



BULGARIAN NATIONAL BANK

**Exchange Rate Arrangements,
Economic Policy and Inflation:
Empirical Evidence for Latin America**

Andreas Freytag

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Send your comments and opinions to:

Publications Division

Bulgarian National Bank

1, Alexander Battenberg Square

1000 Sofia, Bulgaria

Tel.: 9145/1271, 1351, 1906

Fax: (359 2) 980 2425

e-mail: Dimova.L@bnb.org

Web site: www.bnb.bg

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SUMMARY. THERE IS AN ONGOING DEBATE ON THE QUESTION OF WHICH EXCHANGE RATE REGIME IS BETTER SUITED TO GUARANTEE STABILITY: FIXED OR FLEXIBLE RATES. THE MACROECONOMIC CRISIS IN ARGENTINA HAS STIMULATED THE DISCUSSION AGAIN. IN THIS PAPER, WE ARGUE THAT IT IS MISLEADING TO SOLELY CONCENTRATE ON EXCHANGE RATE POLICY TO ASSESS THE PRECONDITIONS FOR STABILITY IN AN INTERNATIONAL SURROUNDING. INSTEAD, WE SHOW THAT THE EXCHANGE RATE REGIME AND THE INSTITUTIONAL SETTING HAVE TO BE COMPATIBLE TO INCREASE THE EXCHANGE RATE REGIME'S CREDIBILITY AND TO HELP WITH ACHIEVING STABILITY. THIS HYPOTHESIS IS EMPIRICALLY TESTED FOR LATIN AMERICA COUNTRIES. WE CANNOT REJECT IT.

New JEL Code: E 50, F 33

* *Dr. Andreas Freytag, Associate Professor, University of Cologne, Robert-Koch-Str. 41, D-50931 Cologne, Phone: ++49 221 470-4879, Fax: ++49 221 470-5187, e-mail: andreas.freytag@uni-koeln.de.*

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I. Introduction

Exchange rate policy in Latin America has regularly been subject to change in the post-war era. Recently, countries to introduce a new regime were Ecuador that officially dollarized in 2000, Argentina doing just the opposite by abandoning the currency board arrangement in January 2002 and Venezuela giving up the peg in the spring of 2002. As monetary policy is regularly subject to time consistency problems, the role of exchange rate regimes as a commitment mechanism has always been analyzed and controversially discussed in literature. *Fischer* (2001) argues that there is a tendency to extreme exchange rate arrangements – either totally flexible or hard-peg. On aggregate, this tendency cannot be denied: until the mid-1990s, fixed or pegged exchange rates were considered to be adequate to help solving monetary problems in developing countries.¹ This view has gained recent support by *Fisher, Sahay and Vegh* (2002), who show that exchange rate based stabilization programs are more likely to stop high and hyperinflation than programs without an exchange rate fix. Nevertheless, under the shock of the currency crises in East Asia, Latin America and Russia respectively, an increasing number of observers began to argue in favor of more flexibility. *Eichengreen et al.* (1998) search for exit strategies from exchange rate pegs. However, *Calvo and Reinhart* (2000) show empirically that true or textbook floating is hardly observable – managed floating seems to be the rule rather than an exception. This observation is analyzed theoretically by *Bofinger and Wollmershäuser* (2001), and justified by *Macedo, Cohen and Reisen* (2001), using the *ERM* as example. *Kuttner and Posen* (2001) depart from here and argue that the bipolar (fixed versus flexible) view is incorrect, as it does not consider other aspects of monetary policy.² Thus, they include monetary targets and central bank autonomy into the analysis.

This paper argues that even this is not sufficient and adds in institutional aspects to the analysis of the impact of exchange rate arrangements on inflation. The view that institutions matter has been increasingly taken in literature.³ *Calvo* (2000) shows that the inclusion of institutions support-

¹ See *Schuler* (1996) for a provocative contribution.

² See also *Vinhas de Souza* (2002).

³ Not only monetary policy issues but also topics such as growth and development are increasingly analyzed in consideration of institutions. See e.g. *Correa* (2002) for Latin America.

ing the exchange rate mechanism such as the financial sector dramatically changes the choice of an optimal exchange rate arrangement. *Eichengreen et al.* (1998) theoretically analyze the institutional setting that makes different exchange rate arrangements an optimal choice. *Keefer and Stasavage* (2000 and 2001) give empirical evidence for the hypothesis that central bank independence (*CBI*) and exchange rate policy respectively are prerequisites for low inflation only if an appropriate system of political checks and balances exists. This argument has already been implicitly put forward by *McCallum* (1997). *Freytag* (2002b) analyzes monetary reforms in the 20th century and shows that beside the degree of monetary commitment institutions play a major role for success and failure of a monetary reform. In a second study, *Freytag* (2002a) gives evidence that the credibility of exchange rate arrangements in Central and Eastern Europe is positively dependent on their compatibility with the institutional settings in these countries.

