DISCUSSION PAPERS

DP/72/2009

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN BULGARIA (1991–2006)
An Econometric Analysis Based on the Logic of the Production Function

Statty Stattev

BULGARIAN NATIONAL BANK


130
ГОДИНИ
БЪЛГАРСКА
НАРОДНА
БАНКА
YEARS
BULGARIAN
NATIONAL
BANK

DISCUSSION PAPERS

DP/72/2009

BULGARIAN
NATIONAL
BANK

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN BULGARIA (1991–2006)

An Econometric Analysis Based on the Logic of the Production Function

Statty Stattev

June 2009

ISBN: 978-954-8579-23-0

Printed in BNB Printing Center.

Views expressed in materials are those of the authors and do not necessarily reflect BNB policy.

Elements of the 1999 banknote with a nominal value of 50 levs are used in cover design.

Send your comments and opinions to:
Publications Division
Bulgarian National Bank
1. Alexander Battenberg Square
1000 Sofia. Bulgaria
Tel.: (+359 2) 9145 1351, 9145 1978
Fax: (+359 2) 980 2425
e-mail: Dimova.L@bnbank.org
Website: www.bnb.bg

Contents

SUMMARY: This study explores the interrelationship between economic growth and the banking system development in Bulgaria following the logic of the production function, further enriched with financial development indicators. The study verifies the presence of short-term and long-term (Granger test and Wald test) causality between the dynamics of real economy and that of the banking system, as well as the existence of co-integration dependencies between them (Johansen test). The major transmission mechanisms between the two sectors have been identified and forecasts have been made concerning the way in which financial development and major real factors will affect, and contribute to, economic growth in the future. It has been proven that in the period preceding the currency board mechanism implementation in Bulgaria, the banking system development had an adverse effect on aggregate output dynamics, while international trade played the role of a basic transmission mechanism throughout that period. After mid-1997, the dynamics of lending to the non-governmental sector affected positively the economic growth, whereas the rest of the financial variables had a negative impact on it, with investments becoming a fundamental transmission mechanism channeling the various effects.

Keywords: Finacial Development, Economic Growth, Finance – Growth Nexus, Production Function, Granger Causality, Johanson Test, Wald Test, Transmission Mechanisms.

JEL Classification: C3, C32, E1, E17, G2, G21, O1, O11, O16

Statty Stattev, Doctor of Economic Sciences, Associate Professor of Economics at the University for National and World Economy, Member of the Governing Council of the Bulgarian National Bank.

1. Introduction

The processes of transformation sweeping through the countries of Central and Eastern Europe in the 1990s were marked by recessions of various durations and depths, which each of these countries initially suffered. The recessions were followed by positive growth rates attained and maintained by these countries, and in a number of cases these growth rates were even relatively high. Parallel to this, a transition from a semi–monetary to a monetary economy began, coupled with a transition from a single–tier to a two–tier banking system, coupled with the introduction of intensive financial intermediation.

The above developments provoke the striving of economic theory to find answers to questions such as: to what an extent these changes are interconnected, what is the specific type of this interconnection, is there any causality underlying the changes, and what is the direction of this causality. The answer to these questions has been sought out in a number of empirical studies, which, owing to the insufficient duration of the time series they explored, include a variety of statistical populations pertaining to the economies in transition in terms of data input and apply the methods of panel simulation and cross–section data analyses. These methods, however, predetermine the impossibility for employing as broad as possible a scope of comparable indicators concerning the countries' financial development, and hence, this makes it impossible for them to formulate unequivocal conclusions about the specificity of the relationships studied in each individual country.

It is these peculiarities precisely that make this subject matter so topical for Bulgaria. The topicality is further enhanced by the fact that apart from the influence of the typical characteristics accompanying a country's transition from a command to market–oriented economy, the economic development of this country has been under the impact of two different monetary regimes, each of which has affected the real economy and the financial system in a different way.

The majority of econometric studies on Bulgaria held to date by Bulgarian authors or by foreign teams with the participation of Bulgarian researchers focus solely either on economic growth, or on the conduct of the banking system, by applying the analytical methods of dynamic series, panel simulation, or the structural models based on the production function. Economic growth simulation is connected mainly with the names of R. Ranguelova, G. Minasyan, Tzv. Tzalinsky, G. Ganev, etc., whereas econometric techniques for the study of money and monetary policy have been used primarily in the publications of N. Nenovsky, K. Christov, M. Berlemann, M. Mikhailov, and other authors.[1] Individual publications, such as those of N. Nenovsky,

K. Christov, G. Ganev, etc., dwell on the interconnection between money and the real economy, the emphasis being laid on the direction of the impact, the effect of monetary regimes and/or the impact of significant channels.[2] The attention in the analyses of N. Nenovsky, E. Peev, and T. Yalumov has been focused on the interactions between banks and companies in their respective roles of lenders and borrowers.[3] As for the relationship between economic growth and financial development in Bulgaria, thus far it has been studied from an econometric point of view by N. Valev and N. Tassich, who focus their research on how bank lending impacts investments and the economic activity in the real sector of the economy.[4]

It is natural for Bulgaria to be present in a number of econometric studies performed on countries in transition, in which the development of the banking system and the real economy has been approximately described by various indicators based on the employment of different econometric methods, leading consequently to ambiguous results. According to the majority of these studies – such as those of G. Fink, P. Haiss, A. Oks, M. Neimke, D. Jaffee, M. Levonian, etc. – the changes in the sector of banking intermediation have a stimulating effect on the dynamic development of aggregate production.[5] In the opinion of T. Koivu, A. Mehl, A. Winkler, C. Vespro, etc., such a positive impact has not been observed and financial development is a statistically negligible factor or is even adversely connected to economic growth, whereas in the research of G. Fink, P. Haiss, G. Vuksic, A. Akimov, A. Wijeweera, etc., the assessment of the effect depends on the choice of a financial development indicator.[6]

The goal of the analysis that follows is to study the interconnectedness between economic growth and the development of the banking system in Bulgaria following the logic of the production function by means of:

– Verification of the availability of a short-term and long-term causality between them;

– An assessment of the presence of a long-term causality and outlining the nature and direction of its effect;

– Identification of the fundamental mechanisms of transmission and mapping out forecasts about the type and dynamic development of this causal interconnection in a future period of time.

In compliance with the intention defined above, the subject matter of this study has been laid down in three sections.

Section One makes a review and comments upon the results of tests, which study the stationarity of the time series of the variables employed in the study, and substantiates at the same time the utilization of their first differences. The short-term causality tests have been made following the logic of

the production function, by employing the Pair–wise Granger Causality Test with the successive exclusion of one of the function's arguments. Finally, the same scheme was applied to measure the effect of the successive inclusion of each of the financial variables in the model, whereby the specificity of this variable in the course of the time periods under exploration has respectively been taken into account.

Sections Two and Three are devoted to the analysis of the long-term dependencies between the financial and real sectors of the economy, discovered on the basis of Johansen's test based on the production function. By applying Wald's test to the second period subject to research (1997–2006), the existing long-term causalities between the variables have also been outlined. The interpretation of the results obtained emphasizes upon these long-term dependencies precisely, which are simultaneously both short-term and long-term causally interrelated.

The analysis has been differentiated into periods divided by the introduction of the currency board mechanism in the country (i.e. into a pre-currency board period and a post-currency board period) in order to distinguish the particular properties characteristic for each of them, whereby for every of the two individual periods the same logical scheme has been applied. Firstly, a presentation and analysis is made of the unadulterated or "authentic" production function, which makes it possible for us to study the interrelations of economic growth with its major generators in the real economy. Then, the assessments obtained for the various production functions are compared with those obtained through their modification by adding indicators for financial development. What is arrived at in this way are indications about the major transmission mechanisms between the real and financial sectors, which are subsequently subjected to a detailed verification by means of the differences between the coefficients preceding the statistically significant variables, obtained after the successive inclusion and exclusion of each individual factor of production and financial variable. Forecasts concerning the second period are made by means of decomposing the variance and impulse functions, commenting at the same time on what the dynamic development will be of the future contribution of the individual variables and their reaction in the event of expected shocks, which condition different scopes and coverage of the production function itself.

Choice of variables, stationarity tests, Granger causality test

In order to perform the econometric analysis, only those indicators concerning the two sectors (real and financial) have been selected, for which a sufficiently large number of observations was amassed for a relatively long period of time. Five indicators for the real sector of the economy (Rj) have been arrived at, out of which two are indicators of economic growth and three are real sector production indicators representing investments, labor, and foreign trade.[7] Another seven indicators have been selected for the financial sector, which play the role of independent variables in the econometric models subsequently constructed; and they have been given the indication Fi (i = 1–7).[8] Quarterly data have been used, whereby the seasonal data have been smoothed in advance and brought into a logarithmic form respectively. Two periods, for which quarterly data are available, have been differentiated, namely: from the first quarter of 1991 to the fourth quarter of 1996 (the pre-currency board period), and from the second quarter of 1997 to the third quarter of 2006 (the post-currency board period).

The tests performed for the data series thus created – with few exceptions – make it impossible for the zero hypothesis to be ruled out.[9] Using the test for detecting the presence of a single root, including both information criteria and their modified versions, it turned out that for the first period (1991–1996) there was not a single stationary series among the financial variables. As far as the real economy variables are concerned, they revealed only individual possibilities for rejecting the zero hypothesis. Rather similar are also the results from the tests concerning the next period (1997–2006). Therefore, it would be safe to conclude that in their initial form of constitution the data series are non-stationary and cannot be used for the purposes of econometric modeling.

However, when the first differences between the variables were tested, it turned out that all of them are stationary, i.e. they are devoid of a single root and can correctly be employed for the purposes of econometric analysis (see the results attached in Addendum 1).

What is notable is that over the two periods of time under exploration, however different they are in terms of their financial and economic environment, the data series behaved in a highly similar manner when the tests for the presence of a single root were held. The series are stationary and manifest their stationarity with an absolutely dominant level of statistical significance equal to 1 percent (what should be kept in mind is that the prevailing practice for such studies is to work with a 5 percent risk for error). The slight confusions in individual assessments (according to different criteria), involving the indicators for the number of the employed and consumer prices during the first period, can be explained by the strong and unstable dynamic development of the economy at that time.

In the case under consideration, the two independent tests for the presence of a single root jointly give the same positive assessment for the presence of stationarity observed in the first differences of the variables, given the presence of a long-term constant mean. Moreover, Addendum 1 makes a perfect illustration of the fact that the levels of statistical significance for the two tests are the same with very few exceptions. For its part, this is a prerequisite for a much higher level of security and reliability of the econometric assessments and results, which have been obtained subsequently in the course of performing this study.

Now that it has become clear that the analysis is based on the first differences of the variables, let us see what they are like and what their economic meaning is. In the general case, the first differences (i.e. the differences occurring in two adjacent periods of time) of a given value, expressed in their logarithmic form, mean that the value has increased, because the difference between the logarithms of the two values is a logarithm of the quotient of these same values. Then, for a random indicator Rj or Fi the following equations will be valid:

$$DLGR_{j,t} = LGR_{j,t} - LGR_{j,t-1} = LG\frac{R_{j,t}}{R_{j,t-1}}$$

or

$$DLGF_{i,t} = LGF_{i,t} - LGF_{i,t-1} = LG\frac{F_{i,t}}{F_{i,t-1}}$$

Because all data series used in the subsequent econometric analysis consist of the first differences of the initially defined variables, they acquire an economic meaning and come to indicate the rate of change of the respective base variable. In this way, the time series used in the econometric simulation and analysis concerning the real and financial sectors of the economy refer to the indicators, which have been conceived as independent variables and are now displayed in Addendum 2.

The results from the stationarity tests are an indispensable step when we attempt to establish causality (or dependency) according to Granger. In this study, when more than two variables are involved, the Pair–wise Granger Causality Test has been applied to the combinations of all possible pairs of variables, which participate in the production function. In practice, this is a test between two variables, but it also takes into account the impact of the rest of the variables in the model in their capacity of hidden variables. This is the way in which the variables participating in the production function have been tested, namely: with and without an indicator or indicators for financial development, and with the successive exclusion of each of the factors of economic growth, namely: investments, labor, and foreign trade.

For the production function constructed in this way, when economic growth (measured by the two indicators – the GDP growth rate and the per capita GDP growth rate) depends only on the above-mentioned three factors, the pair-wise Granger test for the first period fails to indicate any causal dependency between economic growth and any of the factors in both directions (see Addendum 3).

Over the second period under exploration the picture undergoes a substantial change and all factors of production now start to affect economic growth (see Addendum 4). It is only natural that the strongest impact is manifested in the directions from and to investments. The dynamic development of the share of the gross fixed capital formation in terms of the GDP, according to the pair-wise Granger test, is a significant cause for economic growth and at the same time is by itself dependent on both the real GDP growth rate and the per capita real GDP growth rate. Moreover, the afore-mentioned causal interdependence between economic growth and investments is realized at exceptionally good levels of statistical significance, which are far below the 1 percent mark.

The dynamic development of the number of the employed and the share of the foreign trade commodity exchange in terms of the GDP also turn out to be a cause, according to Granger, contributing to the growth rate of the real GDP after the implementation of the currency board mechanism in the country, but now the levels of statistical significance are not as good and hover around the 10 percent mark.

All seven financial variables have been successively included in the complete version of the model (see Addenda 7 and 8). What has been observed for the first period after such an inclusion is two double mutual causalities, according to the Granger test. The first of these causalities confirms the results obtained and quoted above about the interdependence between economic growth (made explicit by means of the two indicators employed) and the first two of the financial indicators. On the one hand, it turns out that the growth rates of the real GDP and the per capita GDP are interdependent according to the Granger test with the rate at which the share of quasi-money changes in terms of the GDP and the share of the M2 monetary aggregate changes in terms of the GDP. On the other hand, this confirms the results already obtained that before the introduction of the currency board mechanism, the links between the real economy and the financial sector fail to pass through the transmission mechanism of investments, and inasmuch as such links or channels exist they are mutually dependent (for half of the financial indicators these links are two-way in fact).

With respect the second causality, the place of growth is now taken by foreign trade. Therefore, the mutual intermediation between growth and finance

for the 1991–1996 period of time is effected predominantly through the channels of foreign trade. This generally means that money "goes round" along the channels of foreign trade commodity exchange, but in the majority of cases this money is not ploughed back as investments for further production.

As far as this first pre-currency board period is concerned, a confirmation was made of Granger's proven unilateral "inverse" dependence of lending extended by the banking system on economic growth. This can mean two things: on the one hand, a substantial part of the loans granted to the real economy enterprises do not become production investments, and, on the other hand, the major part of investment resources (predominantly in the private sector of the real economy) is not funded by means of bank loans.

The analyzed 1991–1996 period of time also yields an unexpected causality in the direction of the country's financial development as a whole, with respect to the growth rate of the employed in the national economy, the only exception being the share of the M2 monetary aggregate in terms of the GDP. The explanation of this phenomenon can be sought out along the line of the fact that a large portion of the financial resources during this period goes to maintaining the employment rate of an unjustifiably high, inefficient and ineffective labor force, which, at the same time, is paid for by relatively low wages. On the whole, however, this is considered to be a quasi-causality, for which a logical explanation cannot be found, and could therefore be neglected as a meaningful economic result.[10]

Interesting results have been obtained after the successive exclusion of each of the factors of production from the model. In all versions of a given factor exclusion, Granger's unilateral causality has been preserved in the direction from economic growth to the shares of overall lending (or total credit) and the non-governmental lending in terms of GDP at the same levels of statistical significance of around 5 percent on the average. This means that this is a stable dependency and that it is not affected either by any of the factors of economic growth, or by any combination of theirs.

The observed two-way causality between the factors of economic growth and the shares of quasi-money in terms of the GDP and the M2 monetary aggregate in terms of the GDP becomes a one-way causality – from financial development to economic growth only – when any one of the growth factors is excluded from the model. In the opposite direction, this Granger's interdependency grows considerably weaker and remains in force depending only on the relation of the per capita real GDP growth rate to the share of quasi-money in terms of the GDP (if the factors of labor and foreign trade are excluded), and on the per capita real GDP growth rate to the share of the M2 monetary aggregate in terms of the GDP (when investments have been excluded).

The reported Granger quasi-causality from financial development to the labor factor of production is now manifested for a smaller part of the financial sector indicators applied in the study. When the factors of *investments* and *foreign trade* are excluded, what affects the employment growth rate is only the share of the domestic financial assets and the share of the total financial assets in terms of the GDP, and this effect is revealed at substantially deteriorated levels of statistical significance hovering around the 10 percent mark. Taking also into account that these results are valid only for the most broadly defined indicators concerning the depth of banking intermediation, which do not directly correspond with the performance of the major financial functions, the results can be taken to be negligible from the point of view of their substance and meaning.

During the second period of time, the direct Granger causality disappears in the direction from financial development to economic growth, and at the same time the causality in the opposite direction is enhanced in comparison with the preceding period. The real GDP growth rate and the per capita real GDP growth rate turn out to be significant causes for the overall development of the financial system according to five out of the seven indicators employed in the study (the two exceptions being only the share of quasi-money in terms of the GDP and the share of the M2 monetary aggregate in terms of the GDP). The sharp increase of the impact exerted by investments has also been confirmed, alongside the confirmation of their performance in the capacity of a transmission mechanism, which is characteristic for five of the financial indicators with the exception of the share of domestic lending in terms of the GDP and the share of domestic assets in terms of the GDP. The mutual Granger causality is observed between the growth rate of the gross fixed capital formation in terms of the GDP and the dynamic development of non-governmental lending in terms of the GDP, which can be accepted as a positive testimony for the development of the country's macro–economy as a whole.

Extremely strong and with a shifted weight center (in comparison with the preceding period) is the Granger interdependency between foreign trade and financial development. The rate of change in the share of the foreign trade commodity exchange is a significant Granger cause (measured at very good levels of statistical significance much below the 1 percent mark) for six of out the seven financial indicators (the only exception being the share of quasi-money in terms of the GDP). The interdependency is expressed by the fact that in the opposite direction financial development is a Granger cause for four out of the six indicators, namely: the share of quasi-money in terms of the GDP, the share of liquid liabilities in terms of the GDP, the share of non-governmental lending in terms of the GDP, and the share of total bank assets in terms of the GDP. In this way foreign trade also turns out to be a transmission mechanism between the real economy and the financial system.

For the period after 1997 (the post–currency board period) we register once again the same quasi-causality in the direction from financial development to the labor factor of production for four of the financial indicators: share of domestic lending and share of non-governmental lending in terms of the GDP, as well as for the share domestic assets and share of the total banking assets in terms of the GDP, whereby for the indicator share of loans for the non-governmental sector in terms of the GDP there is a mutual causality, i.e. an inverse Granger causality indicating a dependency on the dynamic development of the number of the employed or the employment rate. In fact, there is a single possible logical explanation about the relationships between the labor factor of production and financial development. Inasmuch as the Bulgarian economy is developing predominantly in an extensive fashion, we can assume that a certain portion of domestic loans and the loans extended to the non-governmental sector are spent on hiring additional work force. And as this study makes use of the indicator employment growth rate, to a certain extent it is normal for the above commented Granger causalities and mutual causalities to exist in practice (and they do at very good levels of statistical significance at that).

With the successive exclusion of each of the factors of production from the model, what is observed in the second period of time (1997–2006) is an exceptional stability in the mutual dependencies, which have already been proven, among all variables treated simultaneously and successively in the capacity of both dependent and independent variables. In all variants of exclusion of one of the factors of production, the assessments commented above have been preserved – both with respect to the F–statistics assessments and those of the statistical probability (significance), which indicates that the Granger dependencies and mutual dependencies in the period after the implementation of the currency board mechanism are very resilient and stable.

The search for long-term dependencies is based on the presence or absence of co-integration between the various independent variables, because such co-integration underlies the long-term equilibrium in the system subject to the study. In fact, the tests of Dicky–Fuller and Phillips–Peron described above, and all the rest of the stationarity tests, as well as a number of residual–based methods (such as the method of the least squares, for instance)[11], also assess co-integration, but in these cases each equation is assessed *per se* – on its own only. In this study, however, the attention is focused on the verification of co-integration in systems of equations. In other words, what has been sought out in this study are long-term systemic dependencies between different dimensions of financial and economic development.

The check-up for the presence of multiple co-integration is held by means of Johansen's test, which is traditionally employed to this purpose.[12] Four types of models have been successively tested, which differ one from another by the level of differences we have determined to work with – respectively zero, first or second difference. The models also differ by the presence or absence of a free member of the equation. The choice of models for further analysis observes the requirements for the lowest values of the information criteria and the best statistical probability.

Johansen's test assumes and verifies the existence of a correlation in the system, i.e. the existence of at least one long-term dependency. Then, by iteration, the existence of at least two, three, etc., long-term dependencies are assumed and verified (in connection with the variables included in the model, and until their number has been fully depleted). Thus in practice, the verification is carried out in parallel for each two of the mutually related criteria. The first one follows up and determines the number of co-integration vectors, while the second criterion tests the zero hypothesis for the absence of co-integration vectors. If the zero hypothesis has been rejected, the next zero hypothesis is automatically tested for the presence of at least one long-term dependency, then it is tested for the presence of at least two such dependencies, etc.

According to the result obtained from Johansen's test, in each individual case we obtained as many long-term dependencies (co-integration equations) as are the variables included in the model from zero to their actual number. Provided we work with the first differences of each of the variables, which have the meaning of growth rates, at the time of performing Johansen's test all time series were tested at the same time lag (0, 0). The purpose was to assess each co-integration equation, so that a comprehensive and meaningful VAR construction could be arrived at, which is actually a vector auto–regressive model of corrected error (Vector Error Correction Model – VECM).

The vector auto–regressive models, which represent a summary of regular auto–regressive models, are applicable and suitable in cases such as this study, when the independent variables are more than two.[13] The serious advantage of the VAR models in comparison with the other models and simulated constructions is that they do not require any preliminary definition of the variables as a *priori* endogenous or exogenous. Here all variables are presumed to be regarded as endogenous and are defined by means of the given model. The models employed predominantly in this study are of the type mentioned above – VECM, which have been specifically constructed to work with co-integrated time series (and the empirical analysis in *Section Two* proves to operate with such co-integrated time series precisely).

Upon the construction of the VEC models specifically employed in the study, a number of particularities had to be taken in consideration. First, it is

mandatory that one of the variables should always be either the GDP or the per capita GDP, i.e. Y or YC. Second, the presence of one to three out of the seven chosen variables, describing financial development Fi, is also mandatory. Third, one to three out of the remaining five variables, describing economic development Rj, (because the symbols Y and YC have already been reserved) shall always be included. Under these conditions, the specific VEC model employed is described by a system of equations, looking pretty much like the one illustrated below, where ECT_{t-1} is an error correction member with one lag in time[14], which is the same for all equations. In the normal case, ECT_{t-1} inclines to zero, which means that the system is in a state of equilibrium, or a state close to equilibrium, e.g.:

$$DLGY_t(YC_t) = a_1 + a_{1,1}ECT_{t-1} + \sum_{k=1}^{n} b_{1,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{1,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{1,k} DLGR_{j,t-k} + e_{1,t}$$

$$DLGF_{i,t} = a_2 + a_{2,1}ECT_{t-1} + \sum_{k=1}^{n} b_{2,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{2,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{2,k} DLGR_{j,t-k} + e_{2,t}$$

$$DLGR_{j,t} = a_3 + a_{3,1}ECT_{t-1} + \sum_{k=1}^{n} b_{3,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{3,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{3,k} DLGR_{j,t-k} + e_{3,t}$$

The major factor contributing to the choice of VEC models as an instrument for analysis is the understanding that they simulate the long-term equilibrium of the system subject to this study. This is done by introducing into the analysis past presumed equilibriums in the capacity of factors determining the current state and the future development of the variables under consideration.

