of 'rent seeking.'

[33] Analyzing the state (organized stationary bandit), Olson also notes that it is interested in maintaining stable money (*Olson*, 2000, 25–26).

[34] It can be assumed that in most cases stationary bandits are part of bigger groups while roving bandits are represented in small groups. This is so because (as we mentioned) small groups are more successful in achieving their goals, especially short-term ones.

Here again we should pay tribute to Cantillon who is maybe the first to see the relationship between money movement and corruption. Criticizing John Law's[35] financial pyramid, he writes: "Then there is no doubt that the Bank in collaboration with the Minister is capable of increasing and maintaining the government debt and decreasing domestic interest rates, for the Minister's pleasure, and this is done discretely in order to repay the government debt. *But such manipulations opening a room for accumulating great wealth are rarely undertaken for the single benefit of the state and those who participate in such actions are corrupted as a whole"* (*Cantillon*, 1755, 323 – underscored by N. N.).[36]

Of course, here we do not refer to *abstract types of agents,* as real life combinations are much more complex. For example, it is possible (and is often the case) for a particular economic agent to be simultaneously money entrepreneur and money bandit (to one extent or another in respect of different agents, *etc*.) Also, it is common practice for an economic agent to start as roving bandit and turn into stationary, and vice versa. It is possible to have other types of classifications of money bandits. One such classification is that of formal and informal bandits. Actions of formal bandits are transparent and predictable while those of informal bandits are veiled in secrecy and lack transparency.

In the theory of money paths and networks every agent has his own strategy (the lack of it can also be viewed as strategy). Closely related to the processes of money arbitrage and money banditism are economic agents' operating strategies in terms of money paths and networks. So I proceed with this.

3. Monetary Strategies of Economic Agents – Hypotheses

Examination of some stylized strategies enables us to continue constructing a theory of the microeconomic impact of money on the economic system. Basic functional and behavioral hypotheses are presented below:

Strategy 1 (basic strategy): Every economic agent strives to position himself in money paths and networks in such a way as to maximize the

[35] Interestingly, Richard Cantillon himself benefited from John Law's pyramid, leaving it at the moment he anticipated its dissolution. Then isn't he the modern Joseph Stiglitz?

[36] This citation has often attracted the attention of Richard Cantillon's researchers, see *Robbins* (1998, 89), *Thornton* (1999, 26).

purchasing power of the amount of money in his possession.[37] If this is a money entrepreneur, he would strive to do it within the property rights granted, and if this is a money bandit – to violate the property rights or change them in his favor (through the mechanisms of the democratic procedure).

The basic strategy can be reduced to a number of operating strategies. I will list only two of them (it is impossible to be exhaustive here).

Strategy 2: Economic agents strive to be closer to entry points and farther from exit ones (in the event of price rises).[38] They strive to be the first to receive the money and be closer to the one that puts them into circulation for the first time.

There is fight for place in the money path. Economic agents strive to move in the money network or move other agents by pushing them back. Pushing back particular agents is done through: (i) blocking their money paths, (ii) extending their money paths (making them longer and/or longer-term), (iii) creating artificial paths for 'siphoning off' purchasing power, (iv) deforming and manipulating *information* on the purchasing power of money, *etc*.

Strategy 3: Movement along the chain (if we assume, that it is possible to be rationalized) is subject to the following rule – the costs of movement (along the paths and in the networks) should be less than the profit from the higher purchasing power obtained after the transfer. The usual problem in such a trade-off (costs – benefits) is that costs can be predicted to a large extent, while profits cannot (at least because the purchasing power may not move in the expected *ex ante* way).[39]

It should be taken into account that economic agents have *diverse characteristics* (propensity to risk, different preferences, resource endowments, levers of power, *etc*.). This diversity makes it possible to formulate different monetary strategies and behavior. Logically those that have greater propensity to risk strive to short and short-term chains.

[37] It is possible to reduce winners and losers from movement in the purchasing power of money to creditors and debtors. The fight between creditors and debtors could be instrumental in explaining the institutional change of the monetary regime (*Nenovsky and Rizopoulos*, 2002).