We follow a similar approach. Our starting point is the assignment problem in economic policymaking (*Tinbergen*, 1952). For each policy target governments need at least one instrument and one agency. In particular macropolicies such as monetary policy, fiscal policy as well as labor market policy demand individual policy instruments. Otherwise, there are strong incentives to abuse monetary policy for other macroeconomic objectives. In other words, monetary policy (and the exchange rate arrangement) has to be compatible with other elements of the economic order (*Vanberg*, 1998). Only then, according to our hypothesis, the incentives for policymakers allow for low inflation. This hypothesis will be tested for Latin America since it offers not only a variety of different exchange rate regimes, but also a number of very different institutional arrangements. We proceed as follows: in the second section the theoretical framework will be discussed. We introduce the basic model of time inconsistency before we analyze potential commitment mechanisms and ways to measure them. The third section is dedicated to the data. We use two different datasets to derive as much evidence for our hypothesis as possible. The first set focuses on monetary regimes and their success. The second dataset shows the exchange rate regimes in Latin America on a quinquennial basis, which generates more data. The empirical results are discussed in the fourth section. Policy conclusions are drawn in the final section.

II. The Theoretical Framework: Exchange Rate Arrangements and Institutions

(a) *The basic model*

As inflation regularly stems from the fact that the economic policy assignment does not work, the problem at hand demands the standard framework of a utility maximizing policymaker acting under political constraints (Barro, 1983). The reasons for high and/or volatile inflation rates are the government's need for revenues (Bernholz, 1995, pp. 263f.) as well as problems in the labor market. Therefore, it seems attractive for the government to increase the money base. It tries to issue enough money to either maximize the amount of seigniorage or to increase employment above its natural level. Thus, one likely form of the government's utility function is as follows:

$$(1) \quad U = U(S, N, \pi \dots),$$

where S represents seigniorage, N is employment and π stands for inflation. Utility depends positively on S and N , and negatively on inflation. The government takes the expected inflation rate as given.

Many Latin American countries have suffered from high inflation due to their reliance on seigniorage. Applying the general form (1) to the special case of seigniorage being the main motive for inflation leads to the following utility function: $U = \delta L(\pi^e) - \varphi(\pi) \rightarrow \max_{\pi}$, where $L(\pi^e)$ stands for money demand (with $dL/d\pi < 0$), $\pi L(\pi^e)$ represents seigniorage (Cagan, 1956) and $\varphi(\pi)$ reflects the costs of inflation (with $d\varphi/d\pi > 0$). The weight the government places on seigniorage is denoted by δ with $\delta \geq 0$. After replacing π^e by π , utility maximization yields the following first-order condition:

$$(2) \quad \varphi'(\pi)/\delta = L(\pi) + \pi L'(\pi) \quad \text{with}$$

$$(3) \quad \pi^* = \frac{\varphi'(\pi)/\delta - L(\pi)}{L'(\pi)} > 0.$$

The optimal inflation rate π^* is not time consistent, since $dU/d\pi$, evaluated at π^* , is positive. Therefore, it makes sense to introduce a commitment mechanism to increase the costs of inflation $\varphi(\pi)$ and to reduce the politically optimal level of inflation. The commitment mechanism is defined as the choice of a set of rules (Brennan and Buchanan, 1981, p. 65, McCallum, 1997), in this particular case rules about exchange rate policy.

(b) Commitment mechanisms to solve the time inconsistency problem

By using the exchange rate as a nominal anchor, countries in Latin America have regularly tried to reduce inflation. An exchange rate peg allows to raise the political costs of inflation and hence to import stability. To measure exchange rate policy and to assign a certain degree of commitment to it, one has to categorize exchange rate regimes.

Following the IMF categorizing, one can distinguish eight different types of exchange rate arrangement, namely dollarization, currency board, conventional pegged arrangement, pegged exchange rate within horizontal bands, crawling peg, crawling band, managed floating and independent floating. *Kuttner and Posen* (2001) distinguish four types of regimes: currency board arrangement, hard peg, target zones and free float. In Figure 1, they are assigned the codings 1, 0.66, 0.33 and 0.00 respectively (see also Table 1). Nevertheless, there is no unambiguous empirical evidence showing that hard pegs are significantly positively correlated with low inflation. The regression line is only very moderately sloped. Other exchange rate regimes are also correlated with both high and low rates of inflation.