Upon the practical implementation of the summarized VEC model described above, which has been constructed on the logical basis of the production function, several successive stages have to be covered. At each stage we obtain various measurement tools and the general model acquires further specificities. In this way, within the framework of the VEC methodology employed in this study, we create different variants of production functions with the participation of the three real variables (or factors) mentioned above: R_3 – IY, R_4 – LF, and R_5 – XY, employing on top of them the already known financial variables (or factors).[15] Following this logic we verify to what an extent each of these factors plays the role of a transmission mechanism between the real economy and the financial sector.

What is exploited at the beginning is the well–known formal logic from the second stage, and the independent variables are grouped in threes, whereby the first one is an indicator for economic growth: R_1 – Y or R_2 – YC; the second variable takes all the forms of an indicator for the development of the banking sector Fi (i = 1, 2, 3, 4, 5, 6, 7); and the third and fourth variables are all possible pairs of combinations of Rj (j = 3, 4, 6). This is how three com-

binations have been arrived at, from which a successive exclusion is made of R_3 – IY, R_4 – LF, and R_5 – XY.

Each of the above combinations is computed with each of the financial variables (indicated here as the second variable) and in this way seven systems of four equations each have been generated. The specific model can be visualized in the following way as a system of equations (1):

$$Y\,(YC) = F_1\,(Rq, Rs, Fi),\ q, s = 3, 4, 6;\ qs;\ i = 1, 2, 3, 4, 5, 6, 7 \qquad (1)$$

This is how – only with respect to the GDP growth rate (R_1 – Y) – three pairs of real independent variables are obtained, each of which has seven combinations with one financial independent variable. Another seven are the existing combinations with respect to the per capita GDP growth rate (R_2 – YC). In the last version of the extended production function employed, the latter includes the three real independent variables simultaneously (R_3 – IY, R_4 – LF, and R_5 – XY), which – together with the financial variable Fi (i = 1, 2, 3, 4, 5, 6, 7), are presented as four factors (or sources) of economic growth. The production function in this case is formulated by means of the following equation (2):

$$Y\,(YC) = F_2\,(IY, LF, XY, Fi),\ i = 1, 2, 3, 4, 5, 6, 7. \qquad (2)$$

Parallel to this, a similar production function is constructed, which refers to the real sector of the economy only. With an exclude financial independent variable, the production function is formulated by means of equation (3), which is of the following type:

$$Y\,(YC) = F_3\,(IY, LF, XY) \qquad (3)$$

The last two systems of equations (2) and (3) are of a great methodological significance for the specific econometric analysis, because they contain a piece of serious cognitive meaning from a comparative point of view. If we compare them to the preceding set of equations, postulated by the system of equations (1), they are more comprehensive and complete, i.e. they each contain an additional variable (either financial or real) than the preceding equations, from which this variable has been excluded.

Upon performing the empirical comparative analysis in the following two sections of the study, this construction makes it possible to establish what is the independent role and impact of each of the independent real and financial variables on economic growth, i.e. what is the contribution made by each of these variables to the development of the real sector of the economy (and to economic growth in particular), and also what is the contribution of a specific variable in the interactions between the financial sector and the real economy, as well as its contribution to the development of the financial sector itself.

In all the cases subject to this study, for which Johansen's test has been performed and a VEC model has been constructed, a long-term Granger causality (VEC Granger Causality) has been sought out. This search was performed by means of the complex exogenous Wald test (Block Exogeneity Wald Test). For the purposes of the econometric analysis in this study, when the long-term Granger causality was researched, a modified Wald test was implemented in the way proposed by Toda and Yamamoto.[16] In this test, each of the variables of a given econometric equation, which are usually presumed to be endogenous, is treated as an exogenous variable, while at the same time all the rest of the variables remain endogenous by default. In this way, through such a modified Wald test, for each of the equations in the given VRC model we obtain as many blocks (or groups) of assessments as the number of the variables in the model are. In each of the groups one of the variables is taken to be exogenous, and it is in terms of this variable that the assessments of the Chi-square statistics are made, which shows the effect of each one of the remaining variables in this equation (accepted to be endogenous by default) on the selected exogenous (or dependent) variable in the given block, as well as the statistical significance of this effect. Parallel to this, at the end of each block, a general assessment of the Chi-square statistics is made on the complex joint impact of all variables treated as endogenous on the variable chosen to be exogenous, as well as an assessment of its statistical significance.

When the existence of long-term dependencies has been found, it is by means of the above mentioned variances and modifications of the Granger tests that it becomes possible to define for which of the long-term dependencies there is a short-term causality, and for which the causality is a long-term one, as well as for which of the dependencies such causality is simultaneously both a short-term and long-term Granger causality.

The VAR (VEC) methodology, which has been employed in this study, can be used for prognostic purposes as well. This is the intent and design of two of the major functions[17] built in the EVIEWS software package, which are used precisely to this end. These two functions are: the variance decomposition function and the impulse function, which is also known as the impulse response function. The variance decomposition function outlines the effect of each of the independent variables on each and every of the remaining independent variables employed in the model subject to the study, as well as its autonomous effect upon itself at various points of a future period of time. In this way, what we expect to see in the future behavior of the system is the subsiding impact of some of the variables and the growing impact of other variables, which will be taking place at various rates in the course of their dynamic development.

In this study, the independent variables have been filtered in compliance with the methodology of Cholesky, without the presence of any standard errors. When testing the econometric model on the basis of combined graph analysis, we established that the decomposed impact of the different variables stabilizes on the whole approximately at the time of the twentieth time lag, i.e. after a five years' period of time. This is the reason why the variance decomposition has been made for 4, 12, and 20 lags respectively in the tables summarizing the empirical results, which can be seen in the attached Addenda. This is how empirical information is obtained about the future factor effect of the chosen variables for periods of time after one, three, and five years respectively. From a methodological point of view, this approach is completely justified, because the forecast refers to a period of time, which is of a duration equal to half the length of the ten years' period of time subject to analysis (i.e. the entire period after the implementation of the currency board mechanism), and this has been a common practice when similar studies are held.

In each specific model, the variance decomposition of individual variables is expressed in percentage terms, whereby the sum total of all factors (i.e. variables) is always 100 per cent. In this way the variance decomposition for each variable yields valuable information about its relative significance with respect to all the variables making up the system for various future periods of time.

The impulse functions (or else: the impulse response functions) indicate the future shock effect on a given independent variable in relation to each of the remaining independent variables included in the model. Therefore, the impulse function expresses the one–way impact between any two variables within the system, whereas the variance decomposition considers the comprehensive effect of a given variable on the entire system, i.e. on all variables, including the effect it produces on itself as well. The very impulse response or shock within the system is defined as a modification of the size of a standard deviation. In practice, this is the way of assessing the various shocks within the system, and some of them are defined as relatively strong, whereas others are assessed as relatively weak. From the point of view of the behavior of shocks in the course of time, we can say that they subside in different manners: some die out very rapidly, whereas others retain their impact for a much longer period of time.

On the basis of the tests held on the impulse response functions stemming from the models constructed under this study, we can say that the shocks on the whole subside fairly rapidly – at the rate of 10 to 12 time lags. This is the reason why the empirical information obtained in connection with the impulse responses and revealed in the respective tables in the Addenda, attached hereto, covers periods of one, two, and three years ahead. In a num-

ber of cases, especially when the number of the variables in the systems of equations increases, the shocks continue to subside even after the third year and this can take as long as the fifth year. These specific cases have been subject to separate analyses, and it to this effect precisely that the study contains an additional graphic representation of their behavior.

Another particularity can be said to be the fact that Cholesky's methodology, employed in this study, automatically assumes that individual shocks do not correlate among themselves, which is far from a realistic assumption. Because the effect of these correlations cannot be separated, it is usually attributed to the first variable in the model (i.e. in the system of equations), which varies in each individual case. Moreover, the places of the equations in the model change in practice, so that each individual variable (standing for a given factor) is at least once postulated as a first variable and takes this effect upon itself. The same result is obtained when the variance is decomposed, whereby the first variable always has the greatest contribution (usually over 50 percent, and in individual cases its contribution can go as high as 95 percent).

The last problem, which the econometric analysis had to solve, is connected with outlining and assessing the mechanisms of transmission (the channels of impact and interaction) between the real economy and the financial system. From a methodological point of view, the solution to the problem thus defined is sought out by means of the appropriate grouping and comparison of the models already constructed. To this end, a system has been constructed, which is a combination of the systems of equations already constructed (1), (2), and (3), which we have put down in a certain order. The new system (4) looks as follows:

$$Y(YC) = F_2(IY, LF, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7.$$
$$Y(YC) = F_3(IY, LF, XY) \qquad (4)$$
$$Y(YC) = F_1(Rq, Rs, F_i),\ q, s = 3, 4, 6;\ qs;\ i = 1, 2, 3, 4, 5, 6, 7.$$

The system presented in this way makes it possible for us to perform specific comparisons by including and excluding various real and financial variables into and from the model. By means of this inclusion and exclusion we verify the role and significance of each of the independent variables, studied in the model, in their capacity of a factor of interaction between financial and economic development. The specific research method built on the basis of the above stated model can be logically followed up in the following manner:

Let q = 4 and s = 5. Then system (4) acquires the following expression:

$$(YC) = F_2(IY, LF, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7.$$
$$Y(YC) = F_3(IY, LF, XY) \qquad (5)$$
$$Y(YC) = F_1(LF, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7,$$

where a real variable, which has been excluded from the third (last) equa-

tion or the F_1 function, stands for the relative share of the gross fixed capital formation in terms of the GDP (R_3 = IY).

In the same way, if $q = 3$ and $s = 5$, the system acquires the following look (6):

$$Y(YC) = F_2(IY, LF, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7.$$
$$Y(YC) = F_3(IY, LF, XY) \quad (6)$$
$$Y(YC) = F_1(IY, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7,$$

where the excluded real variable from the third equation is the number of the employed(R_4 = LF).

And lastly, if $q = 3$ and $s = 4$, what follows is the exclusion of the third real variable employed – the relative share of foreign trade commodity exchange in terms of the GDP (R_5 = XY) from the third equation. This is how system (7) has been obtained:

$$Y(YC) = F_2(IY, LF, XY, F_i),\ i = 1, 2, 3, 4, 5, 6, 7.$$
$$Y(YC) = F_3(IY, LF, XY) \quad (7)$$
$$Y(YC) = F_1(IY, LF, F_i),\ i = 1, 2, 3, 4, 5, 6, 7.$$

Thus, each of the three last systems of equation, which we have specified in concrete terms, namely (5), (6) u (7), differs from the others by the exclusion of one real variable and consequently by the inclusion of two real variables, represented by the variances in the third equation and the F_1 function. By means of the second equation or the F_3 function we now have as a basis for comparison a constant classical production function concerning an open economy with factors of production such as capital, labor, and foreign trade. On the other hand, by means of the first and third equation or the F_2 and F_1 functions, we provide for the successive inclusion of each of the seven financial variables: F_i, (i = 1, 2, 3, 4, 5, 6, 7) one by one.

The essence of the methodology employed in this study, which is both a factor analysis methodology and one for registering and assessment of the transmission mechanisms between financial and economic development, consists in the comparison of the free members and coefficients preceding the independent variables in each of the equations describing the model. With the successive inclusion and exclusion of a given real and financial variable, the coefficients preceding the rest of the variables and the free member of the respective function also change. On the basis of the dynamic development and size of these differences, we can deduce whether a factor effect and a respective transmission mechanism are present, and consequently infer what is their strength and impact.

If we trace the logic of arranging the equations in the overall system (4) and its subsequent three concretizations (5), (6) and (7), we can see that the successive steps look as follows: First we obtain the above mentioned differ-

ences in the coefficients and the free member for the first two equations of the systems under consideration, i.e. functions F_2 u F_3, which in fact have been derived earlier from equations (2) and (3). These differences give us the quantitative assessment of the contribution, which each of the financial variables makes to economic growth.

What we assess at the next stage are the differences between the free members and the coefficients preceding the independent variables for the first and third equations of the systems considered in this study, represented by functions F_2 and F_1, which are now familiar as equations (2) and (1). It is on the basis of their dynamic development that we are capable of determining the significance of foreign trade and of assessing its effect and contribution, as well as the significance, effect and contribution of each of the financial variables for the economic growth attained by the country.

What the last stage of the analysis under consideration undertakes is to make a comment on the differences in the coefficients between the second and third equation of the systems constructed in this section of the study, stemming either from the F_3 and F_1 functions or expressed by equations (3) and (1). Their values make it possible for us to make a judgment about the relations between financial and economic development, by means of comparing the open economy without a financial system described by equation (3) and the closed economy with a financial system provisionally expressed by equation (1). This enables us to assess the contribution both of foreign trade and each of the financial variables, both in their capacity of growth factors and possible transmission mechanisms between the real economy and the financial system.

The methodology established in this study to the purpose of performing factor analysis and seeking out the transmission mechanisms between economic and financial development has been employed in the concrete empirical analysis performed in the next two sections of this study.

The results obtained in the course of performing the Granger causality tests, which have been presented in Section One of this Chapter, create sufficient grounds for us to exploit them in the further analysis of the interrelation between financial development and economic growth (or the so-called Finance–Growth Nexus) within the framework of the theoretical model presented above, which has been constructed following the logic of the production function. As this analysis becomes multi-dimensional and multi-faceted due to the successive inclusion and exclusion of each of the independent variables concerning the real economy and the financial development of the country in order to make a comparison between them, in the subsequent sections of the study this analysis is performed independently for each of the two periods of time, which have been delimited at the beginning of the study.

An analysis of production functions with the inclusion of a financial variable for the 1991–1996 period of time

The performance of Johansen's co-integration test for the first period subject to this study indicated the presence of long-term dependencies both in the authentic production function (including nothing else but the factors of labor, capital, and foreign trade) and a production function with included financial variable of the share of domestic lending in terms of the GDP at the standard level of statistical significance of 5 percent (see Addendum 5 for further detail). When the statistical significance was lowered to the admissible level of 10 percent, the presence of co-integration dependencies was also revealed upon the inclusion of other three financial indicators in the production function. These indicators are: the share of liquid liabilities in terms of the GDP, the share of non-governmental lending in terms of the GDP, and the share of domestic financial assets in terms of the GDP. In this way, for five out of eight possible combinations we obtained confirmation for the presence of a long-term dependency in the production functions relative to the growth rate of the real GDP. Absolutely the same result has been obtained when economic growth is measured through the second indicator – the per capita real GDP growth rate.[18]

The co-integration equations, which give expression of the above mentioned long-term dependencies, are marked by criss–cross shading in columns (1) and (2) of Addenda 10–15. What is remarkable about these equations is that the following regularity is revealed without any exception whatsoever: The rates of changes in the level of employment and the share of the gross fixed capital formation in terms of the GDP are statistically insignificant, with respective positive and negative signs of their preceding coefficients, whereas the changes in the share of foreign trade commodity exchange in terms of the GDP are statistically significant and have a negative effect. Therefore, the openness of the Bulgarian economy is manifested as the only determinant of economic growth among all real variables, whereby what corresponds to each percent of growth of the openness of the economy is between a 0.33 per cent and 0.52 per cent decline of economic growth (measured both by the growth rate of the real GDP and the per capita growth rate of the real GDP), which reaches 0.59 per cent for the authentic production function.

With the successive inclusion of the financial variables one by one, what can be seen in the logic of their structuring in the groups of liquidity – lending – assets[19] is that all financial variables have a negative sign each preceding their coefficients and that with the only exception of the dynamic development of the share of non-governmental lending in terms of the GDP they

all are statistically significant. This means that the rising level of bank intermediation during the 1991–1996 period of time not only fails to stimulate economic growth, but it also definitely contains it, i.e. it has a restraining effect on economic growth.

Out of the statistically significant financial variables, the effect of the share of domestic bank or financial assets in terms of the GDP is the strongest, and its rise by 1 percent leads to an economic growth decline by 0.51 per cent. A 1 percent change in the share of liquid liabilities in terms of the GDP leads to an inverse change of economic growth by 0.47 per cent. The effect of the share of domestic lending relative to the GDP is of the weakest effect and a 1 percent growth of domestic lending results in an economic growth decline by 0.43 per cent. The statistical insignificance of the coefficient before the variable for non-government lending indicates that economic growth remains relatively unaffected by the variations in the activity of the banking system.

What is notable in the equations analyzed thus far is the following fact: Regardless of the fact which of the two indicators employed in the study are used to the purpose of explicating economic growth, the results obtained both about the statistical significance and the sings preceding the coefficients of each of the independent variables are absolutely identical, whereby even the values of the coefficients are the same up to the third sign after the decimal point.

When the above model is further tested by the successive exclusion of each of the independent variables referring to the real economy in the following order: investments – labor – foreign trade, we obtain an empirical explanation of their corresponding systems of equations (5), (6) u (7), which have already been formulated in the preceding section.[20] The difference in the statistically significant coefficients with an included and excluded real independent variable and the changes, which this difference undergoes, makes it possible for us also to assess the role of the respective factor of growth in its capacity of a transmission mechanism between financial development and economic growth.

In more concrete terms, the analysis referring to the testing of all independent variables in their capacity of possible transmission mechanisms consists in the following. In each of the tables in Addenda 8 – 13 (covering the first pre-currency board period of time) and those in Addenda 15– 20 (covering the second post-currency board period of time), column (0) displays the free member of the equation of the production function and the specific independent variables chosen to participate in it. Then the heading "Co-integration equations" follows and column (1) underneath contains the coefficients standing in front of the free member and the variables when the "complete" production function is considered, having been equipped with the three produc-

tion factors of the real economy plus a given financial variable. Column (2) displays the coefficients of the "authentic" production function, where the financial sector does not participate. The last column (3) underneath the heading displays the coefficients of the production function now containing a financial variable, from which one of the factors of production has been excluded. The last heading "Difference in the coefficients" successively displays the differences in the coefficients from the preceding columns (1), (2) and (3), which are explicitly marked as respective differences.

The differences between the coefficients obtained in column (1 – 3) express the changes that have taken place in the role and contribution of the various independent variables upon the exclusion of one of the growth factors. If the compared coefficients are positive and the change for a given independent variable has a positive sign, this means that when the respective factor is included or taken into account, the impact of the variable is increasing, and vice versa: if the change for a given independent variable has a negative sign, its effect is weakening.

The opposite happens if the coefficients are negative. Then the positive differences indicate that upon the inclusion of a given factor of production, the effect of the variable shrinks, and when the differences are negative, then the impact of the variable rises. In column (1 – 3) an excluded variable is naturally preceded by its actual contribution in the form of a difference and this contribution is set and established by means of the coefficient in front of the variable in the complete production function.

This is the reason why, if the sum total of the changes of all the rest of the coefficients, which have preserved their statistical significance, is smaller than this particular coefficient, it turns out that the respective factor plays a strong role in its capacity of a transmission mechanism. And vice versa, if the sum total of the differences obtained in the rest of the statistically significant coefficients is larger than the coefficient under consideration, this means that the particular factor of production is a weak transmission mechanism, because its role is taken up and enhanced by the other independent variables. And last but not least, the relative size of the changes in the respective coefficients makes it possible for us to make conclusions concerning the strength of the effect, which their defining variables possess.

Similar to the analytical algorithm discussed above, the differences in the coefficients displayed in column (1 – 2) give information about the direction and strength of the impact exerted by the individual financial variables, which we have included in the production function. Because the difference in the coefficients preceding the independent variables in the complete production function with the inclusion (column 1) and exclusion (column 2) of a financial variable is invariant, i.e. it does not depend on the inclusion or exclusion of

the various growth factors, the values in column (1 – 2) are the same for each individual period of time.

The last column (2 – 3) has a complex and summarizing analytical meaning, because from a formal algebraic point of view the values it contains are actually differences from the differences already assessed in columns (1 – 3) and (1 – 2), as by virtue of formal logic it follows that:

(1 – 3) – (1 – 2) = 1 – 3 – 1 + 2 = 2 – 3.

(where the numbers 1, 2, and 3 are the designations of the respective columns in the table).

In this way, the value of the difference between the differences in this last column yields evaluating information about the direction, size, and strength of the effect possessed by the various independent variables upon the simultaneous inclusion of one independent variable from the real economy, and the exclusion of an independent variable pertaining to financial development.

The subsequent analysis first discusses the contribution of the various financial variables to the dependence of economic growth on its major factors, as far as the first period subject to consideration in this study is concerned. Then a separate comment is made of the contribution made by each of the real economy independent variables – investments, labor, and foreign trade, as well as the possible role of this independent variable in the capacity of a transmission mechanism. It is in this sense that the subsequent analysis also makes an interpretation of the differences in the statistically significant coefficients (marked by underlining) of the statistically significant long-term dependencies, the equations of which have been criss–crossed in the tables mentioned above (see the Addenda to the study).

During the first (pre-currency board) period, financial variables as a rule are always negative and smaller than one, i.e. with each 1 percent of change in any of the financial variables we observe a corresponding change of the economic growth rate in the opposite direction, irrespective of the type of production factor combinations, in which these financial variables participate. In three of the equations, the financial indicators are statistically negligible: these are the cases in which the share of quasi-money in terms of the GDP participates, and the same refers to the participation of the M2 monetary aggregate in terms of the GDP and the share of total financial assets in terms of the GDP. In the remaining four cases, the financial variables are statistically significant (see the last row of each segment of column (1)) in each of the Addenda from 8 to 13, which cover the 1991–1996 period of time.

The results from comparing the coefficients upon exclusion of the financial variable, displayed in column (1 – 2) show that the inclusion of any of the seven financial variables in all cases leads to a decline of the absolute value of

the effect foreign trade has. In fact, in the specific situation this means a bigger or smaller restraint or abatement (which however is significant by all means) of the strongly negative impact exerted in principle by the share of the foreign trade commodity exchange relative to the GDP, which stands at -0.6 per cent (or at 0.5952 per cent to be more precise).

The contribution of the various financial indicators to curbing the negative impact of foreign trade throughout the pre-currency board period of time is different for the statistically significant and the statistically negligible variables: it is bigger for the former and smaller for the latter respectively. As far as the statistically significant variables are concerned, the picture is as follows: The dynamic development of the share of liquid liabilities in terms of the GDP leads to one of the largest reductions of its effect – by as much as 0.24 percentage points, which lowers its effect down to -0.36 per cent respectively. The participation of the indicator standing for the share of domestic lending in terms of the GDP diminishes the impact under consideration from -0.60 per cent to -0.44 per cent, or by 0.16 percentage points accordingly. The effect of the dynamic development of the share of private lending in terms of the GDP, for its part, provokes the decrease of the negative impact exerted by foreign trade from -0.60 per cent to -0.52 per cent, or by 0.08 percentage points altogether. The alterations brought about by the changes in the share of domestic financial assets in terms of the GDP lead to the largest curtailment of the negative impact exerted by the dynamic development of the share of the foreign trade commodity exchange in terms of the GDP – by more than 0.26 percentage points (from -0.595 per cent to -0.334 per cent) in comparison with the rest of the financial variables.

