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Money-Based vs. Exchange-Rate-Based Stabilization: Is there Space for Political Opportunism?

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Abstract

In response to the chronic inflation that has plagued the developing world in the past, many countries adopted different stabilization policies, but to what extent these stabilization programs were designed for political rather than economic motivations is not clear. Nor is it known whether and to what extent policy makers may take advantage of the consumption cycles derived from the different stabilization strategies. This empirical paper finds strong evidence that the choice of nominal anchor to stabilize inflation depends on the election cycle. In particular, exchange-rate-based stabilizations are on average launched before elections whereas money-based stabilizations are set after them, implying the existence of political opportunism in the timing and choice of stabilization anchor. The empirical estimates are obtained through the use of a fairly simple econometric model based on a wide range of stabilization episodes. The sample is constructed systematically and coherently enhancing the robustness of the results.

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1 Introduction

Determining how the political process affects economic policy-making is a challenge, particularly for researchers studying developing countries. It is a challenge worth meeting, however, because failing to design the right policy may have a major negative impact on the welfare of these societies. An example of a policy with a high political dimension and strong welfare impact is the choice of nominal anchor to stabilize inflation. In response to chronic inflation many countries adopted stabilization policies. These policies differed in their design, but to what extent these differences arose from political rather than economic motivations is not clear. Nor is it known whether and to what extent policy makers may take advantage of the consumption cycles derived from the different stabilization strategies. Exchange-rate based inflation stabilizations programs generate an initial consumption boom and a later recession in the economy whereas money-based stabilizations generate an early consumption bust followed by a recovery. Knowledge of these consumption patterns allow politicians to use the two nominal anchors opportunistically. In particular, exchange-rate based stabilizations might be used prior to elections whereas monetary anchors might be employed after them. This empirical paper tests the existence of opportunism in the choice of nominal anchor to stabilize inflation contributing to the existing political economy literature and shedding some light on the decision-making process behind a country's choice of a particular stabilization strategy. This paper is organized as follows: Section 2 details the differences between money-

based and exchange-rate based stabilization programs, Section 3 describes the opportunistic use of macroeconomic variables with particular emphasis on the existing literature, Section 4 addresses the opportunistic behavior behind the choice of stabilization strategies, Section 5 describes the data sources and the sample, section 6 defines the model and methodology used in the estimation procedure and Section 7 concludes.

2 Money-based versus Exchange-rate-based Stabilization

Chronic Inflation has been a major problem in the late 20th century for many countries in the developing world and especially in Latin America . The diverse stabilization attempts pursued in Latin America have allowed economists to identify unique stylized facts for each type of stabilization strategy. The debates over what strategy to adopt in order to stabilize the economy have been intense, and have been centered around whether exchange-rate-based stabilization (ERBS henceforth) is superior to money-based stabilization (MBS henceforth)[1] . Formally, the difference between these programs lies in the selection of the nominal anchor to bring inflation down to normal rates. The ERBS chooses the exchange rate as its nominal anchor while the MBS traditionally adopts a monetary aggregate, such as M1 or Monetary Base. The consequences of the choice of the nominal anchor differ considerably and have important implications.

[1] It should be pointed out that there is nothing as a pure and perfect Money-based stabilization program. Most programs, called here MBS, did not rely only on a monetary anchor but adopted a wide mixture of policies. Nevertheless, they tend to strongly differ from the Exchange-Rate-based stabilization programs due to the lack of an explicit "de facto" pegged exchange rate. In most of the cases of MBS considered, a floating exchange rate regime was adopted. Even though the paper will continue to use the term MBS, it seems appropriate to refer to them as non-ERBS.

Traditionally, disinflation has been treated as contractionary in the literature. For example, Okun (1978) relies on the trade-off between inflation and unemployment from the Phillips-curve literature to conclude that any attempt to disinflate would result in costly unemployment for the economy. The main contribution of this literature is the development and application of the sacrifice ratio, which enables economists to calculate how much employment, and therefore output, the economy would have to sacrifice for every percentage point reduction in the inflation rate. Thus, the primary problem faced by policy makers attempting to stabilize the economy has traditionally been considered the contractionary effects disinflation has on output. However, disinflation does not need to be contractionary, as the hyperinflation episodes in Germany, Hungary and Austria in the 1920's and 1930's have shown. The experiences of Latin American countries and Israel in the last few decades also contradict the results predicted by the Phillips-curve based literature. Many stabilization plans, such as Southern Cone "tablitas" of the late 1970's, the Austral in Argentina (1985), the Cruzado in Brazil (1986) and the New Shekel Plan in Israel (1985) have had a positive impact on output and employment, at least in the short run. Since these plans have been ERBS programs, ERBS has been perceived to have a smaller sacrifice ratio than MBS.[2]