Table 1

EXCHANGE RATE REGIMES, DOMESTIC CONSTRAINTS AND CENTRAL BANK AUTONOMY AND THEIR CODINGS

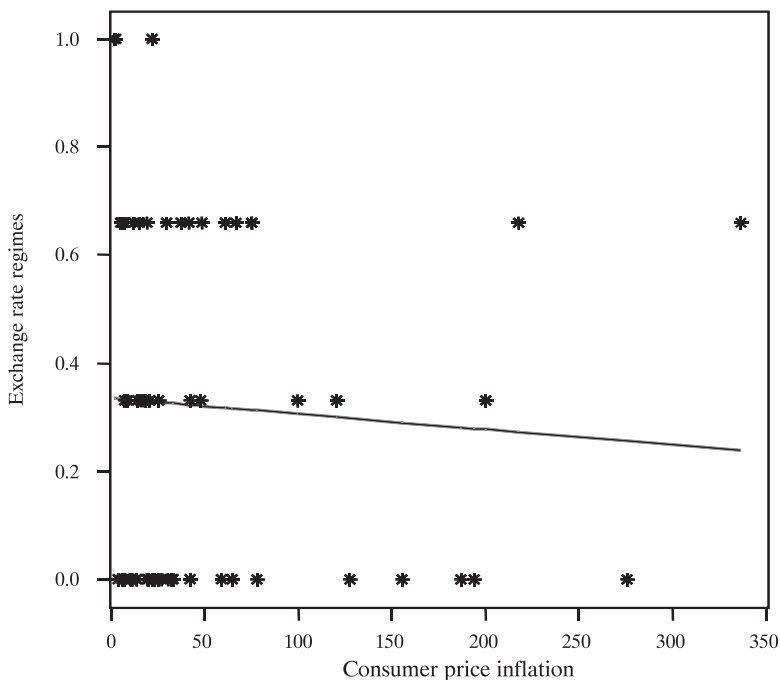
Variable	Symbol	Explanation	Numerical codings*
Pure Exchange Rate Arrangement	<i>ERR</i>	1. Currency board system	1.00
		2. Hard peg	0.66
		3. Target zones	0.33
		4. Free floating	0.00
Central Bank Autonomy	<i>CBA</i>	1. Full autonomy	1.00
		2. Partial autonomy	0.50
		5. No autonomy	0.00
Announced Domestic Targets	<i>Target</i>	1. Currency board system	1.00
		2. Inflation target	0.75
		3. Narrow money target	0.50
		4. Broad money target	0.25
		5. None	0.00

* The symmetry of the difference between single outcomes is not justified by theoretical reasoning. It is used to avoid arbitrariness.

Source: *Kuttner and Posen* (2001), own changes.

Figure 1

THE CORRELATION OF EXCHANGE RATE REGIMES
AND INFLATION IN LATIN AMERICA
(62 observations)



Exchange rate regimes (*EER*) and consumer price inflation (*CPI*) following *Kuttner and Posen* (2001). For codings see *Table 1*.

The loose relationship between exchange rate policy and inflation can be traced back to two explanations. First, exchange rate arrangements do not define a commitment mechanism comprehensively. It is often argued that the appropriate proxy for monetary commitment is the concept of *CBI*. However, conventional measures of *CBI* are not highly correlated with stability in developing countries.⁴ This can be partly explained by the fact that these measures totally neglect external relations; neither exchange rate nor convertibility restrictions are covered by these. Therefore, neither exchange rate regimes nor conventional measures of *CBI* can explain inflation alone.

⁴ For a survey, see *Berger et al.* (2001). See also *Posen* (1993) and *Freytag* (2002b, Chapter 2).

A second explanation for the weak correlation between inflation and legal commitment in general and exchange rate policy in particular is the neglect of other factors. Monetary commitment is a promise; it does not imply that governments necessarily stick to this promise.⁵ Put differently: there might be economic policy constraints, which do not allow the monetary commitment to become credible. To give an example: in a country with perfect unionization and collective bilateral wage negotiations, the government introduces a currency board system (*CBS*) to reduce the annual inflation rate from 200 percent close to zero inflation. Now presume that the negotiators do not consider the case of zero inflation while bargaining. This will cause unemployment to rise heavily unless the government inflates moderately, which is impossible under a *CBS*. It then has the choice to follow a sustainable monetary policy (with rising unemployment) or to give up the currency board (with declining credibility). Taking the labor market regime into account from the beginning, would certainly lead to the introduction of a different exchange rate regime. To generalize, since commitment is always a *de-jure* promise, it should not be mixed up with credibility. In other words, credibility cannot be imported via exchange rate fix, but has to be earned in the context of economic order (*Macedo, Cohen and Reisen, 2001*).

There is a growing concern for the role of institutions in monetary policy (e.g. *Keefer and Stasavage, 2001*). Consequently, a comprehensive analysis adds in the institutional setting in a country, consisting of formal and informal as well as politically created (economic order) and spontaneously evolved institutions. The theoretical argument for including institutions into the analysis is that they are constraints for governmental behavior. International capital mobility and open markets, for instance, constitute competitive factors for the government as the citizens, in particular domestic investors, have the alternative to invest at home or to buy domestic goods. A lack of price stability will make these alternatives more attractive.