[38] In this case we suppose that individual rationality of economic agents could provoke inflation ('heard behavior'). But in reality we should assume that (i) agents have different time preferences (for a short or long chain) which lead to (ii) movement of the real interest rates.

[39] We could question the ability of different agents to realize their positions along the chains and networks (in spatial and time coordinates).

Particularly important for individual behavior and strategies is the *completeness of knowledge and expectations* of the purchasing power of money and their and other agents' positions in the money path. Expectations, in turn, are a function of the information available to economic agents.

Next, it is evident that there is a direct inverse relationship between the risk level and uncertainty in a country and the length and duration of money paths. Post-communist countries are an illustration of the above statement of the shortening of paths at increasing risk and uncertainty.

In this line of reasoning it is possible to define the *institutional change of the monetary regime* as a result of the fight of economic agents and groups for redistribution of the purchasing power of money. The institutional change may be seen as a transition from one configuration of money paths and networks to another. This, in the majority of cases, happens after a period of *money crises* (for example, hyperinflation, banking crisis). It could be assumed that institutional changes are consecutive cyclical movements of purchasing power – from long and long-term paths to short and short-term, and vice versa. Such understanding of the institutional change in the light of the microeconomics of money is an addition to Douglas North's view on the institutional change as a consequence of the changes in relative prices. Combining the CE (the impact of money on relative prices) with North's approach (institutional change as a change in the network of relative prices) helps understand how money movement can provoke institutional change.

Could the theoretical statements proposed explain some of the processes in EE and Russia? In my opinion, using CE could help explain why EE countries are developing so slowly (or at least not at the expected pace) and not in the desired direction.

4. An Illustration – the Bulgarian Transition

In the light of the theory expounded, two events in post-communist countries are noteworthy. *On the one hand,* deep processes of property and wealth redistribution are in place, combined with monetary and financial crises. This happens in a setting of complex interaction between formal and informal monetary relations. This setting may be defined as 'systematically' bandit. *On the other hand*, the leading conventional monetary theory (and mainstream economics on the whole) faces dif-

ficulties in explaining what is happening. At best, its explanations carry little cognitive value. What of it if we state, for example, that in accumulating losses a deficit is formed which sooner or later leads to money supply growth and ultimately to inflation and hyperinflation? The real question is who has interest in this process and what is the mechanism through which the interests of the groups and individuals concerned materialize?

There is voluminous literature describing or trying to explain developments in post-communist countries. I will not make an overview. Nor will I try to build empirical indicators of the theoretical hypotheses expounded in this paper. This is a task for another study. I will only highlight some illustrations of the theory expounded. I will restrict to: (i) the privatization process (and changes in property rights in general) and (ii) the transition from a monobank to a modern banking system (within which the CB pursues active discretionary monetary policy). I will illustrate this with examples from Bulgaria, a country reckoned to be close to the communist economy benchmark.

It is a historic fact that at the end of 1996 and the beginning of 1997 *Bulgaria's* monetary system collapsed: national money practically stopped performing its functions and inflation soared at 240% in February 1997, almost one third of the banking system failed and a currency board was introduced as a consequence of this.[40] The crisis (which in conventional reasoning can be referred to as twin crisis, for details see *Berlemann and al.,* 2002), was the outcome of deep processes of redistribution of wealth and property rights after 1990. This could not have happened without the active participation of the banking system and CB. During 1990–1996 there was fierce fight for entry points of money and forward position in money chains and networks. Fierceness was determined (i) by the inevitable price liberalization at the beginning of transition, which accelerated the processes of losing purchasing power and (ii) by the privatization of public (state-owned) property. The end point of the above dynamics was sharp shortening of money paths.

Among the basic *entry points* (in terms of balance of payments and CB) subject to fight we distinguish: (i) injecting money through the

[40] For details on the specifics of the Bulgarian transition, the 1996–1997 crisis and peculiarities of the currency board introduced see *Balyozov* (1999), *Dobrinsky* (2000), *Vutcheva* (2001), *Minassian* (2002), *Nenovsky and Hristov* (2002), *Nenovsky and Rizopoulos* (2002) and *Berlemann and al.* (2002).

