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

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

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Abstract

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 again stimulated the discussion. 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.

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I. Introduction

Exchange rate policy in Latin America regularly has been subject to change in the post war era. Recently, countries to introduce a new regime were Ecuador that officially dollarised in 2000, Argentina doing just the opposite by abandoning the currency board arrangement in January 2002 and Venezuela giving up the peg in Spring 2002. As monetary policy is regularly subject to time consistency problems, the role of

exchange rate regimes as commitment mechanism has always been analysed and controversially discussed in the 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 stabilisation programs are more likely to stop high and hyper inflation 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 favour 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 the exception. This observation is analysed 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 the literature.[3] Calvo (2000) shows that the inclusion of institutions supporting the exchange rate mechanism such as the financial sector dramatically changes the choice of an optimal exchange rate arrangement. Eichengreen et al. (1998) theoretically analyse 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) analyses 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.

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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 analysed with the consideration of institutions. See e.g. Correa (2002) for Latin America.

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 macro policies such as monetary policy, fiscal policy as well as labour market policy demand for 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 not only offers 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 analyse 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 section IV. 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 for the standard framework of a utility maximising 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 labour market. Therefore, it seems attractive for the government to increase the money base. It tries to issue enough money to either maximise the amount of seigniorage S or to increase employment above its natural level. Thus, one likely form of the government's utility function is as follows:

$$U = U(S, N, \pi ...), \tag{1}$$

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 maximisation yields the following first-order condition

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

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

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.

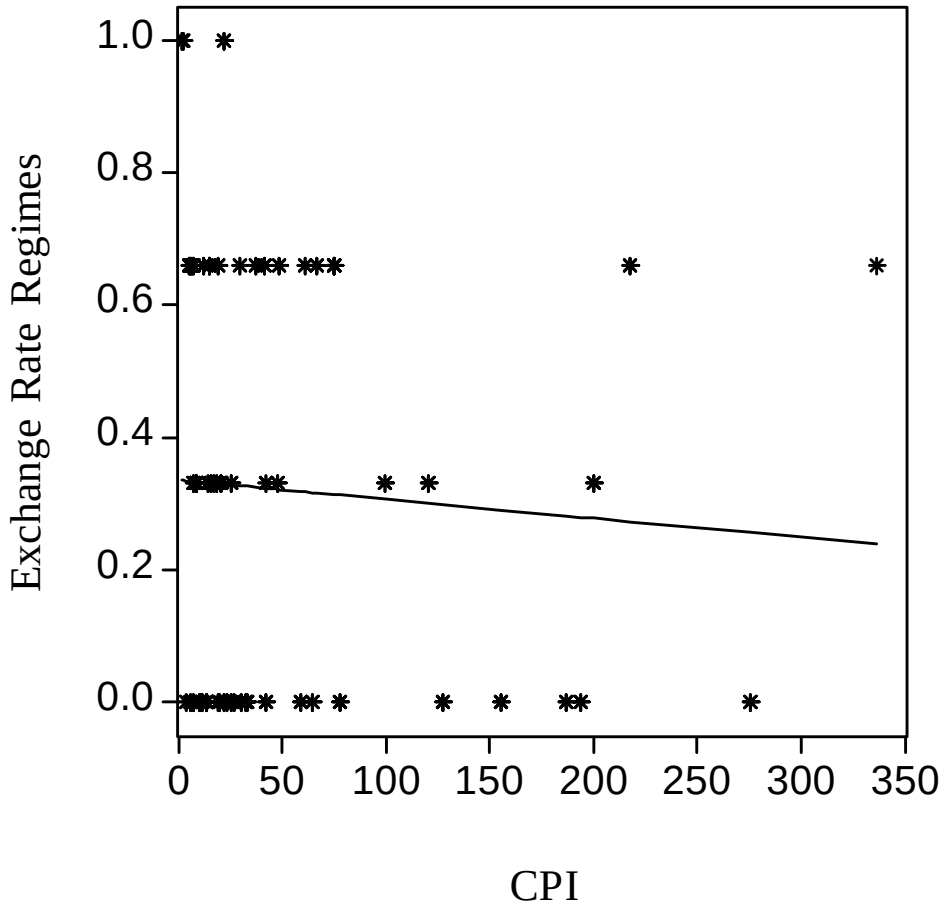
b) Commitment mechanisms to solve the time inconsistency problem