The situation is similar with the statistically insignificant financial indicators. Upon the inclusion of the indicators standing for the share of quasi-money in terms of the GDP and the share of the M2 monetary aggregate in terms of the GDP, the constraint on the negative impact of foreign trade is the smallest – by 0.06 percentage points u 0.07 percentage points respectively, dropping to -0.54 per cent and -0.53 per cent accordingly. The last of the financial indicators – the dynamic development of the share of total financial assets in terms of the GDP – also leads to the reduction of the negative impact exerted by foreign trade by 0.20 percentage points, thus diminishing it by one third: from -0.60 per cent to -0.40 per cent.

The second growth factor – labor – is represented by the number of the employed and has a statistically negligible negative effect on economic growth in the standard production function. This statistical insignificance is also preserved when we include any of the various financial variables, i.e. in all variants of the modified production functions with included financial development, subject to this study.

The last growth factor considered in this study – investments, represented by the dynamic development of the share of the gross fixed capital formation in terms of the GDP, is also statistically negligible over the period of time under observation. At the same time, investments are the only independent variable, which has a positive sign in front of its coefficient in all formulated variants of production functions.

Having followed up the impact exerted by the various financial variables on the dependency of economic growth on its different factors (during the period under consideration only in the case with the openness of the economy as the only statistically significant factor), the analysis continues with deliberating the role, which investments, labor, and foreign trade (treated as independent variables) have and play both among themselves and with respect to each of the financial variables from the point of view of their contribution to the economic growth rate.

When we attempt to assess the role of investments, it is necessary to compare the underlined statistically significant coefficients in front of the independent variables in the equations from Addenda 8 and 11, where the statistically significant equations (or dependencies) have been duly criss–crossed in the respective tables.

In the three pairs of analyzed production function equations with an included financial variable with and without investments (see the corresponding criss–crossed equations in columns (1) and (3) in Addenda 8 and 11), investments are statistically insignificant, and the sign preceding them is positive. At the same time, labor is also statistically insignificant, but the sign preceding it is negative, and foreign trade and all financial variables – with the exception of the share of non-governmental lending in terms of the GDP in the absence of investments – are statistically significant, whereby their contribution to economic growth is negative. By comparing the results between columns (1) and (3), it becomes clear that when investments are included, the labor factor of production preserves its statistical insignificance an all three long-term dependencies (see the assessments in column (1 – 3)). What is observed here is a slight decline of the absolute value of the coefficients preceding the statistically significant financial variables – both the share of domestic lending in terms of the GDP (by 0.006 percentage points) and the share of domestic financial assets in terms of the GDP (by 0.001 percentage points). The underlying meaning is that the inclusion of investments results in a slight curtailment of the negative effect these variables have on the dynamic development of the real GDP and the real per capita GDP.

As far as the foreign trade factor is concerned, what is observed in all three cases is an enhancement of the negative effect within the range of 0.03 percentage points to 0.05 percentage points. The latter result can be taken to

prove the fact that a substantial part of all investments made throughout the 1991–1996 period of time has been channeled to industries and enterprises manufacturing products, which provide non-competitive and ineffective exports of labor– and energy–intensive industrial output.

The simultaneous assessment of the inclusion of investments in the production function and the successive exclusion of the financial indicators enhance and multiply the effect of their presence (see the values of the differences between the coefficients displayed in the last column (2 – 3) and compare them with those already analyzed in the preceding two columns). It is natural for this particular set–up to take into account the impact of investments and the financial variables up to its full size, whereby in the latter case this impact has the opposite sign. In this variance we obtain the strongest reduction of the negative effect played by the foreign trade factor, which shrinks more than two times for the share of domestic financial assets in terms of the GDP – by 0.31 percentage points (or else from -0.60 per cent to -0.29 per cent). At the same time, the decline of this negative impact upon the exclusion of the effect of the share of domestic lending in terms of the GDP is to the tune of from -0.60 per cent to -0.41 per cent, or by 0.19 percentage points, and when the dynamic development of the share of private lending in terms of the GDP is eliminated, the negative effect under consideration is reduced by 0.13 percentage points to -0.47 per cent. As for the labor factor of production, it remains statistically insignificant in all three variants mentioned above.

Upon performing the analysis with the excluded labor factor of production at the beginning of this *Section*, it has already been proven that all eight possible long-term dependencies actually exist. The comparison of the coefficients preceding them and of their common dependencies has been made in Addenda 9 and 12 respectively, which are yet to be analyzed. On the whole, the inclusion of the dynamic development of the number of the employed fails to affect in any substantial way the contribution of the rest of the production function independent variables, because in column (1 – 3) of the tables mentioned above, it is the negative differences that reign supreme. Irrespective of the presence or absence of the labor factor of production in a given equation, as a rule the share of the gross fixed capital formation in terms of the GDP, the share of quasi-money in terms of the GDP, the share of the M2 monetary aggregate in terms of the GDP, the share of non-governmental lending in terms of the GDP, and the share of the total financial assets in terms of the GDP, are all statistically insignificant.

The impact of the inclusion of the labor factor of production has an absolutely unequivocal effect on investments and in all cases leads to a slight decline of the positive influence they have on economic growth to the tune of half to one percent.

The effect of the statistically insignificant financial indicators on foreign trade (upon taking into consideration the dynamic development of the share of quasi-money in terms of the GDP, the share of the M2 monetary aggregate in terms of the GDP, and the share of the non-governmental lending in terms of the GDP) is expressed by the symbolic enhancement of its strongly negative impact in the first case and its relatively slight decline in the latter two cases. In three out of the four cases (with the participation of the share of liquid liabilities in terms of the GDP and the shares of domestic and total financial assets in terms of the GDP), the statistically significant financial indicators reveal a prevailing behavior and impact, i.e. they lead to the enhancement of the negative impact exerted by foreign trade, because the coefficients preceding the negative change in the openness of the economy increase their absolute values. For the last statistically significant financial variable – the share of domestic lending in terms of the GDP – the effect tends to be a very slight reduction of the negative effect played by foreign trade. The size of these changes, however, is symbolic in quantitative terms and amounts to no more than a hundredth of one percent.

The impact of the inclusion of the labor factor of production on the negative contribution, which the financial variables make in principle, in terms of direction is also multifarious. Whereas the effect of the dynamic development of domestic lending in terms of the GDP on economic growth is enhanced in its absolute value, i.e. it increases its negative impact, what is observed relative to the remaining three statistically significant financial variables is a reduction of the negative effect. The changes here, however, once again fail to exceed a few hundredths of a percent. As a whole, the effect of the labor factor of production can be assessed as negligible, because its inclusion results in changes close to zero (of the order of hundredths or tenths of a percent) in the impact of the rest of the financial variables on economic growth.

With the simultaneous inclusion of the labor factor of production and the exclusion of the various financial variables, investments continue to be statistically insignificant, while the changes in the contribution of foreign trade are favorable. The coefficients preceding the dynamic development of the share of the foreign trade commodity exchange diminish in absolute terms, but the intensity of this decline varies when we take into account the differences in the financial indicators (see the differences in column (2 – 3) of the tables mentioned above).

Thus for instance, upon excluding the dynamic development of the share of quasi-money in terms of the GDP, of the share of the M2 monetary aggregate in terms of the GDP, and of the share of non-governmental lending in terms of the GDP, the enhanced negative contribution of the openness of the

economy to economic growth is within the limits of 0.06 per cent and 0.08 per cent. Upon eliminating the rest of the financial development indicators, however, it turns out that when we take into account the labor factor of production, this diminishes the contribution of the dynamic development of the share of foreign trade commodity exchange in terms of the GDP to economic growth by a much higher level – from 0.16 per cent to 0.26 per cent.

With the exclusion of the factor foreign trade we have already proven the presence of five long-term dependencies (without those, in which the share of quasi-money in terms of the GDP and the share of the M2 monetary aggregate in terms of the GDP participate in the capacity of independent financial variables), the co-integration equations of which have been criss–crossed, and their respective coefficients and their differences are displayed in the criss–crossed sections of Addenda 10 and 13. On the whole, the exclusion of the foreign trade factor of production (which by itself is the only statistically significant factor from the real economy, exerting at the same time a strongly negative impact on economic growth) in principle does not alter the prevailing statistical insignificance of the rest of the independent real variables of the production function on economic growth.

The only exception is made by the dynamic development of investments in the equation where the relative share of liquid liabilities in terms of the GDP participates, and the dependent variable is the real GDP growth rate, which becomes statistically significant but has a negative sign of the coefficient preceding it. As for the financial variables, statistically significant variables become the share of liquid liabilities in terms of the GDP and the share of non-governmental lending in terms of the GDP, their impact being to enhance the negative contribution with respect to economic growth in its two dimensions.

The inclusion of the factor under consideration here (i.e. foreign trade) also leads to the decline of the absolute values of the negative coefficients preceding all seven of the financial variables from the long-term dependencies affecting economic growth (see columns (1) and (3) respectively). In this case, however, because of the strongly negative basic effect of the financial variables, the positive impact of foreign trade only succeeds to mitigate it to a certain extent, and the result is negative again but its size is reduced. The said reduction is the biggest in the equation, in which the total financial assets participate (by 0.25 percentage points). With respect to the dynamic development of the domestic financial assets and the liquid liabilities, the reduction is by 0.24 percentage points each, and as far as the changes in domestic lending are concerned, this reduction is by 0.18 percentage points.

As for the dynamic development of the share of the M2 monetary aggregate in terms of the GDP and the share of non-governmental lending in terms of the GDP, the inclusion of foreign trade turns them into statistically insignificant variables and reduces their negative contribution to economic growth by 0.17 percentage points and 0.20 percentage points respectively. The last financial indicator – the share of quasi-money in terms of the GDP – remains statistically insignificant, whereby the reduction brought about by its contribution is the smallest – 0.16 percentage points.

The inclusion of the foreign trade factor of production also results in the absolute enhancement (in all seven cases) of the contribution of the share of the gross fixed capital formation in terms of the GDP to economic growth by 0.08 per cent to 0.20 per cent. In practice, the latter transforms the negative contribution of investments (upon the exclusion of the foreign trade factor) into positive (when the openness of the economy is taken into account), but these factors remain statistically insignificant in all possible cases. Taking into account the openness of the economy leads to the enhancement of the negative contribution of the labor factor of production to economic growth in five of the cases. The negative contribution is the largest – by 0.1 percentage points – with the participation of the share of non-governmental (private) lending in terms of the GDP, whereas with the participation of the share of the M2 monetary aggregate in terms of the GDP and the share of domestic financial assets in terms of the GDP this negative contribution is ten times smaller. What is observed for the remaining two financial indicators – the share of the quasi-money in terms of the GDP and the share of domestic lending in terms of the GDP – is a symbolic increase of the negative contribution of the labor factor of production to economic growth: in the latter case by 0.01 percentage points, and in the former case – by 0.001 percentage points.

The comprehensive analysis of the simultaneous inclusion of foreign trade and the exclusion of each of the financial variables, participating in the dependencies subject to analysis, leads to conclusions, which do not contradict the findings already made above. What is particular in this case is that due to the fact that the changes in foreign trade and the financial development are the only statistically significant independent variables in the production functions, the differences in their coefficients coincide with their own coefficients (see the quantitative characteristics of the differences in the coefficients in columns (1 – 2) and (2 – 3) respectively).

In this way, on the basis of the empirical results demonstrated above, we can outline the role of the openness of the economy as a channel conducive to materializing effects in the direction from financial development to economic growth. A testimony to this is the considerable shrinkage of its own

negative impact on the changes taking place with respect to both the real GDP and the per capita real GDP, which can be observed upon the inclusion of any of the financial variables in the production function. Having done this, the statistical significance or insignificance of the different financial variables, when they jointly participate in the model with the dynamic development of the share of the foreign trade commodity exchange in terms of the GDP, also gives certain indications about the availability of working transmission mechanisms. Thus for instance, the statistical insignificance of the changes in the share of quasi-money in terms of the GDP, in the share of the M2 monetary aggregate in terms of the GDP, and in the share of the lending extended to the non-governmental sector of the economy in terms of the GDP, in the presence of the operating foreign trade channel can be interpreted as a proof of the fact that the manifestation of the impact of financial development on economic growth to a large extent goes through this channel precisely.

On the contrary, although for the period under consideration the analysis failed to confirm the role of investments in the capacity of a traditional transmission mechanism (which thus far has been the generally accepted belief), the statistical significance of the rest of the financial indicators is also a symptom revealing the existence of a certain transmission channel of factor productivity (via the productivity of the factors of production). The negative signs preceding the respective variables in such a case indicate that most probably the changes in the size of banking intermediation throughout the period under consideration have a negative connection with factor productivity.

Long-term dependencies, causalities, and a prognostic analysis of production functions for the 1997–2006 period of time

Johansen's tests for the existence of co-integration dependencies have been tested in all versions arrived at in the process of structuring the production functions, with included or excluded independent variables concerning both the real economy and the country's financial development. The results obtained prove the existence of all possible long-term dependencies throughout the second (post–currency board) period, whereby these results are far below the standard level of statistical significance of 5 per cent (the highest statistical probabilities are of the order of tenths of a percent, and in the usual case – hundredths of a percent) [21]

Irrespective of the fact which of the two economic growth indicators, introduced in this study, perform the role of an independent variable – whether it be the real GDP growth rate, or the per capita real GDP growth rate – the

econometric results along all directions of the study are identical in practice. In the few cases when a difference occurs in the statistical significance with respect to the real GDP growth rate, on the one hand, and with respect to the per capita real GDP growth rate, on the other, and significant quantitative differences emerge in the coefficients preceding their respective variables, a special comment is offered and an analysis is made to this effect.

The co-integration equations, which reproduce the above mentioned long-term dependencies, are displayed in columns (1) u (2) of the respective tables in Addenda 15 to 20. What is remarkable about these equations is that – as an absolute rule, without a single exception – the following dependencies have been manifested:

First: the coefficients preceding the factor of ***investments*** are always and invariably statistically significant, with a positive sign, and as a rule – they are of comparatively high values;

Second: the factor of ***labor*** in the majority of combinations is insignificant, but in the cases where investments have been excluded (and it is then that the labor factor becomes statistically significant), its impact is also positive and of a relatively high value;

Third: ***foreign trade*** is usually statistically insignificant, but in the rare cases of its being statistically significant, the coefficients preceding the share of foreign trade commodity exchange in terms of the GDP have widely disparate values and signs, which depends on the nature of the respective financial variable taking part in the combination;

Fourth: The financial variables in a little more than half of the cases are statistically significant, whereby the coefficients preceding them change their signs and magnitude depending on the specific combination, in which they participate in the production function.

Upon exploring the complete production function with the participation of the three independent variables from the real economy plus a financial variable, the factors of labor and foreign trade are entirely statistically insignificant when economic growth is explicated through the real GDP growth rate. If we substitute the latter with the per capita real GDP growth rate, we obtain statistical significance for foreign trade in the combinations with the share of domestic lending in terms of the GDP and with the share of non-governmental lending in terms of the GDP. As far as the labor factor is concerned, statistical significance for it is obtained only when the share of the total financial assets in terms of the GDP participates in the combination.

The statistically significant coefficients preceding investments vary depending on the group to which the financial variable, included in the production function, belongs. Their values are comparatively more moderate when a

variable from the "liquidity" group participates in the combination – from 0.15 to 0.39, and are markedly higher when an indicator from the groups "lending" and "assets" is included – between 0.41 and 0.58. As far as the financial variables are concerned, what prevails are the negative signs of the coefficients, the only exception being the share of non-governmental lending in terms of the GDP, the coefficient of which is positive, but of a relatively low absolute value. This positive contribution of the growth of lending for the non-governmental (i.e. private) sector confirms the conclusion already made about the stimulating impact of the changes in the banking system activity on economic growth.

Wald's test for the Granger long-term causality gives only one strong two–way causal dependency, which has been confirmed in all the cases of the complete production function, and this is the dependency between economic growth and investments. The only absence of such a dependency is observed solely with the share of non-governmental lending in terms of the GDP, when economic growth is explicated by the per capita real GDP growth rate, and only in the direction from growth to investments. In other words, in this case the dependency remains one–way: from investments to economic growth only.

For the labor factor, such a two–way long-term causality exists in six out of the eight variants of the complete production function (explored for each one of the two indicators for economic growth separately). Causality between labor and economic growth in the direction from the dynamic development of the number of the employed to the economic growth rate has not been observed only in two cases: in the "pure" production function and when the financial variable of the share of non-governmental lending in terms of the GDP has been included in it.

The results confirm the absence of any long-term dependency whatsoever between foreign trade and economic growth in any of the directions. The total nature of the causality between investments and growth is paralleled by the absolute absence of such a causality between foreign trade and economic growth. The latter presupposes that the causal long-term effect of the dynamic development of the share of foreign trade commodity exchange in terms of the GDP crosses over to growth through the channels of the other independent variables, with which it has causal relations.

The long-term dependency between financial development and economic growth is also very weak. A two–way causality is totally absent. In the direction from finance to growth, it is only the dynamic development of quasi-money in terms of the GDP that stands apart as an incentive for economic growth. In the opposite direction, a long-term dependency is demonstrated

by economic growth with respect to the changes in the share of domestic lending in terms of the GDP, and in the share of non-governmental lending in terms of the GDP, as well as with respect to the changes in the share of domestic financial assets in terms of the GDP. Such a causality also exists in the direction from the per capita GDP growth rate to the changes in the share of the total financial assets in terms of the GDP.

There is, however, a strong and constant causality between financial indicators and the real factors of economic growth – mainly investments and labor, less foreign trade – which indicates that the mutual effect between finance and growth is actually facilitated by and depends on them. All financial indicators manifest themselves as a long-term cause for the dynamic development of the share of gross fixed capital formation in terms of the GDP, and for the rate of change in the number of the employed. The only exception is the case when the share of non-governmental lending in terms of the GDP participates in the production function and the result, which this yields, is that the Granger long-term dependency is lost in the direction to investments. In the direction to foreign trade there is only one long-term causal dependency and it comes from the changes in the share of the total financial assets in terms of the GDP.

A proof evidencing the fact that the factors of the real economy perform in the capacity of transmission mechanisms is the demonstration of a strong reverse long-term causality from these factors themselves towards financial development. The dynamic development of investments is a long-term cause for the changes taking place in the share of domestic lending in terms of the GDP, of the share of non-governmental lending in terms of the GDP, and also for the changes in the share of domestic financial assets in terms of the GDP. On the other hand, the dynamic development of labor and foreign trade bring about long-term changes in the share of the M2 monetary aggregate in terms of the GDP, the share of liquid liabilities in terms of the GDP, as well as in the share of non-governmental lending in terms of the GDP, when economic growth is represented by the growth rate of the real GDP. When economic growth is explicated through the growth rate of the per capita real GDP, then the aforesaid two factors also cause long-term changes in the share of domestic lending in terms of the GDP. For their part, the changes in the share of foreign trade commodity exchange in terms of the GDP act as a long-term Granger causality for the changes taking place in the share of the total financial assets in terms of the GDP, and only with respect to the per capita GDP growth rate these changes also bring about changes in the share of quasi-money in terms of the GDP.

The next stage of the analysis deals with the task of outlining the quantitative contribution of the individual financial variables to economic growth, which serves as a basis for the subsequent treatment aimed at determining the role of each of the independent variables from the real economy acting in the capacity of a transmission mechanism from finance to growth and vice versa. During the 1997–2006 period, the "authentic" production function has only one statistically significant independent variable – investments – all the coefficients of which are entirely positive (see the equations and their coefficients in column (2) in Addenda from 15 to 20). This means that the growth in the share of the gross fixed capital formation in terms of the GDP has a positive contribution to economic growth as follows: an increase in the growth rate of gross fixed capital formation in terms of the GDP by 1 per cent brings about an increase in the real GDP growth rate by nearly 0.8 per cent, and a respective increase in the per capita real GDP growth rate by 0.7 per cent.

Labor is a statistically insignificant factor with a positive but relatively weak contribution to economic growth. Foreign trade is also statistically insignificant, but what it manifests is a symbolical positive effect on the real GDP growth rate, and a very weak negative impact on the per capita GDP growth rate.

In all dependencies analyzed during the second (post–currency–board) period, the contribution of the financial variables is negative, in the way observed during the first (pre-currency board) period, the only exception being the share of non-governmental lending in terms of the GDP (see the last row of each section of column (1) in the commented tables). The results from the comparison of the coefficients shown in column (1 – 2) indicate that the inclusion of any of the seven financial variables in all possible cases brings about a sizeable decrease of the impact exerted by investments – as much as up to two and half times in the various combinations.

When we take into account the dynamic development of the share of quasi-money in terms of the GDP, we observe the highest level of reduction, where the contribution of investments drops from 0.76 per cent to 0.24 per cent, or by 0.52 percentage points (with respect to the real GDP growth rate), and from 0.70 per cent to 0.14 per cent, or by 0.56 percentage points (with respect to the per capita real GDP growth rate). A smaller reduction is observed in connection with the participation of the share of the various forms of lending in terms of the GDP, and also with the participation of the various financial assets in terms of the GDP, where the registered decline of the impact is by 0.16 percentage points to 0.30 percentage points. If we turn around the above logic of reasoning, we can also claim that the exclusion of any of the financial variables brings about an increased contribution of investments to economic growth within the quantitative limits considered earlier in this paragraph.

Having analyzed the changes in the contribution of the real factors for economic growth, brought about by the inclusion of the various financial variables, we can now move on to considering their own contribution by successively adding them to the production function of investments, labor, and foreign trade (see the interpretation of the differences between the coefficients displayed in column (1 – 3) in the tables of Addenda 15 to 20).

The inclusion of the dynamic development of the share of the gross fixed capital formation in terms of the GDP actually leads to the elimination of the positive and relatively high contribution of the labor factor, and in essence this inclusion turns it into statistically insignificant (see Addenda 15 and 18). Such a change has not been observed only with respect to production functions with the participation of the relative shares of non-government lending and the total financial assets in terms of the GDP, where the labor factor remains insignificant, regardless of the addition or elimination of the variable, which stands for the share of the gross fixed capital formation in terms of the GDP. The outlined general trend of neutralizing the role of employment when investments participate in the equation can be interpreted as a sign for the presence of a closer connection between them, and also as a reason for accepting them as mutually complementary elements. To a large extent this corresponds with the conclusion drawn in chapter one of this section of the study, concerning the predominantly extensive nature of economic growth with respect to both its major factors of production, namely labor and capital.

Much like the situation with the labor factor, the inclusion of investments in the production function with the participation of the share of liquid liabilities in terms of the GDP has as its result the "degradation" of foreign trade, i.e. it turns into a statistically insignificant factor for economic growth. The same effect is observed with the participation of the share of non-governmental lending in terms of the GDP, but only with respect to the real GDP growth rate. On the contrary, as far as the per capita GDP growth rate is concerned, with the participation of the share of domestic lending in terms of the GDP and the share of non-governmental lending in terms of the GDP, foreign trade remains statistically significant. The explanation once again can be found in the existence of certain internal connections between the independent variables, including some connectedness by means of the external funding of investments (in terms of the two lending indicators employed in this study), and in this particular case for instance such connectedness is effected through the channels of foreign trade. The inclusion of investments in the equations containing the rest of the financial indicators does not give rise to any changes in the initial statistical insignificance of the openness of the economy, which is embodied by the share of the foreign trade commodity exchange and turnover in terms of the GDP.