The difficulty is to model the institutional setting. In the econometric assessment, we use an adjusted version of a comprehensive index, the index of economic freedom (*Gwartney et al., 2001, p. 7*). The theoretical argument for using this index as a constraint to inflation prone policymakers is that a high degree of (*de facto*) economic freedom increases the number

⁵ Recent work has shed new light on this argument. *Reinhart and Rogoff (2002)* argue that official announcements only rarely mirror real exchange rate policies. Similarly, *Frömmel and Schobert (2002)* show that Central and Eastern European countries do not always follow their announced exchange rate policies.

of options for the public. The competitive pressure on domestic policy-makers to provide stable money rises. On the same token, a lack of economic freedom weakens political constraints for governments and makes them prone to inflation, e.g. prior to general elections. Thus, the expected influence of economic freedom on inflation is negative. A similar indicator is the structural policy index, used by the *IDB* (Lora, 1997). It measures different areas of policy reform. Both measures have certain disadvantages, as they have not been calculated explicitly for the study of exchange rate policy and institutions. Alternatively, the institutional setting could be characterized by several institutional factors such as political stability, fiscal stability, openness, labor market flexibility and public attitude towards inflation (Freytag, 2002b). However, as we distinguish a number of periods in Latin America, we are unable to generate the data for all potential observations in the sample (see below).⁶

Finally, we model the *ex-ante* relation between de jure commitment and de facto institutions by calculating the costs of inflation as a function of the difference between the degree of commitment and the index of economic freedom. The result is an *ex-ante* proxy for credibility (Freytag, 2002b, Chapter 4). The economic intuition behind this proxy is that the public – having rational expectations – judges the credibility of an exchange rate regime. The higher the political costs are, the smaller the difference is. In other words: a high degree of commitment is likely to stabilize expectations if it is accompanied by a high degree of economic freedom.

From the theoretical analysis we derive two hypotheses, which will be tested empirically in section IV:

- (1) The lower inflation in Latin America is, the more the government commits itself through an exchange rate arrangement and central bank autonomy, and the higher the economic freedom (the less distorted the structure of the economy) in the country is.
- (2) Inflation is the lower, the more the exchange rate mechanism and the degree of economic freedom are compatible. This makes the exchange rate arrangement credible and creates high political costs of inflation.

⁶ An alternative is to use the index of political freedom (*Freedom House*, 2001). However, this index is theoretically less correlated with economic policymaking than the index of economic freedom.

III. Construction of the Data

These hypotheses will be tested using two different datasets, one of which has already been used in literature, whereas the second one (reference years, see subsection III (b) below) has been created for this study. The purpose of using these completely different sets is to assess the hypotheses as comprehensively as possible and thus to strengthen further the general argument of the paper. In this section, the data is introduced.

(a) *The regimewise dataset*

This dataset constructed by *Kuttner and Posen* (2001) consists of 191 monetary regimes between 1973 and 1999 in 41 countries, of which 62 regimes are Latin American. Every regime shift creates a new observation. The minimum duration of a monetary regime is 12 months. A monetary regime has three legal features: exchange rate regime (*ERR*), central bank autonomy (*CBA*) and policy targets (*target*).

It is important to emphasize that these elements are publicly announced, i.e. de jure regimes, degrees of autonomy and targets. As mentioned above, *Kuttner and Posen* (2001) distinguish four types of exchange rate regimes. They also separate five types of domestic policy targets, namely: currency board, inflation target, narrow money target, broad money target and none. The third feature is central bank autonomy, which they separate into full, partial and no autonomy. The decision to assign one of these is based on the question of whether the government is free to dismiss the central bank governor and whether the central bank is forced to monetize public debt. We arrange the variables numerically as shown in Table 1. In addition to these variables, the duration of the regime (*length*) is used as another exogenous variable. The longer the regime exists, the lower the expected average inflation is.⁷

We also add the index of economic freedom (*EF*) as exogenous variable. As mentioned above, the variable *EF* is calculated as the weighted average of five out of seven groups of the 2001 index of economic freedom by *Gwartney et al.* (2001, p. 7), composed of 19 components:

1. Size of government, 2 components, 11 percent.
2. Structure of the economy and the use of markets, 4 components, 14.2 percent.

⁷ In their own estimation, *Kuttner and Posen* (2001) use only regimes with a minimum length of 36 months. Here, this procedure would dramatically diminish the number of observations in Latin America and produce a survivorship bias.

3. Monetary policy and price stability, 3 components, 9.2 percent (omitted).
4. Freedom to use alternative currencies, 2 components, 14.6 percent (omitted).
5. Legal structure and property rights, 2 components, 16.6 percent.
6. International exchange: trade, 2 components, 17.1 percent.
7. Freedom to exchange in capital and financial markets, 4 components, 17.2 percent.

$$(5) \quad EF = \frac{(G1*0.11+G2*0.142+G5*0.166+G6*0.171+G7*0.172)_{GL}}{0.762*10}$$

The omission of the monetary aspects of economic freedom is necessary to avoid statistical interference. The index is calculated as the average during the existence of a monetary regime. We expect a negative influence on inflation.