Calvo and Vegh (1999) analyze the stabilization programs adopted in Latin America and Israel. The theoretical work and empirical results of their paper are important because of the stylized facts they help to establish. Table 1 shows the most relevant empirical regularities of exchange-rate and money-based stabilization programs considered in their paper.

[2] Since it is usually the case that ERBS raises output while reducing inflation, ERBS should have a positive rather than a negative sacrifice ratio.

Table 1: Empirical Regularities of Stabilization Programs

Exchange-rate-based stabilization	Money-based stabilization
Slow convergence of the inflation rate to the rate of devaluation	Slow convergence of the inflation rate to the rate of growth of the money supply
Initial increase in real GDP and private consumption followed by a later contraction	Initial contraction in economic activity
Real appreciation of the domestic currency	Real appreciation of the domestic currency
Deterioration of the trade balance and current account deficit	No definite response of the trade balance and the current account
Ambiguous impact response of domestic real interest rates	Initial increase in domestic real interest rates

Source: Calvo and Vegh (1999)

The most striking difference between the two stabilization strategies is the real effects on economic activity. In particular, as alluded above, exchange-rate-based stabilization programs exhibit consumption booms early on in the program followed by a later contraction. In contrast, money-based stabilization programs exhibit an initial consumption bust followed by a later recovery. The literature exploring these boom-bust cycles have concentrated on theoretical models replicating the empirical regularities in consumption following stabilization programs. The empirical literature sought to test what would be known as the "recession-now-versus-recession-later" hypothesis making reference to the possibility of delaying the disinflation costs (recession) using the exchange rate as the nominal anchor. It is important to note that exchange-rate-based stabilization attempts often lead to balance-of-payments crisis, loss of international reserves and major devaluations. Therefore, ex-ante, it is not a simple task to determine what stabilization strategy should be pursued, since initial consumption booms are definitely an advantage of ERBS over MBS. This is especially true if the economy is in a recession prior to the launching of the program.

Calvo and Vegh (1999) present a thorough empirical analysis that describes the behavior of real GDP per-capita around stabilization programs in Latin America. They run regressions with real GDP per-capita as the dependent variable and using terms of trade, OECD growth and interest rates as explanatory variables. In order to examine the role of stabilization programs they include time (year) controls.[3] . The results are quite convincing and some important conclusions are derived. First, MBS are mostly launched when real GDP per-capita is high and ERBS are launched when real GDP per-capita is low. This is a very intuitive result considering that MBS are contractionary and ERBS are initially expansionary in terms of real activity. It is too costly to promote a MBS if real GDP per-capita is already below trend. Another important result is that the consumption boom-bust cycles are verified. In particular, their work shows that real GDP per-capita is above trend for at least a year after an ERBS is launched and it falls afterwards. On the other hand, real GDP per-capita is below trend for a year or two after the MBS are launched and it recovers later on.

Calvo and Vegh (1999) also provide theoretical models to explain consumption boom-bust cycles. Perhaps one of the most important results that could be derived from their main model is that, at least a priori, one stabilization strategy should not be preferred over the other. The only difference between them depends on when the stabilization costs will be paid - earlier in the case of a MBS and later in the case of an ERBS. In other words, in an infinite horizon economy, the present value of consumption (and output) after the adoption

[3] The results of this econometric analysis can be found in Calvo and Vegh (1999). They run regressions for the whole sample and stratified by type of stabilization policy (MBS and ERBS). The sample includes 8 countries over 24 years that span 17 episodes of stabilization attempts.

of either stabilization strategy, should be exactly equal.[4]

3 Political Opportunism and the Behavior of Macroeconomic Variables

Given the consumption boom-bust cycles described previously, an interesting question is whether policy makers take advantage of temporary benefits resulting from policies in order to be reelected? In particular, are elections an important factor taken into account by policy makers when deciding the timing for some key economic policies? The political economy literature had been concerned with the relationship between the timing of elections and a wide range of important macroeconomic variables including the size of government budget deficits, the inflation rate, the rate of GDP growth and the real exchange rate. This section presents a survey of the literature discussing the strategic and opportunistic use of some macroeconomic variables by policy-makers.