The addition of investments deteriorates – to a large extent at that – the effect of the financial variables in five of the cases, whereas in four of them – the presence of the share of quasi-money in terms of the GDP, the share of the M2 monetary aggregate in terms of the GDP, the share of liquid liabilities in terms of the GDP, and the share of total financial assets in terms of the GDP – reverses the direction of their impact on growth, completely overturning it from positive into negative, whereby the quantitative reduction is relatively high – within the interval between 0.21 per cent and 0.65 per cent. In the fifth case, with the participation of the share of non-governmental lending in terms of the GDP, the negative impact is expressed in the decline of the positive effect by 0.10 per cent (from 0.14 per cent to 0.04 per cent with respect to the real GDP growth rate and from 0.16 per cent to 0.06 per cent with respect to the per capita real GDP growth rate). As far as the production function with an added financial indicator for the share of liquid liabilities in terms of the GDP is concerned, the impact of investments also reveals a positive projection, inasmuch as it turns the statistically insignificant financial variable into a statistically significant one, although the sign preceding it is negative. The same effect of acquiring statistical significance is observed with respect to the share of total financial assets in terms of the GDP, but here it only concerns the per capita GDP growth rate, inasmuch as with respect to the other economic growth indicator it is statistically significant in both of the cases, which this study explores.

When the other two indicators participate – the share of domestic lending in terms of the GDP and the share of domestic financial assets in terms of the GDP – the inclusion of investments is positive. In the first case the positive coefficient, and in the second case the negative coefficient before the financial variable decrease their absolute value. An accompanying positive effect is also the fact that the share of domestic lending in terms of the GDP turns from a statistically insignificant into a statistically significant variable.

The complex impact of the simultaneous inclusion of investments and exclusion of the financial variable (see column (2 – 3) in the tables displayed in the Addenda) on the whole confirms the conclusions made above about the effect of investments. What is characteristic for this combinations is that with respect to them all remaining factors are statistically insignificant, at least for one group of combinations, whereby the differences in the coefficients reproduce their own coefficients preceding investments and financial variables because of their simultaneously being included and excluded.

Upon the inclusion of the labor factor (even though it is statistically insignificant) in the production function, it is the factor of investments that is mainly repressed. What is observed in this situation is a mirror effect, which

means that the two factors act on the principle of communicating or interconnected vessels. The inclusion of the changes in the share of the gross fixed capital formation in terms of the GDP in the production function totally (in all cases) and to a significant extent represses the effect and contribution of labor on economic growth (this has already been proved in the earlier stages of the study). On the contrary, the inclusion of the employment growth rate factor reduces the impact of investments on economic growth with respect to all financial variables to a considerably high extent – within the interval from 0.10 per cent to 0.63 per cent.

Furthermore, taking into account the behavior of the independent variables in the dependencies subject to the study, we observe a definite regularity in the grouping of the four independent variables in pairs. The "investments – foreign trade" pair in principle has a completely opposite behavior to the behavior of the "labor – financial variable" pair. This gives additional grounds to substantiate the claim that the major transmission mechanisms from finance to economic growth pass through investments and foreign trade, the former enjoying a much higher transmission capacity than the latter in the post-currency board period after 1997.

In quantitative terms, the addition of labor to the production function diminishes the impact of investments to the greatest extent in the presence of the indicators for the share of total financial assets in terms of the GDP and the share of liquid liabilities in terms of the GDP, whereby the reduction for the former indicator is by -0.52 per cent concerning the real GDP growth rate, and by -0.59 per cent concerning the per capita GDP growth rate, and for the latter indicator this reduction is by -0.46 per cent in terms of the real GDP growth rate, and by -0.63 per cent in terms of the per capita GDP growth rate respectively.[22] The weakest reductions, which on their own are relatively large on the background of the changes in all the rest of the indicators, have been registered upon the participation of the share of quasi-money in terms of the GDP, where they are expressed by decreasing the contribution of investments to the real GDP growth rate by 0.10 per cent, and by a 0.24 per cent reduction of the contribution of investments to the per capita real GDP growth rate respectively.

The inclusion of labor, on the whole, has a negative impact on the role of foreign trade for the promotion of economic growth, but this negative impact is much smaller in comparison with the negative role played by labor with respect to investments, and expressed in quantitative terms it has been measured to range within the interval from 0.02 per cent to 0.16 per cent. With five of the financial variables, the changes in the share of the foreign trade commodity exchange in terms of the GDP remain statistically insignificant

determinants of economic growth, irrespective of the inclusion or elimination of the labor factor of production. When the dependent variable is the real GDP growth rate, the participation of the remaining two variables – the share of quasi-money in terms of the GDP and the share of non-governmental lending in terms of the GDP – turns foreign trade from a statistically significant factor with a positive effect on economic growth into a statistically insignificant factor with a weakened positive impact. When the dependent variable is the per capita GDP growth rate and the share of domestic lending in terms of the GDP participates in the equation, foreign trade turns from an insignificant factor into a significant one with in increasingly negative impact. And again, when the share of non-governmental lending in terms of the GDP participates in the equation, foreign trade remains a statistically significant factor, but its positive impact is strongly reduced.

If we take into account the number of the employed or the employment rate, in four out of all the seven cases it has a positive effect on the contribution of financial indicators to economic growth, in the sense that to various degrees it reduces the negative impact, which the employment rate has at large, although this negative effect remains negative nonetheless. In two of the equations (their indicators being the share of the M2 monetary aggregate in terms of the GDP and the share of total financial assets in terms of the GDP) we observe a stronger limitation of the negative impact on economic growth to the order of 0.16 – 0.20 per cent, whereby the statistical significance of the indicators has been preserved. In the other two cases – with the participation of quasi-money in terms of the GDP and the share of the liquid liabilities in terms of the GDP – what we observe is the transformation of the statistical insignificance of these indicators into statistical significance, with a relatively weaker reduction of their impact, whereby their values range within the interval from 0.01 per cent to 0.08 per cent. As for the remaining three indicators, the changes are also negative. For two of them – the share of domestic lending in terms of the GDP and the share of domestic financial assets in terms of the GDP – once again we observe a transformation of their statistical insignificance into statistical significance, but their impact now turns from positive into negative. It is only with the share of non-governmental lending in terms of the GDP that both the statistical significance and positive effect are preserved, but here we also observe a reduction to the tune of 0.16 per cent (from 0.19 per cent to 0.03 per cent with respect to the real GDP growth rate, and from 0.22 per cent to 0.06 per cent with respect to the per capita real GDP growth rate). On the whole, the inclusion of the labor factor of production has a contradictory effect on the contribution of the different financial variables to economic growth, and its overall resultant value inclines to zero.

The joint accounting for the results from the parallel inclusion of the labor factor of production and the exclusion of the financial variable (see column (2 – 3)) confirms in a categorical way the conclusions made about the impact of the employment rate on the contribution of the rest of the independent variables to economic growth. The impact of investments and foreign trade on economic growth is definitely strongly negative. According to the former indicator, the effect is negative in five out of the seven possible cases. A positive impact is observed only upon the exclusion of the share of quasi-money in terms of the GDP, which concerns economic growth in both its dimensions, and upon the elimination of the share of the M2 monetary aggregate in terms of the GDP, which concerns the GDP growth rate alone, whereby in all these cases the coefficients are statistically significant.

The share of the foreign trade commodity exchange in terms of the GDP is statistically insignificant in all cases and in five out of the seven variants, where its contribution diminishes with respect to both the real GDP and the per capita real GDP. The only exceptions are observed with the share of domestic lending in terms of the GDP and the share of domestic financial assets in terms of the GDP, which in quantitative terms are symbolical and have been measured to stand within the 0.01 per cent – 0.03 per cent range.

The inclusion of the foreign trade factor of production has an effect on economic growth similar to the inclusion of investments, but this effect is of a lower intensity (see Addenda 17 and 20). The impact of the changes in the share of the gross fixed capital formation in terms of the GDP is positive, both in terms of its overall quantitative level and in terms of the number of indicators. If the dependent variable is the real GDP growth rate, in five of the cases we observe that investments have a growing impact on the GDP growth rate, which reaches almost 0.1 per cent at very good levels of statistical significance, when the share of non-governmental lending in terms of the GDP participates in the equation. The participation of the share of quasi-money in terms of the GDP turns investments from a statistically insignificant into a statistically significant factor, but the impact of investments slightly declines. A slight decline of the impact made by the share of gross fixed capital formation can also be observed, when the share of domestic lending in terms of the GDP participates in the equation at a good level of statistical significance of its coefficients. If the dependent variable is the per capita GDP growth rate, the picture is totally reversed: in five out of all the cases we observe a diminishing impact, and in two of the cases – an increasing impact. On the whole, however, when foreign trade is included with a strong statistical significance and respective prevalence, what we observe is that the positive impact of investments on the economic growth rate remains in force.

In principle, the labor factor of production is totally insignificant in the complete production function and remains insignificant when the openness of the economy is included in and excluded from the equation. There is a certain particularity, however, when foreign trade is added and its essence is that it turns all the seven financial variables from statistically insignificant into statistically significant. With respect to the real GDP growth rate, in six of all the cases we observe a reduction of the negative impact played by the financial variables, whereas in the case, in which the share of total financial assets in terms of the GDP participates, the positive impact turns into a negative one. It is only with the share of non-governmental lending in terms of the GDP that the positive impact is slightly enhanced.

As far as the second indicator – the per capita real GDP growth rate – is concerned, the reduction of the impact exerted by the financial variables is the same in six of the cases. In two of them, where the share of quasi-money in terms of the GDP and the share of domestic financial assets in terms of the GDP participate, we observe an enhancement of the negative impact, whereas in the remaining four cases, with the participation of the indicators for the share of the M2 monetary aggregate in terms of the GDP, the share of liquid liabilities in terms of the GDP, the share of domestic lending in terms of the GDP, and the share of total financial assets in terms of the GDP, what we observe is a transition from a positive to a negative effect. Once again, only with the participation of the share of non-governmental lending in terms of the GDP, what is registered is a slight increase of the positive impact on economic growth.

The simultaneous taking into account the inclusion of foreign trade and the exclusion of the financial variable (see column (2 – 3) of the tables in the Addenda attached herein) undoubtedly reinforces and confirms the conclusions made concerning the impact of the dynamic development of the share of the foreign trade commodity exchange and turnover in terms of the GDP on the factor effect on economic growth. The effect on the contribution of investments to economic growth in this case is absolutely positive in all the seven possible cases, for each one of the growth indicators, at very good levels of statistical significance at that (statistical insignificance has been registered only with respect to the participation of the share of quasi-money in terms of the GDP). On the contrary, the impact on the contribution of labor in all cases is statistically insignificant and predominantly negative. A statistical insignificance has also been observed with the addition of the financial indicators, when foreign trade is excluded from the equation, whereby their opposite impacts get mutually neutralized in quantitative terms.

The conclusion is that the behavior of the real factors of economic growth and the financial variables in their successive and simultaneous inclusion and exclusion from the constructed production functions gives us sufficient reasons to assess them as linking devices and transmission mechanisms between the real economy and the financial system. Investments manifest themselves as the strongest channel of impulses from financial development to economic growth.

Unlike the previous period subject to study, foreign trade has lost its role of a major mechanism serving as a transmission between the banking sector and the real economy. Such an intermediating function has been observed with respect to the changes in the employment rate, which turn out to be strongly connected with the dynamic development of investments, but in terms of their impact they are statistically insignificant. At the same time, the good level of statistical significance of all financial variables in the complete production function also testifies to the presence of a channel transmitting effects through the factor productivity. This is a new result, too, totally opposite to the situation observed up to 1997, and its essence is that the dynamic development of the share of non-governmental lending in terms of the GDP has a stimulating impact on growth through this mechanism precisely.

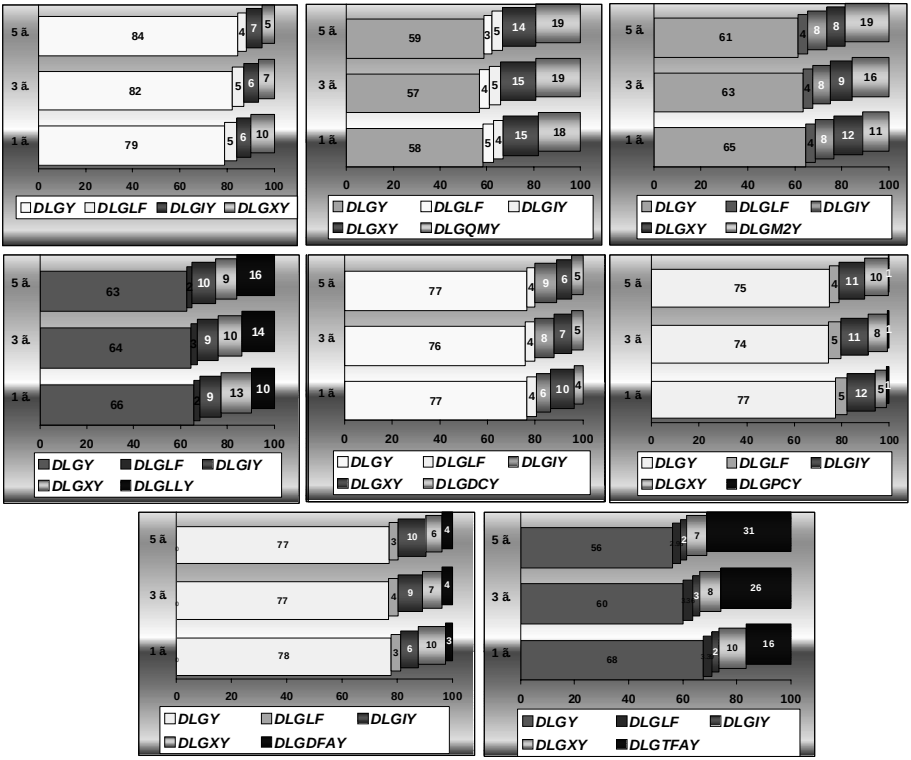
The results outlined above can be taken to be adequate to the dynamic development of the economy, its structure, and its openness in the period after the implementation of the currency board mechanism. We could claim (in the orthodox Keynesian sense) that these two factors of growth, namely – investments and foreign trade, to different degrees act as transmission mechanisms of the impact, which the changes in the financial system have on economic growth.

Now that we have assessed the role of the different variables on the basis both of the changes observed in the coefficient preceding them in the equations of the production functions, and in accordance with the changes taking place in their statistical significance, what is important to undertake is to carry out a prognostic econometric analysis. The goal is to follow up the changes in the contribution of each individual variable in the course of time, as well as the responses of the variables upon the absorption of various shocks.

Upon the application of the function for variance decomposition, a confirmation was obtained once again of the major conclusion obtained by all models used thus far, about the dominating role of the degree of significance of the dependent variable, which usually prevails over all the rest of the variables taken together, i.e. in all the cases subject to this study the contribution of the GDP growth rate or the per capita GDP growth rate amounts to more than 50 per cent (see Figure 1).

Figure 1

A FORECAST OUTLINING THE CONTRIBUTION OF THE GDP GROWTH RATE, INVESTMENTS, LABOR, FOREIGN TRADE AND EACH INDIVIDUAL FINANCIAL VARIABLE



The next regularity observed in the study is that the contribution of the dependent variable is marked by a contradictory dynamic development, with a tendency for a slight decrease in the course of time. The dynamic development of the labor and foreign trade factors reveal the same tendency – their contribution in a future period has a tendency for decline. With the changes in the employment rate this decline is more than truly symbolic, whereby in the general case in five years' time it does not exceed one percentage point. It is only with the "authentic" production function (without the participation of any financial variable) that this decline goes as high as 1.5 percentage points.

With respect to foreign trade, the decline is within the order of 3 to 5 percentage points after a five years' period of time, the only exception from the indicated percentage point interval being the case with an included share of quasi-money in terms of the GDP, when the decline is less than a percentage point. An increase has been observed only in the case with the participation of the share of non-governmental lending in terms of the GDP, where the contribution of the dynamic development of the share of foreign trade commodity exchange marks a rise by 4.76 percentage points.

On the whole, investments and financial variables demonstrate an increase of the extent of their significance with time. As far as the share of the gross fixed capital formation in terms of the GDP is concerned, it marks the biggest increases by 3.74 percentage points with the participation of the share of domestic financial assets in terms of the GDP, and by 3.06 percentage points upon the inclusion of the share of domestic lending in terms of the GDP, whereas the rest of the increases are within the limits of 1 percentage point. In two of the cases, there is also a slight decline of the degree of their significance: with respect to the share of total financial assets in terms of the GDP it is by 0.12 percentage points, and with respect to the share of non-governmental lending in terms of the GDP – by 1.23 percentage points. With respect to the financial variables, the increases of their significance with time are relatively high.

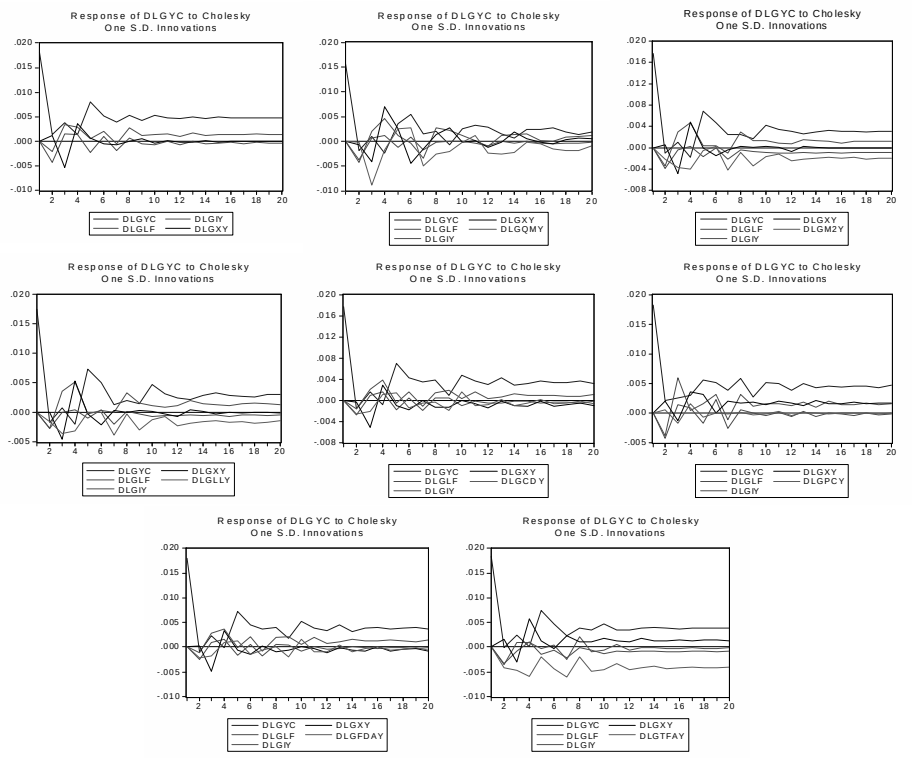
The dynamic development of the share of total financial assets in terms of the GDP increases its contribution by 14.74 percentage points up to the fifth year, that of the share of the M2 monetary aggregate in terms of the GDP – by 7.42 percentage points, and that of the share of liquid liabilities in terms of the GDP – by 6.53 percentage points. For the rest of the financial variables, the increase is to the order of about 1 per cent, and only the changes in the share of non-governmental lending in terms of the GDP diminishes its contribution by 0.44 percentage points.

Because of the relatively great closeness and the overlapping of the econometric results with respect to the two economic growth indicators employed in this study, a fact which has already been subject to comments earlier in the text, Figure 2 displays the graphic expression of the responses of the variables with respect to the per capita real GDP growth rate, but the conclusions are entirely valid for the other growth indicator as well, namely the real GDP growth rate. Whereas in the spreadsheet tables in the Addenda the shock absorption has been followed up until the end of the third year, the graph shows its follow–up till the end of the fifth year, which has been done to the purpose of the better visualization of their fading away or abatement with the different variables. In the general case, though with different heights of the fluctuation amplitudes, the abatement happens about the end of the

fourth year, but with certain variables (which is especially visible with the dynamic development of the share of quasi-money in terms of the GDP) shock absorption continues even after the fifth year.

Figure 2

IMPULSE RESPONSES BETWEEN THE PER CAPITAL GDP GROWTH RATE, INVESTMENTS, LABOR, FOREIGN TRADE, AND EACH OF THE FINANCIAL VARIABLES



With the successive exclusion of the different variables from the production function, we arrive at interesting shifts of the role in future periods of time, and this is a fact, which also merits an assessment of their role as transmission mechanisms. If investments are excluded, the degree of significance of the dependent variable – the economic growth rate – decreases very strongly with time, by about 12 percentage points on the average for a five years' period of time. This is offset by the sharp increase of the contribution of labor (by about 8 percentage points on the average) and the retained positive impact of the financial variables of about 4 percentage points on the average.

The role of foreign trade in this case is strongly reduced and it marks a slight decrease of about 1 percentage point.

When the rate of change in the number of the employed is excluded, we observe an entirely positive contribution of economic growth of about 7 percentage points on the average for a future period of around five years. This totally positive contribution (including all financial variables) is compensated by the negative contribution of the rate of change of the share of gross fixed capital formation in terms of the GDP by about 2.5 percentage points, and also by the negative contribution of the rate of change of the share of foreign trade commodity exchange in terms of the GDP by about 4.5 percentage points on the average, whereby the contribution of the different variables takes different directions, it is generally weak, and gravitates to zero. This result once again confirms the fact, which we have already proven, that investments and foreign trade act in the capacity of transmission mechanisms between financial development and economic growth.

When we exclude the last of the factors of production – foreign trade – it is economic growth again that responds most strongly with time, whereby its own contribution after the fifth year is around 1.5 percentage points on the average, which is offset by the increasing contribution of investments by about 1 percentage point and the increasing contribution of the financial variables by about 0.5 percentage points, as well as by the simultaneous contribution of the labor factor of production, which is close to zero on the average.

Conclusion

This econometric study makes a parallel assessment of the role of financial development and the role of the real factors of economic growth. With respect to the factors of economic growth, the study interprets their interconnections and identifies the transmission mechanisms between the two sectors. For the first period subject to the study (1991 – 1996), the changes in employment and investments turn out to be statistically insignificant determinants of economic growth in the "authentic" production function, whereas foreign trade is statistically significant and has a totally negative effect. With the addition of financial variables, the latter either manifest themselves as statistically significant variables with a negative impact on economic growth, or act as statistically insignificant variables. Their inclusion results in the limitation of the negative impact of foreign trade on economic growth and does not change the statistical insignificance of the dynamic development of investments and employment.

The comparison of the production functions with and without investments respectively leads to the conclusion that investments do not affect the contri-

bution of employment, but diminish the negative impact of financial development, and enhance the negative effect of the increasing openness of the economy. The inclusion of labor does not substantially affect the rest of the factors, but upon the elimination of the financial variables, it has favorable effects on the role of foreign trade. The addition of the dynamic development of foreign trade commodity exchange does not eliminate the statistical insignificance of the rest of the real variables and reduces the negative impact of financial development, or turns it into statistically insignificant. It is foreign trade that manifests itself as a major transmission mechanism for transferring effects from finance to economic growth, but there are symptoms that transmission exists through the channels of factor productivity as well.