We also add in a dummy taking the value one, if one of the following crises took place during the existence of the monetary regime: the oil shock in 1973, the Mexico crisis in late 1994 and the Brazilian crisis in early 1999. The expected influence of these shocks on inflation and depreciation is positive.

These variables are regressors of two endogenous variables, namely the average rate of *CPI* and the average annual nominal depreciation of the domestic currency against the US dollar per regime (*DEPR*). *CPI* is the best approximation given the goal to break inflationary expectations in the public, and it is an internationally comparable indicator. Moreover, the data is available for the whole sample. The average depreciation gives evidence about the quality of monetary policy as compared to the US.

(b) A new dataset based on reference years

To generate more observations, we construct a new dataset consisting of five observations for 23 Latin American countries. To analyze the exchange rate regime, we prefer a two-handed approach. For one, we categorize exchange rate regimes in five groups. In addition, we consider convertibility restrictions and the question of whether or not multiple exchange rates are applied (see Table 2).

Table 2

EXCHANGE RATE REGIMES AND THEIR CODINGS (*ERA*)

Criterion	Component	Explanation	Numerical codings
Pure Exchange Rate Arrangement	<i>extern</i>	1. Currency board system/dollarization	1.00
		2. Conventional peg/peg with horizontal band	0.75
		3. Crawling peg/crawling band*	0.50
		4. Managed floating	0.25
		5. Free floating	0.00
Convertibility Restrictions	<i>conv</i>	1. Full convertibility	1.00
		2. Partial convertibility	0.75
		3. Convertibility for current account transactions only	0.50
		4. Convertibility for capital account transactions only	0.25
		5. No convertibility	0.00
Number of Exchange Rates	<i>mult</i>	1. One exchange rate	1.00
		2. Multiple exchange rates	0.00

* If floating is combined with an inflation target, it may also be plausible to treat crawling peg as a lower degree of commitment than floating. However, we remain with this order. See also *Bofinger and Wollmershäuser* (2001).

Source: Freytag (2001 and 2002a), own changes.

In the resulting variable *ERA*, the pure exchange rate arrangement has a weight of 0.5, and convertibility restrictions as well as the number of exchange rates have a weight of 0.25 each. Hence, all aspects of the commitment associated with exchange rate policy are included in this measure. We observe the exchange rate regime (calculated as in Table 2) in five reference years (1975, 1980, 1985, 1990, 1995).

The second exogenous variable is the index of *EF* for the reference years, which is available for the reference years only. We also use the structural policy index (*SPI*) for the reference years 1985, 1990 and 1995 as an alternative to *EF*. It is the arithmetic mean of trade liberalization, tax neutrality, financial liberalization, privatization and labor deregulation. *Correa* (2002) shows that on average, 19 Latin American countries have made significant progress with respect to structural reforms. The *SPI* index is normed between 0 and 1, a higher value indicating more structural reforms. As in the case of *EF*, we expect a negative sign.

In addition, we compute the *ex-ante* proxy for credibility in absolute and quadratic form. The exchange regime and the institutional setting are comprised into a credibility proxy, which can be interpreted as representing the costs of inflation. It is specified as $(ERA - EF)^2$ (*Credqua*) or $|ERA - EF|$ (*Credabs*) respectively. The higher this difference, the lower credibility. The quadratic form implies that big differences will cause high costs. Both forms make sure that all summands are positive. As a result, the costs of inflation decrease as compared to its highest possible costs not only when the degree of commitment via the exchange rate regime is too low, but also when it is too high. The theoretically expected influence of these variables on inflation is negative. We expect a positive sign of this proxy, i.e. the higher the commitment's credibility, the lower the politically optimal inflation rate. The exogenous variables are completed by two control variables, namely seigniorage and unemployment:

- **Seigniorage:** In the theoretical framework, the success of the reform also hinges on the degree to which the government needs seigniorage (d) and on the money demand. Naturally, an actual attitude of the government towards seigniorage d cannot be observed.⁸ The variable *SEIGN* is an approximation to S and d ; it is calculated as the average of the annual increase in base money over the sum of public revenues and the annual increase in base money for one and the same year from a period of three years after the reference year (e.g. 1976–1978 for 1975). Thus, it summarizes the information about the demand for money and the dependence on seigniorage. The theoretically expected impact of this variable on inflation is positive.
- **Employment:** A second control variable is the level of unemployment. If available, the official rate of unemployment (*UNEM*) in the reference year is used as an exogenous variable to capture whether or not the government considers the *Phillips* curve as policy relevant.

The only endogenous variable is inflation (*CPI*), computed as the average of three years after the reference year. Thereby, we take into account that the reaction of the price level on commitment and other variables takes time.

⁸ This holds regardless of whether or not the government has committed to a rule that abolishes direct loans received from the monetary authority.