By using the exchange rate as a nominal anchor, countries in Latin America regularly have 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 categorise exchange rate regimes.

Following the IMF categorising, one can distinguish eight different types of exchange rate arrangement, namely dollarisation, 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.

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 central bank independence (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 the exchange rate nor convertibility restrictions are covered by these. Therefore, neither exchange rate regimes nor conventional measures of CBI can explain inflation alone.

Figure 1: The Correlation of Exchange Rate Regimes and Inflation in Latin America (62 observations)



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

[4] For a survey see Berger at 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 unionisation and collective bilateral wage negotiations, the government introduces a currency board system (CBS) to reduce the annual inflation rate from 200 per cent 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 labour market regime into account from the beginning, would certainly lead to the introduction of a different exchange rate regime. To generalise, 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 behaviour. 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 of options for the public. The competitive pressure on domestic policymakers 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

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[5] Recent work has shed new light on this argument. Reinhart and Rogoff (2002) argue that official announcement 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.

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 characterised by several institutional factors such as political stability, fiscal stability, openness, labour 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 political costs are the higher, the smaller the difference is. In other words: a high degree of commitment is likely to stabilise 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 4:

(1) Inflation in Latin America is the lower, the more the government commits itself through an exchange rate arrangement and central bank autonomy, and the higher 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.

III. Construction of the Data

These hypotheses will be tested using two different datasets, one of which have already been used in the literature, whereas the second one (reference years, see sub-section *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 the general argument of the paper further. In this section, the data is introduced.

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[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.

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*).

Table 1: Exchange rate regimes, domestic constraints and central bank autonomy and their codings

Variable	Symbol	Explanation	Numerical codings[1]
Pure Exchange Rate Arrangement	*ERR*	1. Currency board system	1.00
		2. Hard peg	0.66
		3. Target zones	0.33
		4. Free floating	0.00
Central Bank Autonomy	*CBA*	1. Full autonomy	1.00
		2. Partial autonomy	0.50
		5. No autonomy	0.00
Announced Domestic Targets	*Target*	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

[1]: 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.

It is important to emphasise 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 monetise 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.[7]

[7] In their own estimation, Kuttner and Posen (2001) only use 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.

We also add the index of economic freedom as introduced above (*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 per cent.
2. Structure of the economy and the use of markets, 4 components, 14.2 per cent.
3. Monetary policy and price stability, 3 components, 9.2 per cent (omitted).
4. Freedom to use alternative currencies, 2 components, 14.6 per cent (omitted).
5. Legal structure and property rights, 2 components, 16.6 per cent.
6. International exchange: trade, 2 components, 17.1 per cent.
7. Freedom to exchange in capital and financial markets, 4 components, 17.2 per cent.

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

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 of economic 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 consumer price inflation (*CPI*) and the average annual nominal depreciation of the domestic currency towards the US-$ 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 analyse the exchange rate regime, we prefer a two-handed approach. For one, we categorise 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*).

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 economic freedom (*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 liberalisation, tax neutrality, financial liberalisation, privatisation and labour deregulation. Correa (200?) 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.