Over the second period (1997–2006), a two-way long-term causality exists between economic growth, on the one hand, and the dynamic development of investments and employment, on the other. There is no long-term causality between economic growth and foreign trade, and with respect to financial development the causality is one-way and is mainly directed from growth to the financial sector. Financial variables are a long-term cause for the changes in the major factors of production and at the same time it is the factors of production that generate them in the long-term perspective. In the "authentic' production function, only the dynamic development of investments is statistically significant, and it is investments that exert a positive impact. When the financial variables participate in the production function, they manifest themselves as statistically significant, but – with the exception of the changes in the relative share of non-governmental lending – their contribution is negative. Their inclusion in the production function only leads to the reduction of the role played by investments. The addition of the growth of investments unfavorably affects the role of financial development, neutralizes the statistical significance of labor, and with three of the financial variables it has a similar effect on the openness of the economy. The presence of labor represses the contribution of investments, does not affect or affects negatively the role of foreign trade and stimulates the impact of financial development. The addition of the foreign trade commodity exchange leads to an increase of the positive effect of investments, and to the transformation of financial development from a statistically insignificant into statistically significant factor, or to the increase of its quantitative contribution.

The dynamic development of investments has been revealed to be the major transmission mechanism for the materialization of effects from the financial to the real sector of the economy, but once again there are indications for the simultaneous existence of a transmission channel via factor productivity. The forecast for a future period of time is for the predominant con-

tribution of economic growth, though with a slight tendency for decline, as well as for the increasing role of investments and financial variables, whereby the shocks created by the independent variables will be absorbed at a relatively slow rate.

Endnotes

[1]See *Ranguelova*, R., Contemporary Dimensions of Economic Growth, Dissertation thesis for the acquisition of the Doctor of Economic Sciences degree, *Minasyan*, G., Financial Programming, Sofia, 2001, "Litavra" Publishing House; *Minasyan*, G., Is the Bulgarian Economy Overheating, Economic Thought, 2008, issue 3, pp. 3–29; *Tzalinski*, Tzv., Two Approaches to Measuring the Potential Output in Bulgaria, Discussions Papers, BNB, Sofia, BNB, 2007, No. 57; *Ganev*, K., Measurement of the Overall Factor Productivity: Accounting of Economic Growth in Bulgaria, Discussions Papers, BNB, Sofia, BNB, 2005, No. 48; *Nenovsky*, N. and *Christov*, K., Financial Repression and Credit Rationing in the Conditions of Currency Board in Bulgaria, , Discussions Papers, BNB, Sofia, BNB, 1998, No. 2; *Nenovsky*, N. and *Christov*, K., The New Currency Boards and Discretion: Empirical Evidence from Bulgaria, Economic Systems, 2002, No. 26, p. 55–72; *Christov*, K. and *Mikhailov*, M., Commercial Banks Lending Activity and Loan Portfolio Rationing, Discussions Papers, BNB, Sofia, BNB, 2002, No. 23; Berlemann, M. and Nenovsky, N., Lending of First versus Lending of Last Resort: The Bulgarian Financial Crisis of 1996/1997, Comparative Economic Studies, 2004, No. 46, p. 245–271; *Christov*, K., The Currency Board "The Only Game in Town", Discussions Papers, BNB, Sofia, BNB, 2004, No. 40.

[2]*Nenovsky*, N. and *Christov*, K., Monetary Regimes and the Real Economy (An Empirical Test before and after the Implementation of a Currency Board Mechanism in Bulgaria), Discussions Papers, BNB, Sofia, BNB, 1999, No. 10; *Christov*, K., The Currency Board "The Only Game in Town", Discussions Papers, BNB, Sofia, BNB, 2004, No. 40; *Ganev*, G., Confidence Level in the Foreign Exchange Regime in Bulgaria during 1991 – 2003, an initial attempt at calibration, Discussions Papers, BNB, Sofia, BNB, 2004, No. 38.

[3]*Nenovsky*, N., *Peev*, E. and *Yalamov*, T., Banks – Firms Nexus under the Currency Board: Empirical Evidence from Bulgaria, Discussion Papers, BNB, Sofia, BNB, 2003, No. 32.

[4]*Valev*, N. and *Tasic*, N., Finance and Growth in Bulgaria – the Effects of Credit Maturity and Credit Size across Economic Sectors, Georgia State University, 2007, mimeo.

[5]*Fink*, G. and *Haiss*, P., Central European Financial Markets from an EU Perspective: Theoretical Aspects and Statistical Analyses, IEF Working Paper,

1999, No. 34; *Oks*, A., Efficiency of the Financial Intermediaries and Economic Growth in CEEC, University of Tartu, Faculty of Economics and Business Administration, Tartu University Press, 2001, ISSN 1406 – 5967; *Neimke*, M., Financial Development and Economic Growth in Transition Countries, Institut für Entwicklungsforschung und Entwicklungspolitik der Ruhr–Universit?t Bochum, IEE Working Paper, 2003, No.173; *Jaffee*, D., *Levonian*, M., The Structure of Banking Systems in Developed and Transition Economies, European Financial Management, 2001, No.7(2), p. 161–181.

[6]*Koivu*, T., Do Efficient Banking Sectors Accelerate Economic Growth in Transition Countries?, Bank of Finland, Institute for Economies in Transition, BOFIT Discussion Papers, 2002, No. 14; *Mehl*, A. and *Winkler*, A. (2003), Banking and Financial Sector in Transition and Emerging Market Economies, The Ninth Dubrovnik Economic Conference, National Croatian National Bank, June, http://www.hnb.hr/dub–konf/9–konferencija–radovi/mehl–winkler.pdf; *Mehl*, A., *Vespro*, C. and *Winkler*, A. (2006), The Finance–Growth Nexus and Financial Sector Environment: New Evidence from Southeast Europe, ECB–CFS Research Network Working Paper; *Fink*, G., *Haiss*, P. and *Vuksic*, G., Changing Importance of Financial Sectors for Growth from Transition to Cohesion and European Integration, Europainstitut Wirtschaftsuniversität Wien, EI Working Paper, 2004, No. 58, July; *Akimov*, A. and *Wijeweera*, A., Financial Development and Economic Growth. Evidence from Countries in Transition, European Association for Comparative Economics Studies (EACES) 9th Bi–Annual Conference: Development Strategies – A Comparative View.

[7]R_1 – real GDP in million denominated BGN in terms of 1995 prices (Y); R_2 –per capita real GDP in denominated BGN in terms of 1995 prices – (YC); R_3 – share of the gross fixed capital formation in terms of the GDP – (IY); R_4 – average number of the employed in the national economy – (LF); R_5 – share of the foreign trade commodity exchange in terms of the GDP – (XY);

[8]F_1 – share of quasi-money in terms of the GDP – (QMY); F_2 – share of the M2 monetary aggregate in terms of the GDP – (M2Y); F_3 – share of liquid liabilities in terms of the GDP – (LLY); F_4 – share of domestic lending in terms of the GDP – (DCY); F_5 – share of the non-governmental sector lending in terms of the GDP – (PCY); F_6 – share of domestic bank assets in terms of the GDP– (DFAY); F_7 – share of total bank assets in terms of the GDP – (TFAY).

[9]The results from the stationarity test of data, i.e. for the presence of a single root of the dynamic series for each of the variables, have been obtained by means of the parallel application of the extended Dicky–Fuller test (ADF) and the non-parametric Phillips–Peron test (PP), whereby the two tests

have been held both according to the information criterion of Schwartz (SIC) and according to the information criterion of Akaike (AIC). The test of the zero hypothesis, which presupposes non-stationarity or the existence of a single root of the time series subject to the test, is held by comparing the critical value of McKinnon at levels of significance of 1 per cent, 5 per cent and 10 per cent respectively. When the calculated ADF or PP statistics of the respective variable is higher than McKinnon's critical value for the respective value of significance, there are no sufficient grounds for the zero hypothesis to be rejected, and this means that the respective time series is non-stationary.

[10]Let us recall that in the studies we are aware of labor is excluded as a factor altogether, or in the rare cases when it is included, it is present with the indicator "level or number of secondary education diploma holders". Because of the inappropriateness of this indicator in the specific Bulgarian conditions, in order to make the production function complete, this study employs the rate of employment, which reflects the number of the employed in the national economy.

[11]For more detail, see *Engle* R.F. and *Granger* C.W.J., Co–integration and Error Correction: Representation, Estimation and Testing, Econometrica, 1987, No. 55, p. 251–276; S. *Karlin*, T. *Amemiya*, L.A.*Goodman* (eds.), Studies in Econometrics, Time-series and Multivariate Statistics, Academic Press, 1983, New York.

[12]See *Johansen*, S., Statistical Analysis of Cointegration Vectors, Journal of Economic Dynamics and Control, 1988, No. 12 (2–3), p. 231–254; *Johansen*, S. and *Juselius*, K., Maximum Likelihood Estimation and Inferences on Cointegration – with Applications to the Demand for Money, Oxford Bulletin of Economics and Statistics, 1990, No. 52, p. 169–210; Johansen, S., Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models, Econometrica, 1991, No. 59, p. 1551–1580.

[13]About the application of these models upon analyzing the dependency between financial and economic development see *Rousseau*, P. and R. *Sylla*, Emerging Financial Markets and Early U.S. Growth, National Bureau of Economic Research Working Paper, 1999, No.7448; *Rousseau*, P. and *Wachtel*, P., Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries. Journal of Money, Credit, and Banking 1998, No.30, p. 657–678; *Trabesli*, M., Finance and Growth: Empirical Evidence from Developing Countries, 1960–1990, CAHIER, 2003, No.13, ISSN 0709–9231; Ünalmis, D., The Causality Between Financial Development and Economic Growth: the Case of Turkey, The Central Bank of the Republic of Turkey Research Department Working Paper, 2002, No. 3.

[14]ECT – error correction term.

[15]Such an idea exists in the study of Jordan Shan, who explores only one financial factor – the total amount of credit in the economy. See *Shan*, J., Financial Development and Economic Growth: The Empirical Evidence from China, Proceedings of the 15th Annual Conference of the Association for Chinese Economics Studies Australia, (ACESA), 2003.

[16]See *Toda*, H.Y. and *Yamamoto*, T., Statistical Inference in Vector Autoregressions with Possibly Integrated Processes, Journal of Econometrics, 1995, No. 66, p. 225–250.

[17]For further detail about the application of these functions to the analysis of the relationship between the real and financial sectors see *Rousseau*, P., Historical Perspectives on Financial Development and Economic Growth, Review, 2003/July–August, p. 81–106; *Abu–Bader*, S. and *Abu–Oarn*, A., Financial Development and Economic Growth: Time Series Evidence from Egypt, Discussion Paper, 2005, No.14, Ben–Gurion University of the Negev, Israel; *Shan*, J., Financial Development and Economic Growth: The Empirical Evidence from China, Proceedings of the 15th Annual Conference of the Association for Chinese Economics Studies Australia, (ACESA), 2003; etc.

[18]The results concerning the two indicators employed for the economic growth rate to a large extent proved to be overlapping. This is the reason why when the analysis focuses on the comment of economic growth in the rest of the text, the two indicators are meant simultaneously. In the rare cases when disparities occur, they are analyzed on an individual basis.

[19]According to this structuring, the "liquidity" group includes the first three indicators: share of quasi-money in terms of the GDP, share of the M2 monetary aggregate in terms of the GDP, and share of liquid liabilities in terms of the GDP; the "lending" group includes the following indicators: share of donestic lending in terms of the GDP, and share of non-governmental lending in terms of the GDP; and the last group of "assets" includes: share of domestic financial assets in terms of the GDP, and share of overall financial assets in terms of the GDP.

[20]The econometric results presenting economic growth through the GDP growth rate are arranged in the same succession in Addenda 8, 9 and 10 and then again in Addenda 11, 12 and 13, when economic growth is measured through the indicator of the per capita real GDP growth rate.

[21]The results of Johansen's test for the second (post currency board) period relative to the real GDP growth rate are presented in Addendum 12. The results of the test relative to the per capita real GDP growth rate are absolutely identical from the standpoint of their statistical significance.

[22]In the subsequent text, the coefficients preceding the variables in the equations presented in Addenda 16 and 19 should be followed up and compared accordingly.

RESULTS FROM THE EXTENDED DICKY–FULLER TEST AND THE PHILLIPS–PERON TEST FOR THE PRESENCE OF A SINGLE ROOT IN THE FIRST DIFFERENCES WITH A LONG–TERM CONSTANT MEDIAN

1991–1996

Variable	ADF and PP statistics, lags, statistical significance as per Akaike's information criterion					ADF and PP statistics, lags, and statistical significance as per Schwartz's information criterion				
	ADF	S%L	L*	PP	S%L	ADF	S%L	L*	PP	S%L
LGQMY	–6.610229	1	0	–6.607924	1	–6.610229	1	0	–6.454301	1
LGM2Y	–6.884149	1	0	–6.883979	1	–6.884149	1	0	–6.833722	1
LGLLY	–7.376067	1	0	–7.374357	1	–7.376067	1	0	–7.373756	1
LGDCY	–5.700540	1	0	–5.698709	1	–5.700540	1	0	–5.599162	1
LGPCY	–6.306318	1	0	–6.303530	1	–6.306318	1	0	–6.105781	1
LGDFAY	–7.312826	1	0	–7.311085	1	–7.312826	1	0	–7.312826	1
LGTFAY	–7.129386	1	0	–7.129338	1	–7.129386	1	0	–7.129386	1
LGY	–4.758545	1	0	–4.758599	1	–4.758545	1	0	–4.762987	1
LGYC	–4.769790	1	0	–4.769841	1	–4.769790	1	0	–4.773989	1
LGIY	–5.406641	1	1	–8.338365	1	–5.406641	1	1	–6.006909	1
LGLF	–2.811956	10	2	–5.709494	1	–2.435844		0	–2.559051	
LGXY	–4.990551	1	0	–4.990544	1	–4.990551	1	0	–4.990551	1

1997–2006

Variable	ADF and PP statistics, lags, statistical significance as per Akaike's information criterion					ADF and PP statistics, lags, and statistical significance as per Schwartz's information criterion				
	ADF	S%L	L*	PP	S%L	ADF	S%L	L*	PP	S%L
LGQMY	–5.590656	1	0	–5.590862	1	–5.590656	1	0	–5.607900	1
LGM2Y	–4.923623	1	0	–18.04363	1	–4.464030	1	3	–4.846051	1
LGLLY	–5.207708	1	0	–14.23452	1	–3.542936	1	3	–5.184084	1
LGDCY	–5.251563	1	2	–3.910668	1	–3.987936	1	3	–3.910668	1
LGPCY	–5.717747	1	0	–5.952908	1	–5.717747	1	0	–5.718200	1
LGDFAY	–4.175706	1	2	–3.130799	5	–3.885720	1	3	–3.279975	5
LGTFAY	–4.382701	1	0	–126.5484	1	–4.382701	1	0	–4.307904	1
LGY	–14.22611	1	0	–13.92711	1	–14.22611	1	0	–16.26638	1
LGYC	–14.22857	1	0	–13.93736	1	–14.22857	1	0	–18.10650	1
LGIY	–6.014902	1	1	–6.736371	1	–6.014902	1	1	–11.17446	1
LGLF	–4.141746	1	1	–4.569605	1	–4.327469	1	0	–4.233508	1
LGGY	–6.452357	1	1	–6.899871	1	–6.452357	1	1	–7.044687	1
LGXY	–3.653505	1	2	–6.254898	1	–7.663980	1	0	–7.435486	1
LGCPI	–3.582740	1	2	–6.351365	1	–6.427045	1	0	–6.351365	1

Remark: LGQMY, LGM2Y, LGLLY, LGDCY, LGPCY, LGDFAY, LGTFAY, LGY, LGYC, LFIY, LGLF, LGGY, LGXY, and LGCPI are the designations for the natural logarithms of the share of quasi-money in terms of the GDP, the share of M2 monetary aggregate in terms of the GDP, the share of liquid liabilities in terms of the GDP, the share of domestic credit or lending in terms of the GDP, the share of private lending in terms of the GDP, the share of domestic financial assets in terms of the GDP, the share of total financial assets in terms of the GDP, of the real GDP itself on the basis of 1995 data, , the per capital real GDP, the share of gross fixed capital formation in terms of the GDP, the employment rate (the number of the employed), the share of government purchases in terms of the GDP, the share of the foreign trade commodity exchange and turnover (exports plus imports) in terms of the GDP, and the index of consumer prices (1995 = 100 per cent). L* is the optimum length of lag, which according to Aikake's criterion is of a 5 lags maximum value, and according to Schwartz's criterion is of a 9 lags maximum value. S per centL displays the statistical significance at levels 1 per cent, 5 per cent, and 10 per cent, or the absence of a statistical significance altogether.

Addendum 2

INDICATORS (INDEPENDENT VARIABLES) CONCERNING THE REAL ECONOMY:

1. DLGY is the rate of change of the real GDP;

2. DLGYC is the rate of change of the per capita real GDP;

3. DLGIY – is the rate of change of the share of gross fixed capital formation in terms of the GDP;

4. DLGLF – is the rate of change of the number of the employed (employment rate);

5. DLGGY – is the rate of change of the share of government purchases in terms of the GDP;

6. DLGXY – is the rate of change of the share of foreign trade commodity exchange in terms of the GDP;

7. DLGCPI – is the rate of change of the consumer price index;

INDICATORS (INDEPENDENT VARIABLES) CONCERNING THE REAL ECONOMY:

1. DLGQMY – is the rate of change of the share of quasi-money in terms of the GDP;

2. DLGM2Y – is the rate of change of the share of the M2 monetary aggregate in terms of the GDP;

3. DLGLLY – is the rate of change of the share of liquid liabilities of the banking system in terms of the GDP;

4. DLGDCY – is the rate of change of the share of domestic lending in terms of the GDP;

5. DLGPCY – is the rate of change of the share of lending for the non-governmental sector (private lending) in terms of the GDP;

6. DLGDFAY – is the rate of change of the share of domestic financial assets of the banking system in terms of the GDP;

7. DLGTFAY – is the rate of change of the share of total financial assets in the banking system in terms of the GDP.

Addendum 3

PAIR–WISE GRANGER CAUSALITY TEST FOR THE 1991–1996 PERIOD OF TIME BETWEEN THE GDP, THE PER CAPITA GDP, INVESTMENTS, AS WELL AS EMPLOYMENT AND FOREIGN TRADE RESPECTIVELY

	Dependent variable			
Indicator	DLGY	DLGIY	DLGLF	DLGXY
DLGY				
DLGIY				
DLGLF				
DLGXY				

	Dependent variable			
Indicator	DLGYC	DLGIY	DLGLF	DLGXY
DLGYC				
DLGIY				
DLGLF				
DLGXY				

Remark: DLGY, DLGYC, DLGIY, DLGLF, DLGXY, DLGQMY, DLGM2Y, DLGLLY, DLGDCY, DLGPCY, DLGDFAY, DLGTFAY stand respectively for the first differences of the natural logarithms of the real GDP and the per capita real GDP in million denominated BGN at 1995 prices, for the share of gross fixed capital formation in terms of the GDP, for the number of the employed in the national economy, for the share of foreign trade in terms of the GDP, for the share of quasi-money in terms of the GDP, for the share of the M2 monetary aggregate in terms of the GDP, for the share of liquid liabilities in terms of the GDP, for the share of domestic lending in terms of the GDP, for the share of private or non-governmental lending in terms of the GDP, for the share of domestic financial assets in terms of the GDP, and for the share of the total financial assets in terms of the GDP.

The above designations are valid for all tables concerning the pair–wise Granger test.

The upper number indicates the value of the F–statistics, and the lower number indicates the statistical probability (significance).

*, **, *** indicate the statistical significance at levels of 10 per cent, 5 per cent, and 1 per cent respectively.

Addendum 4

PAIR–WISE GRANGER CAUSALITY TEST FOR THE 1997–2006 PERIOD OF TIME BETWEEN THE GDP, THE PER CAPITA GDP, INVESTMENTS, AS WELL AS EMPLOYMENT AND FOREIGN TRADE RESPECTIVELY

	Dependent variable			
Indicator	DLGY	DLGIY	DLGLF	DLGXY
DLGY		7.98424 0.00795***		
DLGIY	12.80350 0.00109***			
DLGLF	2.87867 0.09917*			
DLGXY	2.70891 0.10928*			

	Dependent variable			
Indicator	DLGYC	DLGIY	DLGLF	DLGXY
DLGYC		8.13219 0.00475***		
DLGIY	12.54450 0.00121***			
DLGLF				
DLGXY				

Remark: DLGY, DLGYC, DLGIY, DLGLF, DLGXY, DLGQMY, DLGM2Y, DLGLLY, DLGDCY, DLGPCY, DLGDFAY, DLGTFAY stand respectively for the first differences of the natural logarithms of the real GDP and the per capita real GDP in million denominated BGN at 1995 prices, for the share of gross fixed capital formation in terms of the GDP, for the number of the employed in the national economy, for the share of foreign trade in terms of the GDP, for the share of quasi-money in terms of the GDP, for the share of the M2 monetary aggregate in terms of the GDP, for the share of liquid liabilities in terms of the GDP, for the share of domestic lending in terms of the GDP, for the share of private or non-governmental lending in terms of the GDP, for the share of domestic financial assets in terms of the GDP, and for the share of the total financial assets in terms of the GDP.

The above designations are valid for all tables concerning the pair–wise Granger test.

The upper number indicates the value of the F–statistics, and the lower number indicates the statistical probability (significance).

*, **, *** indicate the statistical significance at levels of 10 per cent, 5 per cent, and 1 per cent respectively.

Addendum 5

PAIR–WISE GRANGER CAUSALITY TEST FOR THE 1991–1996 PERIOD OF TIME BETWEEN THE GDP, THE PER CAPITA GDP, INVESTMENTS, EMPLOYMENT, AS WELL AS AND FOREIGN TRADE AND FINANCIAL DEVELOPMENT RESPECTIVELY

Dependent variable

Indicator	DLGY	DLGYC	DLGIY	DLGLF	DLGXY	DLGQMY	DLGM2Y	DLGLLY	DLGDCY	DLGPCY	DLGDFAY	DLGTFAY
DLGY						4.65857	3.72422		4.27977	9.02711		
DLGYC						0.04390** 4.71416	0.06870* 3.76820		0.05245* 4.33305	0.00729*** 9.15718		
DLGIY						0.04279**	0.06722*		0.05114*	0.00695***		
DLGLF												
DLGXY						4.05774	2.98525					
DLGQMY						0.05835*	0.10025*					
DLGM2Y	0.07995* 4.37754	0.07836* 4.41475		0.09169*	0.06625* 4.51154							
DLGLLY	0.05008*	0.04920**		5.69090	0.04702**							
DLGDCY				0.02762** 3.26864								
DLGPCY				0.08647* 4.01178								
DLGDFAY				0.05966* 6.35333								
DLGTFAY				0.02082** 6.07801								
				0.02338**								

Remark: The upper number indicates the value of the F–statistics, and the lower number indicates the statistical probability (significance).
*, **, *** indicate the statistical significance at levels of 10 per cent, 5 per cent, and 1 per cent respectively.