(c) *Data sources*

The data are drawn from different sources. To begin with, the variables *ERA*, *CBA* and *target* as well as the endogenous variables *CPI* and *DEPR* are directly drawn from *Kuttner and Posen* (2001). The index of economic freedom *EF* is a modified version of the index composed by *Gwartney et al.* (2001), *SPI* is taken from *Correa* (2002). The exchange rate regime variable *ERA* as well as the other independent variables, *SEIGN* and *UNEM*, are based on IMF – (a) through (c) data. The same holds for the dependent variable *CPI* in the new dataset.

IV. Report and Discussion of the Empirical Results

(a) *Methodical remarks*

To test the hypotheses derived in section II, three econometric methods are applied; the first being a cross-sectional *OLS* estimation, the second being a pooled regression, the third being a logit estimation. The goodness of fit of an *OLS* estimation depends crucially on whether the model is well specified.⁹ In some estimations heteroscedasticity occurs. *White's* heteroscedasticity test and if necessary *White's* correction for heteroscedasticity are applied. Even in the presence of heteroscedasticity the *OLS* method can produce consistent and unbiased estimators (*White*, 1980). A second problem may be serial correlation. We try to solve this problem as follows.

The regimewise dataset can be computed with *OLS* since the regime shifts are significant and allow treating the sample as a cross-sectional one. Beside the *OLS* estimations we also use a completely different approach, namely a binary choice model. The outcome of monetary policy is not measured as rate of inflation but as a success (value 0) or a failure (value 1) of the monetary policy. However, this approach has methodical shortcomings: for one, the outcome is not directly observable. Whether the policy is successful or not has to be decided by the researcher on the basis of the observed inflation rates. One way to overcome this problem is to use an index function (*Greene*, 1997, pp. 880f.). One has to choose a rate of inflation CPI^* which distinguishes success from failure: $y = 1$ if $CPI > CPI^*$, and $y = 0$ if $CPI \leq CPI^*$. We have chosen 1 (failure) for $CPI > 20$ percent

⁹ For a general overview, see *Kennedy* (1992, in particular the synopsis on p. 45).

and 0 (success) for $CPI \leq 20$ percent.¹⁰ The second shortcoming is that the binary choice approach is based on the assumption that the outcome of y (0 or 1) is due to the choices of the acting individual. It would be unrealistic to assume a deliberate failure.

As the observations in the alternative dataset are not distinguished by a regime switch, they may be serially correlated. Therefore, a pooled regression is applied to it with a *GLS* estimation. Thus, the serial correlation shall be reduced. Throughout the fourth section, the endogenous variables (*CPI* and *DEPR*) are calculated in logarithmic form, which reflects the dynamics of inflation and disinflation respectively.

(b) The results

In general, the results of the empirical assessments can be regarded as being supportive for the hypotheses derived above. This holds for both datasets and all empirical methods. Thus, regardless of some weaknesses of the results, this is strong evidence that institutional constraints matter for the proper choice of an exchange rate regime. A strong commitment via exchange rate policy itself also reduces the probability of high inflation.

The *OLS* estimation of the regimewise dataset with $\ln CPI$ as endogenous variable generates the expected sign for all variables, except for the shock variables. The results are summarized in Tables 3a and 3b. The core variables of the theoretical analysis are *ERR*, *CBA*, *target* and *lengths*. They display the expected signs, albeit with different intensity. The duration of an exchange regime is very important for the average consumer price inflation of this period. The longer the regime lasts, the lower the average inflation rate. The low parameter value of *lengths* reflects the fact that it is not restricted between 0 and 1. Estimated commonly with *lengths*, *ERR* is insignificant (estimations 1, 4 and 6 in Table 3a). The correlation between *lengths* and *ERR* is rather high (0.4), which makes sense economically as a successful regime will be run for a longer period than a failure. The fears expressed in *Kuttner and Posen* (2001) as well as in footnote 3 with respect to a survivorship bias thereby are justified. The incorporation of *lengths* in the estimations significantly raises the coefficient of determination R^2_{adj} . It also reduces the danger of serial correlation, as the duration of subsequent exchange rate regimes does not necessarily depend on each other, whereas variables such as *CBA*, *target* and *EF* well may.

¹⁰ Although it would certainly make sense to separate success and failure more strongly, e.g. by choosing $y = 1$ for $CPI > 50$ percent and $y = 0$ for $CPI < 20$ percent, we refrain from this further diminishing of the sample.

The weak performance of *CBA* (in particular in estimation 2) makes sense economically, as it is not a sophisticated variable.¹¹ In addition, there is a high correlation between *target* and *ERR*: everything else held constant, the significance and parameter value of *ERR* increases when *target* is left out (estimations 2 and 3). This can be explained by a closer look at Table 1, as both variables contain similar, if not the same information.

In addition, the degree of economic freedom is also highly significant, with a greater β -value and a higher significance level than the exchange rate regime. The more economic freedom the citizens have, the higher is the pressure on the government to provide stable money. Thus, the degree of economic freedom indirectly incorporates a strong commitment to stability.