Many papers explore the relationship between fiscal policy and elections. Persson and Svensson (1989), for example, develop a model to explain that conservative governments increase public consumption and create budget deficits if they know they will be replaced by a liberal government that favors larger level of public consumption. In this way, they restrain the ability of the next government to spend and create budget deficits. Tabellini and Alesina (1990) establish a theoretical link between elections and the provision of public

[4] This is true only if it is assumed that there are no wealth effects involved in the process. If, for example, a consumption boom after an ERBS favors the political approval of fiscal and structural reforms that mean higher growth in the near future - then, an ERBS is strongly prefered over MBS to stabilize the economy. This happens because, under the later, the reforms would have taken one or two years more to be implemented (in the recovery) affecting negatively the total output produced by the infinite-lived economy.

goods. According to their model, the incumbent may run budget deficits if he realizes that he is going to be replaced in the next elections. Lambertini (2000) tries to establish empirically the validity of the main ideas developed in the theoretical papers but did not find evidence that the incumbents high probability of being replaced explains budget deficits, or that the provision of public goods follows a political pattern. Budget deficits do not seem to be used strategically by policy makers.

More recently, the political economy literature has developed the idea that other government economic policies may be influenced by the election cycles. Stein and Streb (1997) describe the stop-and-go inflationary process existent in Latin America. Their model explains the existence of opportunistic policy makers that want to exploit the trade-off between present and future inflation. In particular, opportunistic policy makers reduce inflation before elections creating higher inflation afterwards. In order for this opportunistic strategy to work, voters are either assumed to be myopic, as described by Nordhaus(1975), or treated as rational but having incomplete information as in Rogoff (1990). This pattern is consistent with the non-smooth inflationary process in Latin America. As long as voters care about current inflation when deciding whether to vote for the incumbent, opportunistic policy makers may implement a policy to reduce temporarily the inflation rate before elections.[5]

Stein and Streb (1997) suggest that Israel (1988), Bolivia (1989) and Mexico (1994) are typical examples where devaluations were postponed to slow down inflation before elections,

[5] Fair (1978) runs regresions for the presidential elections in the United States using elections and GDP growth as explanatory variables. Democratic and Republican governments face the same type of voters, that put a very high weight on current inflation and GDP growth on the year of the election - as opposed to inflation and growth in the whole presidential term - when deciding for which candidate to vote.

even though in Mexico for example, the stock of international reserves was declining quickly. Kessler (2000) describes the effort made by the PRI (Partido Revolucionario Institucionalista) to extend as much as possible the apparent economic stability in Mexico up to the 1994 elections. The policy of postponing devaluations guaranteed the PRI reelection in 1994 after President Salinas term, but the Tequila crisis soon afterwards was so traumatic that the PRI was later penalized in the 2000 elections. It is possible, therefore, to explain why governments may peg the exchange rate even though they know that this strategy could lead to a balance-of-payment crisis. Cardoso (2000) describes the Brazilian devaluation and change of exchange-rate regime in 1999 as another case where postponing devaluation guaranteed successful political results with the reelection of President Fernando Henrique Cardoso. The country has lost international reserves but did not end up with the huge crisis that Mexico did because the stock of reserves was much greater and the financial system much better prepared to face a major crisis, hedging itself from steep devaluations. Stein and Streb (1997) describe the behavior of some Latin American governments:

> "The lack of an immediate cost in terms of increased unemployment may provide strong incentives for the government to control inflation before elections, using the exchange rate as the nominal anchor... Rather than the traditional inflation-unemployment trade-off, the key element seems to be an intertemporal trade-off between inflation today and inflation tomorrow, which governments have exploited for political purposes".