Ministry of Finance which shifted the money in a given sequence to budget organizations, state-owned firms, persons related to them, *etc*.,[41] (ii) injecting money through commercial banks which channeled it in a given sequence to firms and persons related to these banks, *etc*., (iii) injecting money through the balance of payments (borrowing money from international financial institution, private creditors, *etc*., revenue from exports), which were consecutively channeled to different economic groups and individuals, hence to groups and individuals related to them, and so on and so forth. A more precise detailing is possible. For instance, within the entry point of the banking system there was fierce fight among individual commercial banks to get financing from the CB (mostly unsecured). In this case the entry point of the banking system may be viewed as a multitude of individual entry points.

Let's consider the *banking system*[42] (bear in mind that the present-day banking system *is fractional*). A number of short money paths were created as roving bandits built money chains through which the injected money was immediately spent on *consumer luxury goods*. In everyday language these paths were called 'schemes of bank siphoning off.' There were cases when banks and financial institutions were registered only for the purpose of making a loan to a firm related to the owner of the bank. Subsequently he received refinancing from the CB and ultimately ran out of the country with the money or spent it on luxury goods. Siphoning off was also associated with participation in privatization of an unprecedented scale consistent with the nature of communist ownership (see *Chavdarova*, 2002). Particularly interesting were 'mass privatization' methods whereby a great number of channels for the profiting of particular groups and individuals were created.[43]

[41] It should be noted that pensioners, teachers and public doctors have always been among the last in the chain, i.e. they received least purchasing power. This was particularly ostensible in the periods of high rates of inflation.

[42] *Caporale and al.* (2001) make an overview of the evolution of the Bulgarian banking system.

[43] Different types of financial pyramids emerged. They spread on a large scale in Albania and Romania as well. The notion 'mass privatization' which is widely spread is strictly speaking nonsense. The privatization process is by definition a process where some individuals deprive other individuals of ownership's possession (Georgi Kirov suggested this detail to me). In the light of our analysis it could be mentioned that the mass privatization tried to make the monetary chains longer. In reality these chains were occupied by different kinds of bandits, who made them shorter and inflationary. It is also true that there were cases when after making chains shorter, some of these bandits converted from roving to stationary ones (and tried consecutively to get longer chains).

In the case when a roving bandit leaves the country, he takes the 'siphoned off' money in foreign currency out of the country thereby depreciating the lev. On the whole, this leads to the same result as if the money were spent in the country. In taking the money out of the country (*de facto* capital outflow) a price increase (i.e. loss of purchasing power) is effected not through higher demand for goods but through higher demand for foreign currency. Banker flights from Bulgaria became massive practice at the end of 1996, as it was reported in the press,[44] and fancy villas (grotesquely huge and inconvenient) still loom in the outskirts of Sofia.[45]

Injecting money into particular banks did not go without the participation of CB representatives (there are still pending legal suits against some of them). Injection took a variety of forms: unsecured refinancing, preferential credit terms, subjective licensing, different schemes of recapitalization, purchase of bankrupt banks against token payment[46] *etc*. Siphoning off was done by *small groups* of interested persons who redistributed actively the purchasing power, monopolizing all entry points and shortening the money paths.[47]

There were 'technical tricks' for redistribution. An ostensibly insignificant observation proves telling in this respect. In the periods of rapid price rises the CB paid salaries to its employees *weekly* (moreover there was a period of interest accrual on the salaries) whereas pensioners received their pensions with great delay. The situation of workers in a number of state-owned enterprises was similar. Obviously, inflation led to a significant CE and hence to great redistribution of purchasing power among different individuals and groups. Some individuals and interested groups pushed back other individuals and inter-

[44] Although documents on roving bandits are available, they cover only part of the cases and are mostly in the press. On the whole, attempts at analytical explanation are few. See the exceptions in *Chavdarova* (2002), *Koford* (2000), *Koford and Tschogel* (1999) and *Nenovsky and Rizopoulos* (2002).

[45] It is interesting to note that roving bandits could and can be identified at first sight. Generally these are stout individuals with bellies and not very intelligent looks. Their appearances are a result of excessive eating and unhealthy life. They spend a lot of their time in restaurants and pubs (i.e. sitting).