Instead of spurring inflation, the oil shock, the Mexico crisis and the Brazilian crisis obviously have mainly contributed to the opposite – with the exception of the Mexico crisis (estimation 6). Governments may have felt to be obliged to care for a more stable price level.

Table 3a

EXCHANGE RATE REGIMES, ECONOMIC FREEDOM AND
INFLATION (*lnCPI*): THE REGIMEWISE DATASET (OLS)

Est.	1	2	3	4	5	6
<i>C</i>	6.73***	6.68***	6.98***	7.43***	7.01***	6.75
<i>ERR</i>	-0.25	-1.0**	-1.14***	-0.44	-1.15***	-0.25
<i>CBA</i>	-0.53	0.02	-0.03			-0.53
<i>Target</i>	-0.52	-0.58				-0.53
<i>EF</i>	-4.94***	-5.63***	-6.25	-6.6***	-6.31***	-4.98***
<i>Lengths</i>	-0.006***			-0.006***		-0.006***
<i>Shock*</i>						0.03
<i>R²adj</i>	0.64	0.42	0.42	0.63	0.43	0.63
<i>N</i>	62	62	62	62	62	62

* Mexico crisis.

***, **, * Significant at the 10 percent level, 5 percent level and 1 percent level respectively.

Sources: See section III (c).

¹¹ More comprehensive measures of central bank independence are much higher correlated with inflation, at least in industrialized countries. See *Berger et al. (2001)* for a survey.

The binary choice model confirms the results of the *OLS* estimations. Again, *lengths* is a very important exogenous variable as it is highly significant and increases R^2 (estimations 1 and 3 in Table 3b). The difficulties of the binary choice model with respect to macroeconomic policy described above seem to be negligible, as long as one assumes that governments have the choice to select an inflation rate and the benchmark inflation rate of 20 percent for a successful monetary policy is accepted.

Table 3b

**EXCHANGE RATE REGIMES, ECONOMIC FREEDOM
AND INFLATION: THE REGIMewise DATASET
(LOGIT ESTIMATION)**

Est.	1	2	3	4
<i>C</i>	7.97***	6.32***	9.22***	6.99
<i>ERR</i>	-1.36	-2.21**	-1.75	-2.35**
<i>CBA</i>	-1.33	-0.35		
<i>Target</i>	-1.42	-0.72		
<i>EF</i>	-9.7**	-9.07 *	-12.98***	-10.56**
<i>Lengths</i>	-0.01***		-0.01***	
<i>McFadden R²</i>	0.35	0.21	0.33	0.20
<i>N</i>	62	62	62	62

*, **, *** Significant at the 10 percent level, 5 percent level and 1 percent level respectively.

Sources: See section III (c).

These results are further confirmed by the *OLS* estimations with *DEPR* as endogenous variable. Again, *lengths* plays a major role (with the same properties as above, see estimation 1 in Table 4), however, this time even less surprisingly so, as one could expect a lower average annual rate of depreciation in a more successful and thus more durable regime. The exchange rate regime is important, as fixing the exchange rate to the US dollar reduces nominal depreciation. *CBA* shows the same weaknesses (estimation 2) as in Table 3a, *ERR* and *target* have common influence (estimations 3 and 4), *EF* is as important as in Tables 3a and 3b.

Table 4

**EXCHANGE RATE REGIMES, ECONOMIC FREEDOM AND
DEPRECIATION (*lnDEPR*): THE REGIMEWISE DATASET**

Est.	1	2	3	4
<i>C</i>	8.32***	7.99***	4.29***	8.5***
<i>ERR</i>	-1.18	-1.87***	-1.31*	-2.07***
<i>CBA</i>	-0.15	0.146	-1.73***	
<i>Target</i>	-1.54**	-1.184	-1.78**	
<i>EF</i>	-7.35***	-7.71***		-8.77***
<i>Lengths</i>	-0.008***			
<i>R²adj</i>	0.486	0.37	0.27	0.37
<i>N</i>	60	60	60	60

***, ** Significant at the 10 percent level, 5 percent level and 1 percent level respectively.

Sources: See section III (c).

To summarize, the assessment of the first hypothesis derived in section II cannot be rejected. Monetary commitment via exchange rate policy and policy constraints via economic freedom for the citizens restrict the policymakers' incentives to increase the monetary base to meet other objectives than price stability. In Latin America, politicians regularly had recourse to the money pressure to solve their fiscal policy difficulties. Table 5 consequently confirms this knowledge as it shows that one very important reason for inflation in Latin America is the need for seigniorage.