Table 2: Exchange rate regimes and their codings (ERA)

Criterion	Com-ponent	Explanation	Numerical codings
Pure Exchange Rate Arrangement	*extern*	1. Currency board system/dollarisation	1.00
		2. Conventional peg/peg with horizontal band	0.75
		3. Crawling peg/crawling band[1]	0.50
		4. Managed floating	0.25
		5. Free floating	0.00
Convertibility Restrictions	*conv*	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	*mult*	1. One exchange rate	1.00
		2. Multiple exchange rates	0.00

[1]: 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 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 if the degree of commitment via the exchange rate regime is too low, but also if 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 (δ) and on the money demand. An actual attitude of the government towards seigniorage δ, naturally, cannot be observed.[8] The variable *SEIGN* is an approximation to *S* and δ; 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 the same year of three years after the reference year (e.g. 1976-1978 for 1975). Thus, it summarises 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.

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 (200?). 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.

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

IV. Report and Discussion of the Empirical Results

a*) Methodical remarks*

To test the hypotheses derived in section 2, 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 as 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 base 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≤CPI*. We have chosen 1 (failure) for CPI>20 per cent and 0 (success) for CPI≤ 20 per cent.[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

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

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

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 *lnCPI* as endogenous variable generates the expected sign for all variables, except for the shock variables. The results are summarised 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^2adj. 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.

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 ß-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.

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

Table 3a: Exchange rate regimes, economic freedom and inflation (lnCPI): The regimewise dataset (OLS)

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

[1]: Mexico crisis; *, **, ***: significant at the 10 per cent level, 5 per cent level and 1 per cent level respectively.
Sources: see section IIIc).

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 one assumes that governments have the choice to select an inflation rate and the benchmark inflation rate of 20 per cent 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**
C	7.97***	6.32***	9.22***	6.99
ERR	-1.36	-2.21**	-1.75	-2.35**
CBA	-1.33	-0.35		
Target	-1.42	-0.72		
EF	-9.7**	-9.07*	-12.98***	-10.56***
Lengths	-0.01***		-0.01***	
McFaddenR²	0.35	0.21	0.33	0.20
N	62	62	62	62

*, **, ***: significant at the 10 per cent level, 5 per cent level and 1 per cent level respectively.
Sources: see section IIIc).

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 c.p. 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-$ c.p. 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**
C	8.32***	7.99***	4.29***	8.5***
ERR	-1.18	-1.87***	-1.31*	-2.07***
CBA	-0.15	0.146	-1.73**	
Target	-1.54**	-1.184	-1.78**	
EF	-7.35***	-7.71***		-8.77***
Lengths	-0.008***			
R²adj	0.486	0.37	0.27	0.37
N	60	60	60	60

*, **, ***: significant at the 10 per cent level, 5 per cent level and 1 per cent level respectively.
Sources: see section IIIc).

To summarise, the assessment of the first hypothesis derived in section 2, 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 took recourse to the money press to solve their fiscal policy difficulties. The following *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 c.p. 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 no deliberately chosen variable. The evidence so far can be read from 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**
C	3.14***	9.11***	4.65***	2.15	
ERA	-0.43*	-0.13***	-0.06		
EF	-1.48***	-8.21***			
SPI			-3.86***		
SEIGN	5.04***		2.88***	4.71***	4.70***
UNEM		-0.13***			
Credabs				0.24	
Credqua					0.42
R^2adj	0.78	0.99	0.84	0.87	0.86
N	99	45	42	99	99

*, **, ***: significant at the 10 per cent level, 5 per cent level and 1 per cent level respectively.
Sources: see section IIIc).

The following 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 too 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 attention from potential weaknesses of this type of analysis. First, the assumed endogeneity may be questioned. The exchange rate

[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.

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 well as economic order are responsible for the degree of inflation. Second, there may be a common determinant of both a 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 cause governments to 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.

VI. 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 being the most important determinant of the rate of inflation. Other features of the monetary regime also matter. Finally, the use of the money press to finance the public budget increased 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. Monetary policy, including the exchange rate regime, needs to be adjusted to institutional constraints to be successful. 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 others. This holds in Latin America as well as elsewhere. However, as governments in Latin America in the past regularly

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

have been 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 is 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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