[46] For instance, Agrobusinessbank and CB Yambol were bought by the BNB for the mere sum of BGN 1. This price could be viewed later as the price of all assets and liabilities of the bank, and not of the bank itself. And it was BNB's obligation to pay back the deposits that melted during the hyperinflation in the amount before the crisis. Thus, the loses were socialized trough a new money injection.

[47] *Chavdarova* (2002) makes an overview of the networks of personal relationships which have a long-standing tradition and special importance in Bulgarian history.

ested groups in the money path depending on their ability to impact the administrative and political system.

Money injected through the *state budget* exhibited similar dynamics. In this case tax preferences were given instead of credit ones, combined with tax siphoning off, customs preferences and customs siphoning off,[48] *etc*. The same reasoning applies to the *balance of payments*. Grants and loans initially went into the hands of particular economic groups. Depending on whether these groups utilized immediately the entire sum or left something to the others, it is possible to differentiate between roving and stationary bandits.[49]

The end point in the logic of shortening of money paths was a rapid price rise culminating into hyperinflation and a collapse of the purchasing power of the lev in late 1996 and early 1997. In practice, this illustrates the basic hypothesis of Olson of the role of groups in economic development. If we adapt it to our theory, it can be argued that there exists a certain cyclical pattern when different interested groups shorten money paths thereby reducing the efficiency of the economy. This, in turn, inhibits domestic growth and wealth, intensifying the fight for wealth among the groups, shortening money paths, *etc*. The crisis is a logical outcome of this cyclical pattern. But even in the crisis period itself, the fight for redistribution does not stop. Actually, at that time it was most fierce and crucial (*Nenovsky and Rizopoulos*, 2002).

Hyperinflation proved a convenient tool for purchasing power redistribution. One of the channels for this was the devaluation of the *domestic debt* whose component in national currency terms was almost completely devalued and holders of lev-denominated debt were decapitalized (see Table 1). As a whole, holders of lev-denominated debt had low capacity for pressure (among them was a great number of pensioners who held small amounts of government securities). Some of the big debt holders were state-owned banks and state-owned enterprises. In this configuration the issuer and the buyer of securities was one and the same agent – the government. Again, Cantillon's insight could be rediscovered. As we pointed out, Cantillon links public debt

[48] Customs siphoning off logically turned the customs into a focus of the fight among different lobbies. In 2002 the government decided to mandate the collection of customs duties to a foreign company, the English Crown Agents. In the course of discussions the government announced that in the former government's term a special bank (or financial scheme) was set up to facilitate movement of money siphoned off through the customs.

[49] Till the present day there are pending suits for appropriation and rechanneling of foreign aids and loans.

devaluation with the profiting of certain economic groups and individuals.

Table 1

GOVERNMENT AND GOVERNMENT GUARANTEED DEBT DYNAMICS (1991–2000)

(%)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Domestic debt/GDP	13	19	37	52	39	60	16	14	13	7
Foreign debt/GDP	168	127	109	129*	73	243**	91**	72	78	74

* Foreign debt restructuring in 1994 needs to be taken into account.

** Lev devaluation (changes in the exchange rate) needs to be taken into account.

Source: *BNB, Fiscal Services. The currency board was introduced in July 1997. The table shows foreign and domestic debt dynamics. A sharp fall in domestic debt after the hyperinflation period is evident.*

The introduction of the Currency Board[50] in July 1997 could be seen as an institutional monetary change producing new allocation of forces of different individuals and interested groups in purchasing power redistribution (for details see *Nenovsky and Rizopoulos*, 2002).

Bulgaria is just one illustration. Any other post-communist country has its specific examples.[51] *Russia* is particularly interesting, where redistribution processes were (and still are) large-scale and where the CE takes numerous and various forms. Suffice it to mention such phenomena and events in Russia's most recent history as: (i) the large scale siphoning off of state enterprises through mass privatization methods and the emergence of the so-called oligarchs, (ii) total tax evasion through one-day firms (odnodnevki),[52] (iii) information on stealing nearly an entire IMF tranche, (iv) foreign debt management by the CB of Russia through a private firm linked to some employees of the bank, and (v) such a development as the Russian crisis of 1998, when the government practically stopped payments on domestic debt, *etc*.[53]

[50] See *Ho* (2001) concerning the general description of CB functioning.