The pooled regression of the new dataset, which is the bigger one, generally confirms the results obtained so far. Both a tight exchange rate regime and a high degree of economic freedom and structural reforms respectively give incentives for policymakers to deliver price stability. In contrast, the need for seigniorage counters these incentives and causes inflation to rise. This does not hold for the rate of unemployment. The higher unemployment, the lower inflation (with high significance). One possible explanation of this puzzle is that a government that cares for price stability also cares for high employment. It also may be the case that cyclical aspects beyond our analysis play a major role for the level of unemployment; it is not a deliberately chosen variable. The evidence so far can be seen in estimations 1 to 3 in Table 5.

Table 5

**EXCHANGE RATE REGIMES, ECONOMIC FREEDOM AND
INFLATION (*lnCPI*): A POOLED REGRESSION (*GLS*) WITH THE
NEW DATASET**

Est.	1	2	3	4	5
<i>C</i>	3.14***	9.11***	4.65***	2.15	
<i>ERA</i>	-0.43*	-0.13***	-0.06		
<i>EF</i>	-1.48***	-8.21***			
<i>SPI</i>			-3.86***		
<i>SEIGN</i>	5.04***		2.88***	4.71***	4.70***
<i>UNEM</i>		-0.13***			
<i>Credabs</i>				0.24	
<i>Credqua</i>					0.42
<i>R²adj</i>	0.78	0.99	0.84	0.87	0.86
<i>N</i>	99	45	42	99	99

***, ** Significant at the 10 percent level, 5 percent level and 1 percent level respectively.

Sources: See section III (c).

The two estimations (4 and 5) test the second hypothesis, namely that a high compatibility of the exchange rate regime with the degree of economic freedom makes a regime credible and leads to low inflation. The respective variables *Credqua* and *Credabs* indeed show the expected sign, but have a very high standard deviation. Therefore, the hypothesis cannot be regarded as being validated. Nevertheless, it can be seen as another step towards the construction of a meaningful *ex-ante* proxy for credibility.¹²

These interesting results should not distract our attention from the potential weaknesses of this type of analysis. First, the assumed endogeneity may be questioned. The exchange rate regime as well as the institutional setting may well be and often are responses to past inflation experience as the history of monetary reform shows. As a consequence, the coefficients of both *ERR* and *ERA* may be too high. However, neither are we interested in this sort of feedback process in this study,¹³ nor does this line of argument question the general observation that exchange rate arrangement as

¹² To make the results robust, the proxy has to be further improved. The institutional factors should be designed more precisely. It seems to be an interesting field of research to improve the knowledge of the *ex-ante* credibility of economic policy in general and monetary policy in particular.

¹³ For the determinants of governments' choice of exchange rate regimes in Latin America, see *Blomberg, Frieden and Stein (2002)*.

well as economic order are responsible for the degree of inflation. Second, there may be a common determinant of both the high degree of monetary commitment created via the exchange rate regime and the institutional setting surrounding the monetary framework. In other words, governments opting for monetary stability may also have a focus on fiscal stability and high employment. In this case, the common explanatory power of the exogenous variable may be limited. This argument has been put forward by *Posen* (1993) with respect to inflation and *CBI*. The search for a common determinant of a stability-oriented macroeconomic policy also raises an important question regarding the political economy of policy reform as it shifts attention to the circumstances that make governments correct the economic policy assignment. This, however, is a positive question beyond the topic of this paper. In the final section we draw some normative policy conclusions.

V. Conclusion

Regardless of the dataset used and the method applied, the main conclusion of the analysis is straightforward: it is not only the monetary regime – here mainly interpreted as exchange rate regime – that matters for stability, but also other aspects of economic policymaking. In the empirical assessments, we find that the index of economic freedom as well as the structural policy index are the most important determinants of the rate of inflation. Other features of the monetary regime also matter. Finally, the use of the money pressure to finance the public budget increased the average inflation in Latin America. The story told is not new so far. However, it gives additional empirical evidence that there is no one-size-fits-all solution in exchange rate policy. The exchange rate regime can enhance price stability if it is compatible with the institutional setting. The *ex-ante* proxy for credibility is hinting at this result, which is commonplace among institutional economists.

The lessons for economic policymaking are also clear. To be successful monetary policy, including the exchange rate regime, needs to be adjusted to institutional constraints. Those countries that reform their exchange rate policy in accordance to such constraints or that reform both the exchange rate regime and other parts of the economic order, will be more successful than the others. This holds in Latin America as well as elsewhere. However,

as governments in Latin America in the past were regularly prone to inflation, it is very important to introduce an institutional setting that increases the political price of inflation.

One can even expect that the exchange rate regime will be less important for the success of monetary policy, i.e. for stability, than is the fiscal policy regime. Evidence in Argentina shows that the monetary regime lost its credibility after the fiscal problems became prevalent. Interestingly, most observers including the government itself did not focus on these fiscal policy shortcomings, but blamed the rigid currency board arrangement of preventing the government from a quick and sustainable response to the crisis. Consequently, the newly emerged debate on proper exchange rate arrangements may not cover the main economic policy problems in many Latin American countries.

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