PAIR–WISE GRANGER CAUSALITY TEST FOR THE 1997–2006 PERIOD OF TIME BETWEEN THE GDP, THE PER CAPITA GDP, INVESTMENTS, EMPLOYMENT, AS WELL AS AND FOREIGN TRADE AND FINANCIAL DEVELOPMENT RESPECTIVELY

Dependent variable

Indicator	DLGY	DLGYC	DLGIY	DLGLF	DLGXY	DLGQMY	DLGM2Y	DLGLLY	DLGDCY	DLGPCY	DLGDFAY	DLGTFAY
DLGY								3.07055	5.85282	19.91150	3.35412	3.28848
DLGYC								0.06121* 3.38438	0.00714*** 5.62746	0.00000*** 19.49540	0.04846** 3.26199	0.05113* 3.34541
DLGIY								0.04728**	0.00841*** 5.55686	0.00000*** 2.68276	0.05226*	0.04880**
DLGLF									0.00885*** 2.73053	0.08475*		
DLGXY							6.67920	10.07790	0.08138* 10.04500	10.02790	9.10594	3.06149
DLGQMY							0.00399***	0.00045***	0.00046***	0.00046***	0.00081***	0.06167*
DLGM2Y			0.00267*** 9.37371		4.84206							
DLGLLY			0.00069*** 5.66940		0.01505** 2.81884							
DLGDCY			0.00816***	6.70703	0.07554*							
DLGPCY			3.30258	0.00391*** 10.48480	2.59134							
DLGDFAY			0.05055**	0.00035*** 7.23052	0.09160*							
DLGTFAY			6.00228	0.00274*** 3.13018	6.34484							
			0.00642***	0.05826*	0.00503***							

Remark: The upper number indicates the value of the F–statistics, and the lower number indicates the statistical probability (significance).
*, **, *** indicate the statistical significance at levels of 10 per cent, 5 per cent, and 1 per cent respectively.

Addendum 7

JOHANSEN'S CO–INTEGRATION TEST BETWEEN THE GDP, INVESTMENTS, EMPLOYMENT, FOREIGN TRADE, AND FINANCIAL DEVELOPMENT (1991–1996)

Independent Variables	H_0 H_1	trace statistics	critical value at 5 per cent	proba-bility**	Max–Eigen statistics	critical value at 5 per cent	proba-bility**
DLGY,	r = 0*	83.63434	47.85613	0.0000	35.96427	27.58434	0.0033
DLGLF,	r <= 1*	47.67008	29.79707	0.0002	25.86722	21.13162	0.0100
DLGIY,	r <= 2*	21.80286	15.49471	0.0049	16.49848	14.26460	0.0218
DLGXY	r <= 3*	5.30438	3.84147	0.0213	5.30438	3.84147	0.0213
DLGY,	r = 0*	116.27660	69.81889	0.0000	49.07843	33.87687	0.0004
DLGLF,	r <= 1*	67.19819	47.85613	0.0003	29.32241	27.58434	0.0296
DLGIY,	r <= 2*	37.87577	29.79707	0.0047	26.97931	21.13162	0.0067
DLGXY	r <= 3	10.89646	15.49471	0.2179	6.007799	14.2646	0.6122
DLGQMY,	r <= 4*	4.888661	3.841466	0.0270	4.888661	3.841466	0.0270
DLGY,	r = 0*	117.0884	69.81889	0.0000	48.21378	33.87687	0.0005
DLGLF,	r <= 1*	68.87464	47.85613	0.0002	31.07728	27.58434	0.0170
DLGIY,	r <= 2*	37.79736	29.79707	0.0049	27.53818	21.13162	0.0055
DLGXY	r <= 3	10.25918	15.49471	0.2613	5.804944	14.2646	0.6384
DLGM2Y,	r <= 4*	4.454234	3.841466	0.0348	4.454234	3.841466	0.0348
DLGY,	r = 0*	125.1586	69.81889	0.0000	54.83075	33.87687	0.0001
DLGLF,	r <= 1*	70.32781	47.85613	0.0001	32.23261	27.58434	0.0117
DLGIY,	r <= 2*	38.09521	29.79707	0.0044	24.68356	21.13162	0.0151
DLGXY	r <= 3	13.41165	15.49471	0.1006	7.067925	14.2646	0.4811
DLGLLY,	r <= 4*	6.343723	3.841466	0.0118	6.343723	3.841466	0.0118
DLGY,	r = 0*	125.4618	69.81889	0.0000	54.07213	33.87687	0.0001
DLGLF,	r <= 1*	71.38968	47.85613	0.0001	31.50362	27.58434	0.0149
DLGIY,	r <= 2*	39.88606	29.79707	0.0025	23.26781	21.13162	0.0246
DLGXY	r <= 3*	16.61825	15.49471	0.0337	10.33836	14.2646	0.1907
DLGDCY	r <= 4*	6.279891	3.841466	0.0122	6.279891	3.841466	0.0122
DLGY,	r = 0*	114.1679	69.81889	0.0000	43.10933	33.87687	0.0030
DLGLF,	r <= 1*	71.0586	47.85613	0.0001	29.5539	27.58434	0.0276
DLGIY,	r <= 2*	41.5047	29.79707	0.0015	27.0401	21.13162	0.0065
DLGXY	r <= 3	14.4646	15.49471	0.0710	8.765609	14.2646	0.3062
DLGPCY	r <= 4*	5.698991	3.841466	0.0170	5.698991	3.841466	0.0170
DLGY,	r = 0*	125.7942	69.81889	0.0000	54.72319	33.87687	0.0001
DLGLF,	r <= 1*	71.07103	47.85613	0.0001	30.7892	27.58434	0.0187
DLGIY,	r <= 2*	40.28183	29.79707	0.0022	26.01108	21.13162	0.0095
DLGXY	r <= 3	14.27075	15.49471	0.0758	7.890295	14.2646	0.3899
DLGDFAY	r <= 4*	6.380455	3.841466	0.0115	6.380455	3.841466	0.0115
DLGY,	r = 0*	120.442	69.81889	0.0000	50.76831	33.87687	0.0002
DLGLF,	r <= 1*	69.67373	47.85613	0.0001	32.04861	27.58434	0.0124
DLGIY,	r <= 2*	37.62512	29.79707	0.0051	25.46791	21.13162	0.0115
DLGXY	r <= 3	12.15721	15.49471	0.1495	7.250217	14.2646	0.4600
DLGTFAY	r <= 4*	4.906992	3.841466	0.0267	4.906992	3.841466	0.0267

H_0 – zero hypothesis for the absence of a long-term causality

H_1 – single hypothesis for the presence of a long-term causality

* marks the rejection of the hypothesis for the absence of long-term causality at a probability level of 0.05

** – p–values of McKinnon, Hoge, and Mischellis (1999)

Remark: The criss–crossed combinations of variables indicate co-integration dependencies at a 5 per cent and a 10 per cent level of statistical significance.

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1991 – 1996) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGLF AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_i

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1-2)	(1-3)	(2-3)
	DLGY =	DLGY =	DLGY =			
C	-0.030997	-0.027519	-0.032276	-0.003478	0.001279	0.004757
DLGLF	-0.180124	-0.161655	-0.184660	-0.018469	0.004536	0.023005
DLGIY	0.052173	0.068786		-0.016613	0.052173	0.068786
DLGXY	-0.534859	-0.595160	-0.497547	0.060301	-0.037312	-0.097613
DLGQMY	-0.200054		-0.208509	-0.200054	0.008455	0.208509
	DLGY =	DLGY =	DLGY =			
C	-0.033853	-0.027519	-0.035225	-0.006334	0.001372	0.007706
DLGLF	-0.168740	-0.161655	-0.172894	-0.007085	0.004154	0.011239
DLGIY	0.054572	0.068786		-0.014214	0.054572	0.068786
DLGXY	-0.526337	-0.595160	-0.487747	0.068823	-0.038590	-0.107413
DLGM2Y	-0.244989		-0.251969	-0.244989	0.006980	0.251969
	DLGY =	DLGY =	DLGY =			
C	-0.040619	-0.027519	-0.042058	-0.013100	0.001439	0.014539
DLGLF	-0.118585	-0.161655	-0.122697	0.043070	0.004112	-0.038958
DLGIY	0.060940	0.068786		-0.007846	0.060940	0.068786
DLGXY	-0.360568	-0.595160	-0.317601	0.234592	-0.042967	-0.277559
DLGLLY	-0.469323		-0.472921	-0.469323	0.003598	0.472921
	DLGY =	DLGY =	DLGY =			
C	-0.039514	-0.027519	-0.040517	-0.011995	0.001003	0.012998
DLGLF	-0.213713	-0.161655	-0.217225	-0.052058	0.003512	0.055570
DLGIY	0.037904	0.068786		-0.030882	0.037904	0.068786
DLGXY	-0.436532	-0.595160	-0.408836	0.158628	-0.027696	-0.186324
DLGDCY	-0.430225		-0.436673	-0.430225	0.006448	0.436673
	DLGY =	DLGY =	DLGY =			
C	-0.035662	-0.027519	-0.037133	-0.008143	0.001471	0.009614
DLGLF	-0.062227	-0.161655	-0.070566	0.099428	0.008339	-0.091089
DLGIY	0.077256	0.068786		0.008470	0.077256	0.068786
DLGXY	-0.521156	-0.595160	-0.471093	0.074004	-0.050063	-0.124067
DLGPCY	-0.248458		-0.241664	-0.248458	-0.006794	0.241664
	DLGY =	DLGY =	DLGY =			
C	-0.039362	-0.027519	-0.040858	-0.011843	0.001496	0.013339
DLGLF	-0.156260	-0.161655	-0.161148	0.005395	0.004888	-0.000507
DLGIY	0.067120	0.068786		-0.001666	0.067120	0.068786
DLGXY	-0.333634	-0.595160	-0.287813	0.261526	-0.045821	-0.307347
DLGDFAY	-0.512599		-0.513451	-0.512599	0.000852	0.513451
	DLGY =	DLGY =	DLGY =			
C	-0.039878	-0.027519	-0.041346	-0.012359	0.001468	0.013827
DLGLF	-0.152185	-0.161655	-0.156592	0.009470	0.004407	-0.005063
DLGIY	0.061653	0.068786		-0.007133	0.061653	0.068786
DLGXY	-0.401066	-0.595160	-0.357629	0.194094	-0.043437	-0.237531
DLGTFAY	-0.408439		-0.412205	-0.408439	0.003766	0.412205

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1991–1996) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_1

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGY =	DLGY =	DLGY =			
C	-0.030997	-0.027519	-0.029633	-0.003478	-0.001364	0.002114
DLGLF	-0.180124	-0.161655		-0.018469	-0.180124	-0.161655
DLGIY	0.052173	0.068786	0.053017	-0.016613	-0.000844	0.015769
DLGXY	-0.534859	-0.595160	-0.534948	0.060301	0.000089	-0.060212
DLGQMY	-0.200054		-0.198305	-0.200054	-0.001749	0.198305
	DLGY =	DLGY =	DLGY =			
C	-0.033853	-0.027519	-0.032588	-0.006334	-0.001265	0.005069
DLGLF	-0.168740	-0.161655		-0.007085	-0.168740	-0.161655
DLGIY	0.054572	0.068786	0.055261	-0.014214	-0.000689	0.013525
DLGXY	-0.526337	-0.595160	-0.526051	0.068823	-0.000286	-0.069109
DLGM2Y	-0.244989		-0.244412	-0.244989	-0.000577	0.244412
	DLGY =	DLGY =	DLGY =			
C	-0.040619	-0.027519	-0.039798	-0.013100	-0.000821	0.012279
DLGLF	-0.118585	-0.161655		0.043070	-0.118585	-0.161655
DLGIY	0.060940	0.068786	0.061366	-0.007846	-0.000426	0.007420
DLGXY	-0.360568	-0.595160	-0.359231	0.234592	-0.001337	-0.235929
DLGLLY	-0.469323		-0.471368	-0.469323	0.002045	0.471368
	DLGY =	DLGY =	DLGY =			
C	-0.039514	-0.027519	-0.037840	-0.011995	-0.001674	0.010321
DLGLF	-0.213713	-0.161655		-0.052058	-0.213713	-0.161655
DLGIY	0.037904	0.068786	0.038969	-0.030882	-0.001065	0.029817
DLGXY	-0.436532	-0.595160	-0.437180	0.158628	0.000648	-0.157980
DLGDCY	-0.430225		-0.426929	-0.430225	-0.003296	0.426929
	DLGY =	DLGY =	DLGY =			
C	-0.035662	-0.027519	-0.035321	-0.008143	-0.000341	0.007802
DLGLF	-0.062227	-0.161655		0.099428	-0.062227	-0.161655
DLGIY	0.077256	0.068786	0.077607	0.008470	-0.000351	-0.008821
DLGXY	-0.521156	-0.595160	-0.519994	0.074004	-0.001162	-0.075166
DLGPCY	-0.248458		-0.251813	-0.248458	0.003355	0.251813
	DLGY =	DLGY =	DLGY =			
C	-0.039362	-0.027519	-0.038212	-0.011843	-0.001150	0.010693
DLGLF	-0.156260	-0.161655		0.005395	-0.156260	-0.161655
DLGIY	0.067120	0.068786	0.067725	-0.001666	-0.000605	0.001061
DLGXY	-0.333634	-0.595160	-0.333044	0.261526	-0.000590	-0.262116
DLGDFAY	-0.512599		-0.512941	-0.512599	0.000342	0.512941
	DLGY =	DLGY =	DLGY =			
C	-0.039878	-0.027519	-0.038770	-0.012359	-0.001108	0.011251
DLGLF	-0.152185	-0.161655		0.009470	-0.152185	-0.161655
DLGIY	0.061653	0.068786	0.062232	-0.007133	-0.000579	0.006554
DLGXY	-0.401066	-0.595160	-0.400348	0.194094	-0.000718	-0.194812
DLGTFAY	-0.408439		-0.409096	-0.408439	0.000657	0.409096

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1991–1996) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGLF, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_i

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
DLGY =	DLGY =	DLGY =				
C	-0.030997	-0.027519	-0.043703	-0.003478	0.012706	0.016184
DLGLF	-0.180124	-0.161655	-0.181493	-0.018469	0.001369	0.019838
DLGIY	0.052173	0.068786	-0.144804	-0.016613	0.196977	0.213590
DLGXY	-0.534859	-0.595160		0.060301	-0.534859	-0.595160
DLGQMY	-0.200054		-0.361784	-0.200054	0.161730	0.361784
	DLGY =	DLGY =	DLGY =			
C	-0.033853	-0.027519	-0.047927	-0.006334	0.014074	0.020408
DLGLF	-0.168740	-0.161655	-0.160196	-0.007085	-0.008544	-0.001459
DLGIY	0.054572	0.068786	-0.136112	-0.014214	0.190684	0.204898
DLGXY	-0.526337	-0.595160		0.068823	-0.526337	-0.595160
DLGM2Y	-0.244989		-0.411978	-0.244989	0.166989	0.411978
	DLGY =	DLGY =	DLGY =			
C	-0.040619	-0.027519	-0.052182	-0.013100	0.011563	0.024663
DLGLF	-0.118585	-0.161655	-0.089987	0.043070	-0.028598	-0.071668
DLGIY	0.060940	0.068786	-0.034211	-0.007846	0.095151	0.102997
DLGXY	-0.360568	-0.595160		0.234592	-0.360568	-0.595160
DLGLLY	-0.469323		-0.707546	-0.469323	0.238223	0.707546
	DLGY =	DLGY =	DLGY =			
C	-0.039514	-0.027519	-0.052113	-0.011995	0.012599	0.024594
DLGLF	-0.213713	-0.161655	-0.225481	-0.052058	0.011768	0.063826
DLGIY	0.037904	0.068786	-0.114603	-0.030882	0.152507	0.183389
DLGXY	-0.436532	-0.595160		0.158628	-0.436532	-0.595160
DLGDCY	-0.430225		-0.612603	-0.430225	0.182378	0.612603
	DLGY =	DLGY =	DLGY =			
C	-0.035662	-0.027519	-0.051577	-0.008143	0.015915	0.024058
DLGLF	-0.062227	-0.161655	0.030196	0.099428	-0.092423	-0.191851
DLGIY	0.077256	0.068786	-0.090369	0.008470	0.167625	0.159155
DLGXY	-0.521156	-0.595160		0.074004	-0.521156	-0.595160
DLGPCY	-0.248458		-0.447211	-0.248458	0.198753	0.447211
	DLGY =	DLGY =	DLGY =			
C	-0.039362	-0.027519	-0.049162	-0.011843	0.009800	0.021643
DLGLF	-0.156260	-0.161655	-0.147831	0.005395	-0.008429	-0.013824
DLGIY	0.067120	0.068786	-0.014024	-0.001666	0.081144	0.082810
DLGXY	-0.333634	-0.595160		0.261526	-0.333634	-0.595160
DLGDFAY	-0.512599		-0.749245	-0.512599	0.236646	0.749245
	DLGY =	DLGY =	DLGY =			
C	-0.039878	-0.027519	-0.053361	-0.012359	0.013483	0.025842
DLGLF	-0.152185	-0.161655	-0.138432	0.009470	-0.013753	-0.023223
DLGIY	0.061653	0.068786	-0.047906	-0.007133	0.109559	0.116692
DLGXY	-0.401066	-0.595160		0.194094	-0.401066	-0.595160
DLGTFAY	-0.408439		-0.666892	-0.408439	0.258453	0.666892

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1991–1996) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGLF AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
DLGYC =	DLGYC =	DLGYC =				
C	-0.029430	-0.025973	-0.030700	-0.003457	0.001270	0.004727
DLGLF	-0.188809	-0.170449	-0.193313	-0.018360	0.004504	0.022864
DLGIY	0.051806	0.068322		-0.016516	0.051806	0.068322
DLGXY	-0.535028	-0.594936	-0.497938	0.059908	-0.037090	-0.096998
DLGQMY	-0.198883		-0.207278	-0.198883	0.008395	0.207278
	DLGYC =	DLGYC =	DLGYC =			
C	-0.032282	-0.025973	-0.033643	-0.006309	0.001361	0.007670
DLGLF	-0.177506	-0.170449	-0.181629	-0.007057	0.004123	0.011180
DLGIY	0.054163	0.068322		-0.014159	0.054163	0.068322
DLGXY	-0.526378	-0.594936	-0.488077	0.068558	-0.038301	-0.106859
DLGM2Y	-0.244046		-0.250973	-0.244046	0.006927	0.250973
	DLGYC =	DLGYC =	DLGYC =			
C	-0.039030	-0.025973	-0.040458	-0.013057	0.001428	0.014485
DLGLF	-0.127518	-0.170449	-0.131600	0.042931	0.004082	-0.038849
DLGIY	0.060501	0.068322		-0.007821	0.060501	0.068322
DLGXY	-0.361100	-0.594936	-0.318442	0.233836	-0.042658	-0.276494
DLGLLY	-0.467810		-0.471382	-0.467810	0.003572	0.471382
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037923	-0.025973	-0.038917	-0.011950	0.000994	0.012944
DLGLF	-0.222318	-0.170449	-0.225797	-0.051869	0.003479	0.055348
DLGIY	0.037552	0.068322		-0.030770	0.037552	0.068322
DLGXY	-0.436884	-0.594936	-0.409445	0.158052	-0.027439	-0.185491
DLGDCY	-0.428662		-0.435050	-0.428662	0.006388	0.435050
	DLGYC =	DLGYC =	DLGYC =			
C	-0.034037	-0.025973	-0.035497	-0.008064	0.001460	0.009524
DLGLF	-0.071973	-0.170449	-0.080252	0.098476	0.008279	-0.090197
DLGIY	0.076710	0.068322		0.008388	0.076710	0.068322
DLGXY	-0.521640	-0.594936	-0.471931	0.073296	-0.049709	-0.123005
DLGPCY	-0.246079		-0.239334	-0.246079	-0.006745	0.239334
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037778	-0.025973	-0.039263	-0.011805	0.001485	0.013290
DLGLF	-0.165071	-0.170449	-0.169926	0.005378	0.004855	-0.000523
DLGIY	0.066660	0.068322		-0.001662	0.066660	0.068322
DLGXY	-0.334241	-0.594936	-0.288733	0.260695	-0.045508	-0.306203
DLGDFAY	-0.510970		-0.511816	-0.510970	0.000846	0.511816
	DLGYC =	DLGYC =	DLGYC =			
C	-0.038289	-0.025973	-0.039747	-0.012316	0.001458	0.013774
DLGLF	-0.161011	-0.170449	-0.165386	0.009438	0.004375	-0.005063
DLGIY	0.061212	0.068322		-0.007110	0.061212	0.068322
DLGXY	-0.401496	-0.594936	-0.358370	0.193440	-0.043126	-0.236566
DLGTFAY	-0.407060		-0.410800	-0.407060	0.003740	0.410800

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1991–1996) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
DLGYC =	DLGYC =	DLGYC =				
C	-0.029430	-0.025973	-0.028000	-0.003457	-0.001430	0.002027
DLGLF	-0.188809	-0.170449		-0.018360	-0.188809	-0.170449
DLGIY	0.051806	0.068322	0.052691	-0.016516	-0.000885	0.015631
DLGXY	-0.535028	-0.594936	-0.535078	0.059908	0.000050	-0.059858
DLGQMY	-0.198883		-0.197049	-0.198883	-0.001834	0.197049
	DLGYC =	DLGYC =	DLGYC =			
C	-0.032282	-0.025973	-0.030951	-0.006309	-0.001331	0.004978
DLGLF	-0.177506	-0.170449		-0.007057	-0.177506	-0.170449
DLGIY	0.054163	0.068322	0.054887	-0.014159	-0.000724	0.013435
DLGXY	-0.526378	-0.594936	-0.526076	0.068558	-0.000302	-0.068860
DLGM2Y	-0.244046		-0.243439	-0.244046	-0.000607	0.243439
	DLGYC =	DLGYC =	DLGYC =			
C	-0.039030	-0.025973	-0.038147	-0.013057	-0.000883	0.012174
DLGLF	-0.127518	-0.170449		0.042931	-0.127518	-0.170449
DLGIY	0.060501	0.068322	0.060959	-0.007821	-0.000458	0.007363
DLGXY	-0.361100	-0.594936	-0.359662	0.233836	-0.001438	-0.235274
DLGLLY	-0.467810		-0.470009	-0.467810	0.002199	0.470009
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037923	-0.025973	-0.037840	-0.011950	-0.000083	0.011867
DLGLF	-0.222318	-0.170449		-0.051869	-0.222318	-0.170449
DLGIY	0.037552	0.068322	0.038969	-0.030770	-0.001417	0.029353
DLGXY	-0.436884	-0.594936	-0.437180	0.158052	0.000296	-0.157756
DLGDCY	-0.428662		-0.426929	-0.428662	-0.001733	0.426929
	DLGYC =	DLGYC =	DLGYC =			
C	-0.034037	-0.025973	-0.033642	-0.008064	-0.000395	0.007669
DLGLF	-0.071973	-0.170449		0.098476	-0.071973	-0.170449
DLGIY	0.076710	0.068322	0.077116	0.008388	-0.000406	-0.008794
DLGXY	-0.521640	-0.594936	-0.520296	0.073296	-0.001344	-0.074640
DLGPCY	-0.246079		-0.249960	-0.246079	0.003881	0.249960
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037778	-0.025973	-0.036562	-0.011805	-0.001216	0.010589
DLGLF	-0.165071	-0.170449		0.005378	-0.165071	-0.170449
DLGIY	0.066660	0.068322	0.067300	-0.001662	-0.000640	0.001022
DLGXY	-0.334241	-0.594936	-0.333617	0.260695	-0.000624	-0.261319
DLGDFAY	-0.510970		-0.511331	-0.510970	0.000361	0.511331
	DLGYC =	DLGYC =	DLGYC =			
C	-0.038289	-0.025973	-0.037117	-0.012316	-0.001172	0.011144
DLGLF	-0.161011	-0.170449		0.009438	-0.161011	-0.170449
DLGIY	0.061212	0.068322	0.061825	-0.007110	-0.000613	0.006497
DLGXY	-0.401496	-0.594936	-0.400737	0.193440	-0.000759	-0.194199
DLGTFAY	-0.407060		-0.407756	-0.407060	0.000696	0.407756