[51] See the analysis of the hyperinflation in Yugoslavia at the end of the eighties and the beginning of the nineties in *Petrovic and al.* (1999), *Petrovic and Vujosevic* (2000).

[52] See *Yakovlev* (2001), *Radaev* (2001).

[53] For details see *Vavilov* (2001) and *Chapman and Mulino* (2001).

5. Discussion – Directions for Future Studies

In this paper I tried to present the basic analytical elements of the theory of money paths and networks, which I summarized as CE. In turn, the theory of money paths and networks could be viewed as part (or supplementary element) of the theory of money (mainly in its microeconomic aspect[54]). In addition, I tried to highlight that the CE set of tools provides better analytical possibility for explaining what is happening in post-communist countries. Researchers of Eastern Europe transition would benefit from incorporating CE in their analyses.

In the course of constructing this theory a number of new problems and unresolved issues emerged, outlining directions for reasoning and future research. The tasks can be grouped into three categories: (i) theoretical improvement, (ii) formalizing and quantifying the theory, and (iii) empirical testing.

Firstly, in a *positive (explanatory) theoretical perspective* it is necessary to develop and refine the set of categories and to make theoretical hypotheses more precise. For instance, a more profound analysis of entry points of money should be considered in order to find a way to distinguish between end – and – entry points (from the viewpoint of the central bank) and interim – and – entry points (on the part of the commercial bank granting a loan). Also, the importance of expectations and information for individual optimization of monetary path, *etc*. needs to be studied. A specific analysis of groups and networks participating in the process of purchasing power redistribution is necessary.[55] Focus should be placed on the interests of the groups, the structure of the networks (e.g. to what extent the type of network affects purchasing power volatility), *etc*. In this sense, research of monetary groups and networks by using the set of tools of the political economy and institutional economics might be considered.[56]

[54] In my view, the monetary theory is uniform and microeconomic in nature. However, this does not mean that the quantity theory or some other holistic monetary theories have no cognitive value *at all*. In a specific context (e.g. centralized supply of money) they have certain marginal utility. Let's recall Hayek's statement that the quantity theory is 'wrong' but the worst disaster that could meet us is to stop to believe in its validity.

[55] The way in which the new monetary injection affects the 'old' money in circulation, as well as how the new money changes agents' behavior and agents' configuration in the network are issues of particular interest.

[56] In our earlier study we made an attempt at focusing on the fight between creditors and debtors, which in turn explains the dynamics of the institutional change of the monetary regime (*Nenovsky and Rizopoulos*, 2002).

Next, at a more specific level it is necessary to see how CE acts not only under the conditions of a hypothetical trend of inflation but also in deflation and in a combination of inflation and deflation (a cyclical pattern often observed in Eastern Europe). In a *normative theoretical perspective*, it is necessary to answer a number of questions. For instance, how to 'organize' economic activity in order to create conditions for extending the monetary paths and for most efficient distribution of purchasing power? Is it necessary and is it possible to restrict the activity of monetary groups and especially that of monetary bandits and how to do this? Could the state undertake this task or is it at the root of deformation of monetary paths and networks? Where is the boundary between ethics and efficiency?

Secondly, it is possible to make an attempt at *formalizing* and *quantifying* the theoretical statements presented. In my opinion, the graph theory provides good possibility for this. As we mentioned, David Ellerman uses this approach successfully in his theory of property rights (*Ellerman*, 2002).

Thirdly, a system of empirical indicators needs to be constructed, which should allow (insofar as this is possible) checking the theoretical hypotheses stated. As we know, both institutional economics and the new political economy experience some difficulties in empirically testing their theories (*Alston and al.,* 1996). Experience in post-communist countries provides an excellent ground to check the theory of money paths and networks, which in turn would provide the opportunity to include new elements in the theory of money as a whole.

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