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1991–1996) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGLF, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGYC =	DLGYC =	DLGYC =			
C	-0.029430	-0.025973	-0.042139	-0.003457	0.012709	0.016166
DLGLF	-0.188809	-0.170449	-0.190179	-0.018360	0.001370	0.019730
DLGIY	0.051806	0.068322	-0.145218	-0.016516	0.197024	0.213540
DLGXY	-0.535028	-0.594936		0.059908	-0.535028	-0.594936
DLGQMY	-0.198883		-0.360651	-0.198883	0.161768	0.360651
	DLGYC =	DLGYC =	DLGYC =			
C	-0.032282	-0.025973	-0.046357	-0.006309	0.014075	0.020384
DLGLF	-0.177506	-0.170449	-0.168962	-0.007057	-0.008544	-0.001487
DLGIY	0.054163	0.068322	-0.136536	-0.014159	0.190699	0.204858
DLGXY	-0.526378	-0.594936		0.068558	-0.526378	-0.594936
DLGM2Y	-0.244046		-0.411047	-0.244046	0.167001	0.411047
	DLGYC =	DLGYC =	DLGYC =			
C	-0.039030	-0.025973	-0.050610	-0.013057	0.011580	0.024637
DLGLF	-0.127518	-0.170449	-0.098878	0.042931	-0.028640	-0.071571
DLGIY	0.060501	0.068322	-0.034791	-0.007821	0.095292	0.103113
DLGXY	-0.361100	-0.594936		0.233836	-0.361100	-0.594936
DLGLLY	-0.467810		-0.706385	-0.467810	0.238575	0.706385
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037923	-0.025973	-0.050533	-0.011950	0.012610	0.024560
DLGLF	-0.222318	-0.170449	-0.234095	-0.051869	0.011777	0.063646
DLGIY	0.037552	0.068322	-0.115078	-0.030770	0.152630	0.183400
DLGXY	-0.436884	-0.594936		0.158052	-0.436884	-0.594936
DLGDCY	-0.428662		-0.611187	-0.428662	0.182525	0.611187
	DLGYC =	DLGYC =	DLGYC =			
C	-0.034037	-0.025973	-0.049967	-0.008064	0.015930	0.023994
DLGLF	-0.071973	-0.170449	0.020536	0.098476	-0.092509	-0.190985
DLGIY	0.076710	0.068322	-0.091070	0.008388	0.167780	0.159392
DLGXY	-0.521640	-0.594936		0.073296	-0.521640	-0.594936
DLGPCY	-0.246079		-0.445017	-0.246079	0.198938	0.445017
	DLGYC =	DLGYC =	DLGYC =			
C	-0.037778	-0.025973	-0.047596	-0.011805	0.009818	0.021623
DLGLF	-0.165071	-0.170449	-0.156627	0.005378	-0.008444	-0.013822
DLGIY	0.066660	0.068322	-0.014631	-0.001662	0.081291	0.082953
DLGXY	-0.334241	-0.594936		0.260695	-0.334241	-0.594936
DLGDFAY	-0.510970		-0.748046	-0.510970	0.237076	0.748046
	DLGYC =	DLGYC =	DLGYC =			
C	-0.038289	-0.025973	-0.051787	-0.012316	0.013498	0.025814
DLGLF	-0.161011	-0.170449	-0.147243	0.009438	-0.013768	-0.023206
DLGIY	0.061212	0.068322	-0.048464	-0.007110	0.109676	0.116786
DLGXY	-0.401496	-0.594936		0.193440	-0.401496	-0.594936
DLGTFAY	-0.407060		-0.665791	-0.407060	0.258731	0.665791

JOHANSEN'S CO-INTEGRATION TEST BETWEEN THE GDP, INVESTMENTS, EMPLOYMENT, FOREIGN TRADE, AND FINANCIAL DEVELOPMENT (1997–2006)

Independent Variables	H_0 H_1	trace statistics	critical value at 5 per cent	proba-bility**	Max-Eigen statistics	critical value at 5 per cent	proba-bility**
DLGY,	r = 0*	174.89430	47.85613	0.0000	84.14922	27.58434	0.0000
DLGLF,	r <= 1*	90.74508	29.79707	0.0000	51.69979	21.13162	0.0000
DLGIY,	r <= 2*	39.04529	15.49471	0.0000	21.00221	14.26460	0.0037
DLGXY	r <= 3*	18.04308	3.84147	0.0000	18.04308	3.84147	0.0000
DLGY,	r = 0*	204.00250	69.81889	0.0000	89.61744	33.87687	0.0000
DLGLF,	r <= 1*	114.38500	47.85613	0.0000	56.00776	27.58434	0.0000
DLGIY,	r <= 2*	58.37726	29.79707	0.0000	24.45615	21.13162	0.0164
DLGXY	r <= 3*	33.92111	15.49471	0.0000	21.32228	14.26460	0.0033
DLGQMY,	r <= 4*	12.59882	3.84147	0.0004	12.59882	3.84147	0.0004
DLGY,	r = 0*	216.41930	69.81889	0.0000	84.92593	33.87687	0.0000
DLGLF,	r <= 1*	131.49340	47.85613	0.0000	66.88743	27.58434	0.0000
DLGIY,	r <= 2*	64.60598	29.79707	0.0000	27.88725	21.13162	0.0048
DLGXY	r <= 3*	36.71873	15.49471	0.0000	20.98845	14.26460	0.0037
DLGM2Y,	r <= 4*	15.73028	3.84147	0.0001	15.73028	3.84147	0.0001
DLGY,	r = 0*	216.76320	69.81889	0.0000	85.28663	33.87687	0.0000
DLGLF,	r <= 1*	131.47660	47.85613	0.0000	63.67162	27.58434	0.0000
DLGIY,	r <= 2*	67.80499	29.79707	0.0000	30.63530	21.13162	0.0017
DLGXY	r <= 3*	37.16969	15.49471	0.0000	20.70910	14.26460	0.0042
DLGLLY,	r <= 4*	16.46059	3.84147	0.0000	16.46059	3.84147	0.0000
DLGY,	r = 0*	203.80680	69.81889	0.0000	84.61973	33.87687	0.0000
DLGLF,	r <= 1*	119.18710	47.85613	0.0000	62.88927	27.58434	0.0000
DLGIY,	r <= 2*	56.29782	29.79707	0.0000	25.21744	21.13162	0.0126
DLGXY	r <= 3*	31.08038	15.49471	0.0001	19.90099	14.26460	0.0058
DLGDCY	r <= 4*	11.17939	3.84147	0.0008	11.17939	3.84147	0.0008
DLGY,	r = 0*	203.09870	69.81889	0.0000	84.38339	33.87687	0.0000
DLGLF,	r <= 1*	118.71530	47.85613	0.0000	60.25903	27.58434	0.0000
DLGIY,	r <= 2*	58.45623	29.79707	0.0000	28.13632	21.13162	0.0044
DLGXY	r <= 3*	30.31991	15.49471	0.0002	18.88738	14.26460	0.0086
DLGPCY	r <= 4*	11.43253	3.84147	0.0007	11.43253	3.84147	0.0007
DLGY,	r = 0*	205.64610	69.81889	0.0000	84.60961	33.87687	0.0000
DLGLF,	r <= 1*	121.03650	47.85613	0.0000	64.00457	27.58434	0.0000
DLGIY,	r <= 2*	57.03194	29.79707	0.0000	27.75899	21.13162	0.0050
DLGXY	r <= 3*	29.27295	15.49471	0.0002	19.25175	14.26460	0.0075
DLGDFAY	r <= 4*	10.02119	3.84147	0.0015	10.02119	3.84147	0.0015
DLGY,	r = 0*	205.76680	69.81889	0.0000	84.58053	33.87687	0.0000
DLGLF,	r <= 1*	121.18620	47.85613	0.0000	58.29429	27.58434	0.0000
DLGIY,	r <= 2*	62.89195	29.79707	0.0000	25.45438	21.13162	0.0116
DLGXY	r <= 3*	37.43757	15.49471	0.0000	20.06881	14.26460	0.0054
DLGTFAY	r <= 4*	17.36875	3.84147	0.0000	17.36875	3.84147	0.0000

H_0 – zero hypothesis for the absence of a long-term causality

H_1 – single hypothesis for the presence of a long-term causality

* marks the rejection of the hypothesis for the absence of long-term causality at a probability level of 0.05

** – p-values of McKinnon, Hoge, and Mischellis (1999)

Remark: The criss-crossed combinations of variables indicate co-integration dependencies at a 5 per cent and a 10 per cent level of statistical significance.

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGLF AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_1

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGY =	DLGY =	DLGY =			
C	0.013931	0.013057	0.007244	0.000874	0.006687	0.005813
DLGLF	0.145971	0.209072	0.489997	-0.063101	-0.344026	-0.280925
DLGIY	0.237026	0.756991		-0.519965	0.237026	0.756991
DLGXY	0.036977	0.006223	-0.028419	0.030754	0.065396	0.034642
DLGQMY	-0.109748		0.179061	-0.109748	-0.288809	-0.179061
	DLGY =	DLGY =	DLGY =			
C	0.015116	0.013057	0.007848	0.002059	0.007268	0.005209
DLGLF	0.202429	0.209072	0.443791	-0.006643	-0.241362	-0.234719
DLGIY	0.398028	0.756991		-0.358963	0.398028	0.756991
DLGXY	-0.006086	0.006223	-0.039424	-0.012309	0.033338	0.045647
DLGM2Y	-0.135597		0.169342	-0.135597	-0.304939	-0.169342
	DLGY =	DLGY =	DLGY =			
C	0.015339	0.013057	0.010830	0.002282	0.004509	0.002227
DLGLF	0.289136	0.209072	0.376563	0.080064	-0.087427	-0.167491
DLGIY	0.383950	0.756991		-0.373041	0.383950	0.756991
DLGXY	0.002317	0.006223	-0.055146	-0.003906	0.057463	0.061369
DLGLLY	-0.154196		0.096090	-0.154196	-0.250286	-0.096090
	DLGY =	DLGY =	DLGY =			
C	0.013883	0.013057	0.013114	0.000826	0.000769	-0.000057
DLGLF	0.320647	0.209072	0.536315	0.111575	-0.215668	-0.327243
DLGIY	0.510863	0.756991		-0.246128	0.510863	0.756991
DLGXY	-0.035282	0.006223	-0.043554	-0.041505	0.008272	0.049777
DLGDCY	-0.061944		-0.089391	-0.061944	0.027447	0.089391
	DLGY =	DLGY =	DLGY =			
C	0.010506	0.013057	0.005249	-0.002551	0.005257	0.007808
DLGLF	0.364880	0.209072	0.168270	0.155808	0.196610	0.040802
DLGIY	0.574263	0.756991		-0.182728	0.574263	0.756991
DLGXY	0.142895	0.006223	0.163991	0.136672	-0.021096	-0.157768
DLGPCY	0.037356		0.136906	0.037356	-0.099550	-0.136906
	DLGY =	DLGY =	DLGY =			
C	0.014195	0.013057	0.013636	0.001138	0.000559	-0.000579
DLGLF	0.425542	0.209072	0.756598	0.216470	-0.331056	-0.547526
DLGIY	0.583922	0.756991		-0.173069	0.583922	0.756991
DLGXY	-0.017328	0.006223	-0.019979	-0.023551	0.002651	0.026202
DLGDFAY	-0.074007		-0.124294	-0.074007	0.050287	0.124294
	DLGY =	DLGY =	DLGY =			
C	0.018927	0.013057	0.005395	0.005870	0.013532	0.007662
DLGLF	0.390806	0.209072	0.126442	0.181734	0.264364	0.082630
DLGIY	0.526757	0.756991		-0.230234	0.526757	0.756991
DLGXY	0.028962	0.006223	-0.164288	0.022739	0.193250	0.170511
DLGTFAY	-0.310774		0.333378	-0.310774	-0.644152	-0.333378

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGY =	DLGY =	DLGY =			
C	0.013931	0.013057	0.013999	0.000874	-0.000068	-0.000942
DLGLF	0.145971	0.209072		-0.063101	0.145971	0.209072
DLGIY	0.237026	0.756991	0.339995	-0.519965	-0.102969	0.416996
DLGXY	0.036977	0.006223	0.088297	0.030754	-0.051320	-0.082074
DLGQMY	-0.109748		-0.121329	-0.109748	0.011581	0.121329
	DLGY =	DLGY =	DLGY =			
C	0.015116	0.013057	0.018317	0.002059	-0.003201	-0.005260
DLGLF	0.202429	0.209072		-0.006643	0.202429	0.209072
DLGIY	0.398028	0.756991	0.747572	-0.358963	-0.349544	0.009419
DLGXY	-0.006086	0.006223	0.118484	-0.012309	-0.124570	-0.112261
DLGM2Y	-0.135597		-0.294246	-0.135597	0.158649	0.294246
	DLGY =	DLGY =	DLGY =			
C	0.015339	0.013057	0.016399	0.002282	-0.001060	-0.003342
DLGLF	0.289136	0.209072		0.080064	0.289136	0.209072
DLGIY	0.383950	0.756991	0.848505	-0.373041	-0.464555	-0.091514
DLGXY	0.002317	0.006223	0.111047	-0.003906	-0.108730	-0.104824
DLGLLY	-0.154196		-0.193634	-0.154196	0.039438	0.193634
	DLGY =	DLGY =	DLGY =			
C	0.013883	0.013057	0.013029	0.000826	0.000854	0.000028
DLGLF	0.320647	0.209072		0.111575	0.320647	0.209072
DLGIY	0.510863	0.756991	0.864279	-0.246128	-0.353416	-0.107288
DLGXY	-0.035282	0.006223	-0.014528	-0.041505	-0.020754	0.020751
DLGDCY	-0.061944		0.026326	-0.061944	-0.088270	-0.026326
	DLGY =	DLGY =	DLGY =			
C	0.010506	0.013057	0.005022	-0.002551	0.005484	0.008035
DLGLF	0.364880	0.209072		0.155808	0.364880	0.209072
DLGIY	0.574263	0.756991	0.934786	-0.182728	-0.360523	-0.177795
DLGXY	0.142895	0.006223	0.270828	0.136672	-0.127933	-0.264605
DLGPCY	0.037356		0.191389	0.037356	-0.154033	-0.191389
	DLGY =	DLGY =	DLGY =			
C	0.014195	0.013057	0.012963	0.001138	0.001232	0.000094
DLGLF	0.425542	0.209072		0.216470	0.425542	0.209072
DLGIY	0.583922	0.756991	1.018729	-0.173069	-0.434807	-0.261738
DLGXY	-0.017328	0.006223	0.004808	-0.023551	-0.022136	0.001415
DLGDFAY	-0.074007		0.042046	-0.074007	-0.116053	-0.042046
	DLGY =	DLGY =	DLGY =			
C	0.018927	0.013057	0.022759	0.005870	-0.003832	-0.009702
DLGLF	0.390806	0.209072		0.181734	0.390806	0.209072
DLGIY	0.526757	0.756991	1.049673	-0.230234	-0.522916	-0.292682
DLGXY	0.028962	0.006223	0.156421	0.022739	-0.127459	-0.150198
DLGTFAY	-0.310774		-0.479821	-0.310774	0.169047	0.479821

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGY VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGLF, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGY =	DLGY =	DLGY =			
C	0.013931	0.013057	0.012850	0.000874	0.001081	0.000207
DLGLF	0.145971	0.209072	0.207738	-0.063101	-0.061767	0.001334
DLGIY	0.237026	0.756991	0.248226	-0.519965	-0.011200	0.508765
DLGXY	0.036977	0.006223		0.030754	0.036977	0.006223
DLGQMY	-0.109748		-0.047260	-0.109748	-0.062488	0.047260
	DLGY =	DLGY =	DLGY =			
C	0.015116	0.013057	0.012619	0.002059	0.002497	0.000438
DLGLF	0.202429	0.209072	0.229590	-0.006643	-0.027161	-0.020518
DLGIY	0.398028	0.756991	0.353672	-0.358963	0.044356	0.403319
DLGXY	-0.006086	0.006223		-0.012309	-0.006086	0.006223
DLGM2Y	-0.135597		-0.026990	-0.135597	-0.108607	0.026990
	DLGY =	DLGY =	DLGY =			
C	0.015339	0.013057	0.012983	0.002282	0.002356	0.000074
DLGLF	0.289136	0.209072	0.268317	0.080064	0.020819	-0.059245
DLGIY	0.383950	0.756991	0.362030	-0.373041	0.021920	0.394961
DLGXY	0.002317	0.006223		-0.003906	0.002317	0.006223
DLGLLY	-0.154196		-0.043651	-0.154196	-0.110545	0.043651
	DLGY =	DLGY =	DLGY =			
C	0.013883	0.013057	0.013431	0.000826	0.000452	-0.000374
DLGLF	0.320647	0.209072	0.341221	0.111575	-0.020574	-0.132149
DLGIY	0.510863	0.756991	0.556449	-0.246128	-0.045586	0.200542
DLGXY	-0.035282	0.006223		-0.041505	-0.035282	0.006223
DLGDCY	-0.061944	-0.047033	-0.061944	-0.014911	0.047033	
	DLGY =	DLGY =	DLGY =			
C	0.010506	0.013057	0.016990	-0.002551	-0.006484	-0.003933
DLGLF	0.364880	0.209072	0.327876	0.155808	0.037004	-0.118804
DLGIY	0.574263	0.756991	0.480981	-0.182728	0.093282	0.276010
DLGXY	0.142895	0.006223		0.136672	0.142895	0.006223
DLGPCY	0.037356		0.021651	0.037356	0.015705	-0.021651
	DLGY =	DLGY =	DLGY =			
C	0.014195	0.013057	0.013743	0.001138	0.000452	-0.000686
DLGLF	0.425542	0.209072	0.455848	0.216470	-0.030306	-0.246776
DLGIY	0.583922	0.756991	0.553323	-0.173069	0.030599	0.203668
DLGXY	-0.017328	0.006223		-0.023551	-0.017328	0.006223
DLGDFAY	-0.074007		-0.061938	-0.074007	-0.012069	0.061938
	DLGY =	DLGY =	DLGY =			
C	0.018927	0.013057	0.011591	0.005870	0.007336	0.001466
DLGLF	0.390806	0.209072	0.194442	0.181734	0.196364	0.014630
DLGIY	0.526757	0.756991	0.447466	-0.230234	0.079291	0.309525
DLGXY	0.028962	0.006223		0.022739	0.028962	0.006223
DLGTFAY	-0.310774		0.032393	-0.310774	-0.343167	-0.032393

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGLF AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE FI

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGYC =	DLGYC =	DLGYC =			
C	0.015234	0.015478	0.009473	-0.000244	0.005761	0.006005
DLGLF	0.120821	0.159261	0.431414	-0.038440	-0.310593	-0.272153
DLGIY	0.145044	0.702157		-0.557113	0.145044	0.702157
DLGXY	-0.009331	-0.037775	-0.080172	0.028444	0.070841	0.042397
DLGQMY	-0.064641		0.196614	-0.064641	-0.261255	-0.196614
	DLGYC =	DLGYC =	DLGYC =			
C	0.017134	0.015478	0.009492	0.001656	0.007642	0.005986
DLGLF	0.150172	0.159261	0.413177	-0.009089	-0.263005	-0.253916
DLGIY	0.365178	0.702157		-0.336979	0.365178	0.702157
DLGXY	-0.047686	-0.037775	-0.087047	-0.009911	0.039361	0.049272
DLGM2Y	-0.115075		0.214055	-0.115075	-0.329130	-0.214055
	DLGYC =	DLGYC =	DLGYC =			
C	0.017225	0.015478	0.012586	0.001747	0.004639	0.002892
DLGLF	0.227564	0.159261	0.307008	0.068303	-0.079444	-0.147747
DLGIY	0.354457	0.702157		-0.347700	0.354457	0.702157
DLGXY	-0.042023	-0.037775	-0.112212	-0.004248	0.070189	0.074437
DLGLLY	-0.125371		0.081266	-0.125371	-0.206637	-0.081266
	DLGYC =	DLGYC =	DLGYC =			
C	0.015721	0.015478	0.015082	0.000243	0.000639	0.000396
DLGLF	0.166557	0.159261	0.325046	0.007296	-0.158489	-0.165785
DLGIY	0.410269	0.702157		-0.291888	0.410269	0.702157
DLGXY	-0.088420	-0.037775	-0.107004	-0.050645	0.018584	0.069229
DLGDCY	-0.032151		-0.047197	-0.032151	0.015046	0.047197
	DLGYC =	DLGYC =	DLGYC =			
C	0.016870	0.015478	0.007065	0.001392	0.009805	0.008413
DLGLF	0.264702	0.159261	0.084947	0.105441	0.179755	0.074314
DLGIY	0.546009	0.702157		-0.156148	0.546009	0.702157
DLGXY	0.114745	-0.037775	0.118234	0.152520	-0.003489	-0.156009
DLGPCY	0.063636		0.160684	0.063636	-0.097048	-0.160684
	DLGYC =	DLGYC =	DLGYC =			
C	0.015974	0.015478	0.015652	0.000496	0.000322	-0.000174
DLGLF	0.238304	0.159261	0.539632	0.079043	-0.301328	-0.380371
DLGIY	0.512282	0.702157		-0.189875	0.512282	0.702157
DLGXY	-0.070324	-0.037775	-0.085303	-0.032549	0.014979	0.047528
DLGDFAY	-0.038189		-0.085324	-0.038189	0.047135	0.085324
	DLGYC =	DLGYC =	DLGYC =			
C	0.022214	0.015478	0.012067	0.006736	0.010147	0.003411
DLGLF	0.375576	0.159261	0.171591	0.216315	0.203985	-0.012330
DLGIY	0.452844	0.702157		-0.249313	0.452844	0.702157
DLGXY	0.005749	-0.037775	-0.159116	0.043524	0.164865	0.121341
DLGTFAY	-0.361907		0.122124	-0.361907	-0.484031	-0.122124

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGXY, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
DLGYC =	DLGYC =	DLGYC =				
C	0.015234	0.015478	0.015677	-0.000244	-0.000443	-0.000199
DLGLF	0.120821	0.159261		-0.038440	0.120821	0.159261
DLGIY	0.145044	0.702157	0.388331	-0.557113	-0.243287	0.313826
DLGXY	-0.009331	-0.037775	0.046770	0.028444	-0.056101	-0.084545
DLGQMY	-0.064641		-0.077990	-0.064641	0.013349	0.077990
	DLGYC =	DLGYC =	DLGYC =			
C	0.017134	0.015478	0.021567	0.001656	-0.004433	-0.006089
DLGLF	0.150172	0.159261		-0.009089	0.150172	0.159261
DLGIY	0.365178	0.702157	0.938638	-0.336979	-0.573460	-0.236481
DLGXY	-0.047686	-0.037775	0.109441	-0.009911	-0.157127	-0.147216
DLGM2Y	-0.115075		-0.316428	-0.115075	0.201353	0.316428
	DLGYC =	DLGYC =	DLGYC =			
C	0.017225	0.015478	0.019314	0.001747	-0.002089	-0.003836
DLGLF	0.227564	0.159261		0.068303	0.227564	0.159261
DLGIY	0.354457	0.702157	0.983502	-0.347700	-0.629045	-0.281345
DLGXY	-0.042023	-0.037775	0.092504	-0.004248	-0.134527	-0.130279
DLGLLY	-0.125371		-0.203456	-0.125371	0.078085	0.203456
	DLGYC =	DLGYC =	DLGYC =			
C	0.015721	0.015478	0.015289	0.000243	0.000432	0.000189
DLGLF	0.166557	0.159261		0.007296	0.166557	0.159261
DLGIY	0.410269	0.702157	0.715595	-0.291888	-0.305326	-0.013438
DLGXY	-0.088420	-0.037775	-0.072314	-0.050645	-0.016106	0.034539
DLGDCY	-0.032151		0.028627	-0.032151	-0.060778	-0.028627
	DLGYC =	DLGYC =	DLGYC =			
C	0.016870	0.015478	0.006763	0.001392	0.010107	0.008715
DLGLF	0.264702	0.159261		0.105441	0.264702	0.159261
DLGIY	0.546009	0.702157	0.994568	-0.156148	-0.448559	-0.292411
DLGXY	0.114745	-0.037775	0.239793	0.152520	-0.125048	-0.277568
DLGPCY	0.063636		0.218764	0.063636	-0.155128	-0.218764
	DLGYC =	DLGYC =	DLGYC =			
C	0.015974	0.015478	0.015323	0.000496	0.000651	0.000155
DLGLF	0.238304	0.159261		0.079043	0.238304	0.159261
DLGIY	0.512282	0.702157	0.944971	-0.189875	-0.432689	-0.242814
DLGXY	-0.070324	-0.037775	-0.047958	-0.032549	-0.022366	0.010183
DLGDFAY	-0.038189		0.047285	-0.038189	-0.085474	-0.047285
	DLGYC =	DLGYC =	DLGYC =			
C	0.022214	0.015478	0.026130	0.006736	-0.003916	-0.010652
DLGLF	0.375576	0.159261		0.216315	0.375576	0.159261
DLGIY	0.452844	0.702157	1.042626	-0.249313	-0.589782	-0.340469
DLGXY	0.005749	-0.037775	0.119586	0.043524	-0.113837	-0.157361
DLGTFAY	-0.361907		-0.520831	-0.361907	0.158924	0.520831

TRANSMISSION MECHANISMS BETWEEN FINANCIAL DEVELOPMENT AND THE PER CAPITA GDP GROWTH RATE (1997–2006) AND RESPECTIVELY THE DEPENDENT DLGYC VARIABLE, THE CONSTANT INDEPENDENT VARIABLES DLGIY AND DLGLF, AND THE VARIATE INDEPENDENT FINANCIAL VARIABLE F_I

Variable Coefficients	CO-INTEGRATION EQUATIONS			COEFFICIENT DIFFERENCES		
0	1	2	3	(1–2)	(1–3)	(2–3)
	DLGYC =	DLGYC =	DLGYC =			
C	0.015234	0.015478	0.013625	-0.000244	0.001609	0.001853
DLGLF	0.120821	0.159261	0.165895	-0.038440	-0.045074	-0.006634
DLGIY	0.145044	0.702157	-0.098834	-0.557113	0.243878	0.800991
DLGXY	-0.009331	-0.037775		0.028444	-0.009331	-0.037775
DLGQMY	-0.064641		-0.026449	-0.064641	-0.038192	0.026449
	DLGYC =	DLGYC =	DLGYC =			
C	0.017134	0.015478	0.013688	0.001656	0.003446	0.001790
DLGLF	0.150172	0.159261	0.190596	-0.009089	-0.040424	-0.031335
DLGIY	0.365178	0.702157	0.422766	-0.336979	-0.057588	0.279391
DLGXY	-0.047686	-0.037775		-0.009911	-0.047686	-0.037775
DLGM2Y	-0.115075		0.033444	-0.115075	-0.148519	-0.033444
	DLGYC =	DLGYC =	DLGYC =			
C	0.017225	0.015478	0.014243	0.001747	0.002982	0.001235
DLGLF	0.227564	0.159261	0.213170	0.068303	0.014394	-0.053909
DLGIY	0.354457	0.702157	0.422021	-0.347700	-0.067564	0.280136
DLGXY	-0.042023	-0.037775		-0.004248	-0.042023	-0.037775
DLGLLY	-0.125371		0.007773	-0.125371	-0.133144	-0.007773
	DLGYC =	DLGYC =	DLGYC =			
C	0.015721	0.015478	0.015023	0.000243	0.000698	0.000455
DLGLF	0.166557	0.159261	0.199826	0.007296	-0.033269	-0.040565
DLGIY	0.410269	0.702157	0.684105	-0.291888	-0.273836	0.018052
DLGXY	-0.088420	-0.037775		-0.050645	-0.088420	-0.037775
DLGDCY	-0.032151		0.004461	-0.032151	-0.036612	-0.004461
	DLGYC =	DLGYC =	DLGYC =			
C	0.016870	0.015478	0.012841	0.001392	0.004029	0.002637
DLGLF	0.264702	0.159261	0.268101	0.105441	-0.003399	-0.108840
DLGIY	0.546009	0.702157	0.414363	-0.156148	0.131646	0.287794
DLGXY	0.114745	-0.037775		0.152520	0.114745	-0.037775
DLGPCY	0.063636		0.048402	0.063636	0.015234	-0.048402
	DLGYC =	DLGYC =	DLGYC =			
C	0.015974	0.015478	0.015340	0.000496	0.000634	0.000138
DLGLF	0.238304	0.159261	0.303071	0.079043	-0.064767	-0.143810
DLGIY	0.512282	0.702157	0.649463	-0.189875	-0.137181	0.052694
DLGXY	-0.070324	-0.037775		-0.032549	-0.070324	-0.037775
DLGDFAY	-0.038189		-0.017192	-0.038189	-0.020997	0.017192
	DLGYC =	DLGYC =	DLGYC =			
C	0.022214	0.015478	0.012679	0.006736	0.009535	0.002799
DLGLF	0.375576	0.159261	0.113448	0.216315	0.262128	0.045813
DLGIY	0.452844	0.702157	0.536624	-0.249313	-0.083780	0.165533
DLGXY	0.005749	-0.037775		0.043524	0.005749	-0.037775
DLGTFAY	-0.361907		0.094202	-0.361907	-0.456109	-0.094202

Literature

Ganev, G. (2004), Confidence Level in the Foreign Exchange Regime in Bulgaria during 1991 – 2003, an initial attempt at calibration, Discussions Papers of the BNB, Sofia, BNB, No. 38;

Ganev, K. (2005), Measurement of the Overall Factor Productivity: Accounting of Economic Growth in Bulgaria, Discussions Papers of the BNB, Sofia, BNB, No. 48;

Minasyan, G. (2008), Is the Bulgarian Economy Overheating, Economic Thought, issue 3, pp. 3–29;

Minasyan, G. (2001), Financial Programming, Sofia, "Litavra" Publishing House;

Nenovsky, N., Christov, K. (1998), Financial Repression and Credit Rationing in the Conditions of Currency Board in Bulgaria, Discussions Papers of the BNB, Sofia, BNB, No. 2;

Nenovsky, N., Christov, K. (1999), Monetary Regimes and the Real Economy (An Empirical Test before and after the Implementation of a Currency Board Mechanism in Bulgaria), Discussions Papers of the BNB, Sofia, BNB, 1999, No. 10;

Christov, K. (2004), The Currency Board "The Only Game in Town", Discussions Papers of the BNB, Sofia, BNB, 2004, No. 40;

Christov, K., Mikhailov, M. (2002), Commercial Banks Lending Activity and Loan Portfolio Rationing, Discussions Papers, BNB, Sofia, BNB, 2002, No. 23;

Tzalinski, Tzv. (2007), Two Approaches to Measuring the Potential Output in Bulgaria, Discussions Papers, BNB, Sofia, BNB, No. 57;

Abu–Bader, S. and Abu–Oarn, A. (2005), Financial Development and Economic Growth: Time Series Evidence from Egypt, Discussion Paper No. 05, Monaster Center for Economic Research, Ben–Gurion University of the Negev, Israel, 35 p.;

Akimov, A. and Wijeweera, A. (2005), Financial Development and Economic Growth: Evidence from Countries in Transition, 17 p.; Paper Presented at the European Association of Comparative Economics Studies (EACES), 9th Bi–Annual Conference: Development Strategies – A Comparative View;

Berlemann, M. and Nenovsky, N. (2004), Lending of First versus Lending of Last Resort: The Bulgarian Financial Crisis of 1996/1997, Comparative Economic Studies, 2004, No. 46, p. 245–271;

Engle, R. and Granger C. (1987), Cointegration and Error Correction: Representation, Estimation, and Testing, Econometrica, No. 55, p. 251–276;

Fink, G. and Haiss, P., (1999), Central European Financial Markets from an EU Perspective: Theoretical Aspects and Statistical Analyses, IEF Working Paper, No. 34;

Fink, G., Haiss, P. and Vuksic, G. (2004), Changing Importance of Financial Sectors for Growth from Transition to Cohesion and European Integration, Europainstitut Wirtschaftsuniversit?t Wien, EI Working Paper, No. 58, July 2004;

Jaffee, D. and Levonian, M. (2001), The Structure of Banking Systems in Developed and Transition Economies, European Financial Management, No. 7(2), p. 161–181;

Johansen, S. (1988), Statistical Analysis of Cointegration Vectors, Journal of Economic Dynamics and Control, No. 12, p. 231–254;

Johansen, S. (1991), Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models, Econometrica, No. 59, p. 1551–1580;

Johansen, S. and Juselius, K. (1990), Maximum Likelihood Estimation and Inferences on Cointegration – with applications to the demand for money, Oxford Bulletin of Economics and Statistics, No. 52, p. 169–210;

Karlin, S., Amemiya, T. and Goodman, L.A. (eds.), (1983), Studies in Econometrics, Time–Series and Multivariate Statistics, Academic Press, New York, USA;

Koivu, T., (2002), Do Efficient Banking Sectors Accelerate Economic Growth in Transition Countries?, Bank of Finland, Institute for Economies in Transition, BOFIT Discussion Papers, No. 14;

Mehl, A. and Winkler, A. (2003), The Finance–Growth Nexus and Financial Sector Environment: New Evidence from Southeast Europe, The Ninth Dubrovnik Economic Conference Banking and the Financial Sector in Transition and Emerging Market Economies;

Mehl, A., Vespro, C. and Winkler, A. (2006), The Finance – Growth Nexus and Financial Sector Environment: New Evidence from Southeast Europe, ECB–CFS Research Network Working Paper, October 2005, 44 p.;

Neimke, M. (2003), Financial Development and Economic Growth in Transition Countries, Institut f?r Entwicklungsforschung und Entwicklungspolitik der Ruhr–Universit?t Bochum, IEE Working Paper, No. 173, 35 p.;

Nenovsky, N., Hristov, K., (2002), The New Currency Boards and Discretion: Empirical Evidence from Bulgaria, Economic Systems, No. 26, p. 55–72;

Nenovsky, N., Peev, E. and Yalamov, T. (2003), Banks – Firms Nexus under the Currency Board: Empirical Evidence from Bulgaria, BNB Discussion Papers, 2003, No. 32, BNB, Sofia;

Oks, A. (2001), Efficiency of the Financial Intermediaries and Economic Growth in CEEC, University of Tartu, Faculty of Economics and Business Administration, Tartu University Press, ISSN 1406 – 5967;

Rousseau, P. (2003), Historical Perspectives on Financial Development and Economic Growth, Review, July–August 2003, p. 81–106;

Rousseau, P. and Sylla, R. (1997), Emerging Financial Markets and Early U.S. Growth, National Bureau of Economic Research Working Paper, No. 7448;

Rousseau, P. and Wachtel, P. (1998), Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries. Journal of Money, Credit, and Banking, No. 30, p. 657–678;

Shan, J. (2003), Financial Development and Economic Growth: The Empirical Evidence from China, Proceedings of the 15th Annual Conference of the Association for Chinese Economics Studies Australia, (ACESA), 24 p.;

Toda, H. and Yamamoto, T. (2002), Statistical Inference in Vector Autoregressions with Possibly Integrated Processes, Journal of Econometrics, No. 66, p. 225–250;

Trabesli, M. (2003), Finance and Growth: Empirical Evidence from Developing Countries, 1960–1990, CAHIER, 2003, No. 13, ISSN 0709–9231;

Ünalmis, D. (2002), The Causality Between Financial Development and Economic Growth: the Case of Turkey, The Central Bank of the Republic of Turkey, Research Department Working Paper, No. 3, June 2002;

Valev, N. and Tasic, N. (2007). Finance and Growth in Bulgaria – the Effects of Credit Maturity and Credit Size across Economic Sectors, Georgia State University, mimeo;

DISCUSSION PAPERS

DP/1/1998	The First Year of the Currency Board in Bulgaria Victor Yotzov, Nikolay Nenovsky, Kalin Hristov, Iva Petrova, Boris Petrov
DP/2/1998	Financial Repression and Credit Rationing under Currency Board Arrangement for Bulgaria Nikolay Nenovsky, Kalin Hristov
DP/3/1999	Investment Incentives in Bulgaria: Assessment of the Net Tax Effect on the State Budget Dobrislav Dobrev, Boyko Tzenov, Peter Dobrev, John Ayerst
DP/4/1999	Two Approaches to Fixed Exchange Rate Crises Nikolay Nenovsky, Kalin Hristov, Boris Petrov
DP/5/1999	Monetary Sector Modeling in Bulgaria, 1913–1945 Nikolay Nenovsky, Boris Petrov
DP/6/1999	The Role of a Currency Board in Financial Crises: The Case of Bulgaria Roumen Avramov
DP/7/1999	The Bulgarian Financial Crisis of 1996–1997 Zdravko Balyozov
DP/8/1999	The Economic Philosophy of Friedrich Hayek (The Centenary of his Birth) Nikolay Nenovsky
DP/9/1999	The Currency Board in Bulgaria: Design. Peculiarities and Management of Foreign Exchange Cover Dobrislav Dobrev
DP/10/1999	Monetary Regimes and the Real Economy (Empirical Tests before and after the Introduction of the Currency Board in Bulgaria) Nikolay Nenovsky, Kalin Hristov
DP/11/1999	The Currency Board in Bulgaria: The First Two Years Jeffrey B. Miller
DP/12/1999	Fundamentals in Bulgarian Brady Bonds: Price Dynamics Nina Budina, Tsvetan Manchev
DP/13/1999	Currency Circulation after Currency Board Introduction in Bulgaria (Transactions Demand, Hoarding, Shadow Economy) Nikolay Nenovsky, Kalin Hristov
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
DP/15/2000	Bank Reserve Dynamics under Currency Board Arrangement for Bulgaria Boris Petrov
DP/16/2000	A Possible Approach to Simulate Macroeconomic Development of Bulgaria Victor Yotzov
DP/17/2001	Banking Supervision on Consolidated Basis *(in Bulgarian only)* Margarita Prandzheva
DP/18/2001	Real Wage Rigidity and the Monetary Regime Choice Nikolay Nenovsky, Darina Koleva

DP/19/2001	The Financial System in the Bulgarian Economy Jeffrey Miller, Stefan Petranov
DP/20/2002	Forecasting Inflation *via* Electronic Markets Results from a Prototype Experiment Michael Berlemann
DP/21/2002	Corporate Image of Commercial Banks (1996–1997) *(in Bulgarian only)* Miroslav Nedelchev
DP/22/2002	Fundamental Equilibrium Exchange Rates and Currency Boards: Evidence from Argentina and Estonia in the 90's Kalin Hristov
DP/23/2002	Credit Activity of Commercial Banks and Rationing in the Credit Market in Bulgaria *(in Bulgarian only)* Kalin Hristov, Mihail Mihailov
DP/24/2001	Balassa – Samuelson Effect in Bulgaria *(in Bulgarian only)* Georgi Choukalev
DP/25/2002	Money and Monetary Obligations: Nature, Stipulation, Fulfilment Stanislav Natsev, Nachko Staykov, Filko Rosov
DP/26/2002	Regarding the Unilateral Euroization of Bulgaria Ivan Kostov, Jana Kostova
DP/27/2002	Shadowing the Euro: Bulgaria's Monetary Policy Five Years on Martin Zaimov, Kalin Hristov
DP/28/2002	Improving Monetary Theory in Post-communist Countries – Looking Back to Cantillon Nikolay Nenovsky
DP/29/2003	Dual Inflation under the Currency Board: The Challenges of Bulgarian EU Accession *(in Bulgarian only)* Nikolay Nenovsky, Kalina Dimitrova
DP/30/2003	Exchange Rate Arrangements, Economic Policy and Inflation: Empirical Evidence for Latin America Andreas Freytag
DP/31/2003	Inflation and the Bulgarian Currency Board Stacie Beck, Jeffrey B. Miller, Mohsen Saad
DP/32/2003	Banks – Firms Nexus under the Currency Board: Empirical Evidence from Bulgaria Nikolay Nenovsky, Evgeni Peev, Todor Yalamov
DP/33/2003	Modelling Inflation in Bulgaria: Markup Model *(in Bulgarian only)* Kalin Hristov, Mihail Mihailov
DP/34/2003	Competitiveness of the Bulgarian Economy Konstantin Pashev
DP/35/2003	Exploring the Currency Board Mechanics: a Basic Formal Model Jean-Baptiste Desquilbet, Nikolay Nenovsky
DP/36/2003	A Composite Tendency Indicator for Bulgaria's Industry *(in Bulgarian only)* Tsvetan Tsalinsky
DP/37/2003	The Demand for Euro Cash: A Theoretical Model and Monetary Policy Implications Franz Seitz

DP/38/2004 Credibility Level of the Bulgarian Exchange Rate Regime, 1991–2003: First Attempt at Calibration *(in Bulgarian only)*
Georgi Ganev

DP/39/2004 Credibility and Adjustment: Gold Standards Versus Currency Boards
Jean-Baptiste Desquilbet, Nikolay Nenovsky

DP/40/2004 The Currency Board: "The only game in town" *(in Bulgarian only)*
Kalin Hristov

DP/41/2004 The Relationship between Real Convergence and the Real Exchange Rate: the Case of Bulgaria
Mariella Nenova

DP/42/2004 Effective Taxation of Labor, Capital and Consumption in Bulgaria
Plamen Kaloyanchev

DP/43/2004 The 1911 Balance of Payments of the Kingdom of Bulgaria *(in Bulgarian only)*
Martin Ivanov

DP/44/2004 Beliefs about Exchange Rate Stability: Survey Evidence from the Currency Board in Bulgaria
Neven T. Valev, John A. Carlson

DP/45/2004 Opportunities of Designing and Using the Money Circulation Balance *(in Bulgarian only)*
Metodi Hristov

DP/46/2005 The Microeconomic Impact of Financial Crises: The Case of Bulgaria
Jonathon Adams-Kane, Jamus Jerome Lim

DP/47/2005 Interest Rate Spreads of Commercial Banks in Bulgaria *(in Bulgarian only)*
Michail Michailov

DP/48/2005 Total Factor Productivity Measurement: Accounting and Economic Growth in Bulgaria *(in Bulgarian only)*
Kaloyan Ganev

DP/49/2005 An Attempt at Measurement of Core Inflation in Bulgaria *(in Bulgarian only)*
Kalina Dimitrova

DP/50/2005 Economic and Monetary Union on the Horizon
Dr Tsvetan Manchev, Mincho Karavastev

DP/51/2005 The Brady Story of Bulgaria *(in Bulgarian only)*
Garabed Minassian

DP/52/2006 General Equilibrium View on the Trade Balance Dynamics in Bulgaria
Hristo Valev

DP/53/2006 The Balkan Railways, International Capital and Banking from the End of the 19th Century until the Outbreak of the First World War
Peter Hertner

DP/54/2006 Bulgarian National Income between 1892 and 1924
Martin Ivanov

DP/55/2006 The Role of Securities Investor Compensation Schemes for the Development of the Capital Market (*in Bulgarian only*)
Mileti Mladenov, Irina Kazandzhieva

DP/56/2006 The Optimal Monetary Policy under Conditions of Indefiniteness (*in Bulgarian only*)
Nedyalka Dimitrova

DP/57/2007 Two Approaches to Estimating the Potential Output of Bulgaria (*in Bulgarian only*)
Tsvetan Tsalinski

DP/58/2007 Informal Sources of Credit and the "Soft" Information Market (Evidence from Sofia)
Luc Tardieu

DP/59/2007 Do Common Currencies Reduce Exchange Rate Pass-through? Implications for Bulgaria's Currency Board
Slavi T. Slavov

DP/60/2007 The Bulgarian Economy on Its Way to the EMU: Economic Policy Results from a Small-scale Dynamic Stochastic General Equilibrium Framework
Jochen Blessing

DP/61/2007 Exchange Rate Control in Bulgaria in the Interwar Period: History and Theoretical Reflections
Nikolay Nenovsky, Kalina Dimitrova

DP/62/2007 Different Methodologies for National Income Accounting in Central and Eastern European Countries, 1950–1990
Rossitsa Rangelova

DP/63/2008 A Small Open Economy Model with a Currency Board Feature: the Case of Bulgaria
Iordan Iordanov, Andrey Vassilev

DP/64/2008 Potential Output Estimation Using Penalized Splines: the Case of Bulgaria
Mohamad Khaled

DP/65/2008 Bank Lending and Asset Prices: Evidence from Bulgaria
Michael Frömmel, Kristina Karagyozova

DP/66/2008 Views from the Trenches: Interviewing Bank Officials in the Midst of a Credit Boom
Neven Valev

DP/67/2008 Monetary Policy Transmission: Old Evidence and Some New Facts from Bulgaria
Alexandru Minea, Christophe Rault

DP/68/2008 The Banking Sector and the Great Depression in Bulgaria, 1924-1938: Interlocking and Financial Sector Profitability
Kiril Danailov Kossev

DP/69/2008 The Labour Market and Output in the UK – Does Okun's Law Still Stand?
Boris Petkov

DP/70/2008 Empirical Analisys of Inflation Persistence and Price Dynamics in Bulgaria
Zornitsa Vladova, Svilen Pachedjiev

DP/71/2008 Testing the Weak-form Efficiency of the Bulgarian Stock Market
Nikolay Angelov