Stein and Streb (2000), in the tradition of their previous paper, conclude that there is a

clear relationship between elections and the timing of devaluations. In particular, a government is tempted to devalue after elections. Their interesting empirical findings suggest that the depreciation of the exchange rate reaches on average 7% two months after presidential elections. Empirical work by Bonomo and Terra (1999) suggests that, in Brazil, the probability of having an appreciated exchange rate is higher in the months preceding elections while the probability of having a depreciated exchange rate is higher in the months succeeding elections. Bonomo and Terra (2000) develop a theoretical model to explain elections and exchange rate policy cycles based on the idea that voters have imperfect information about the preferences of policy makers. If preferences were known to the public, the candidate more closely connected to the interests of the non-tradable sector would be elected, since this sector is assumed to have a higher number of votes. This feature, therefore, creates real exchange rate cycles around elections. Ghezzi, Stein and Streb (2000) follow similar theoretical ideas. In their model, voters have incomplete information on the competence and the opportunism of incumbents. Devaluation acts like a tax and may suggest to the voting public that the policy maker is incompetent. It provides, therefore, an incentive for the incumbent to postpone devaluation, leading to an overvalued exchange rate before elections.

The choice of stabilization strategy and exchange rate regime are also examined in the literature. It is argued that many countries still choose fixed nominal exchange-rate regimes so many years after the abandonment of the Bretton Woods system because it may lead to stronger macroeconomic discipline. Edwards (1996) writes:

"The credibility problem can be solved (partially) by selecting an exchange-

rate system that constrains the authorities ability to generate inflation. Thus, countries with a more ambitious real target, with other things given, will have an incentive to select a pegged regime as a way of reducing their credibility problem".

A natural extension to this idea would be that ERBS might be perceived as more credible than MBS, since the fixed nominal anchor chosen increases the authorities macroeconomic discipline in the future. Tornell and Velasco (1999) challenges Edwards' paper with a model attributing different discount rates to the representative consumer and to the policy maker, the later granted with a higher discount rate. The model implies that a floating exchange rate regime imposes higher macroeconomic discipline. Alfaro (1999) suggests that temporary stabilization programs could be implemented by governments since the owners of non-traded goods' welfare improves while owners of traded goods are hurt for reasonable parameter values. Using this distributional effect caused by real exchange rate appreciation, governments enjoy stronger political support and may favor the implementation of temporary exchange-rate-based stabilization programs.

4 Political Opportunism and Inflation Stabilization

The survey of the previous section clearly reveals the existence of a wide variety of papers discussing the opportunistic use of real exchange rates and inflation. They are theoretical and empirical studies establishing that, for many developng countries, the real exchange-rate appreciates (low inflation) prior to elections and real exchange-rate depreciates (high inflation) after elections. However, the political economy literature fails to address a very important

policy question regarding inflation stabilization. Is the strategic choice between monetary or exchange-rate anchors influenced by elections when policy makers want to stabilize the rate of inflation? Are policy makers compelled to choose ERBS before elections and MBS after elections acknowledging the different consumption cycle in the aftermath of each stabilization strategy? I propose to answer these questions with empirical evidence. I believe that political variables, such as elections, do influence policy making in many countries. Table 2 shows how voting intentions for the 1994 Brazilian presidential campaign changed in favor of the candidate who launched the Real exchange-rate-based stabilization program in July of the same year.

Table 2: Real Plan - Voting Intentions

	Cardoso	Lula
June	17%	39%
July	27%	30%
August	45%	23%
September	43%	22%
October (results)	54%	27%

Source: Stein and Streb (1997)

The Mexican exchange-rate-based stabilization program is another case where the elections occurred after the plan was launched in December 1987. In July 1988, Carlos Salinas was elected and the PRI strategic choice to stabilize the economy was praised by voters enthusiastic with the ongoing consumption boom. However, it is not always the case that exchange-rate-based stabilization programs are implemented before presidential elections.

Programs such as Austral 1985, Cruzado 1986 and Convertibility 1991 seem to be more related to congressional elections usually held months after the stabilization was launched. On the other hand, money-based stabilization programs seemed to have occurred after elections took place. Bonex plan in Argentina was launched by the new elected government headed by Carlos Menem. The Collor plan in Brazil was launched in March 1990 right after Fernando Collor de Melo was elected president. Other money-based programs such as Peru 1990 and Dominican Republic 1990 were also launched after elections. The consumption busts that follow from money-based stabilization programs represent a great political cost to be avoided before important elections; rather, the incumbent would prefer the cost to be paid as soon as the new government is in charge so that the economic recovery can take place later in the same presidential term. Furthermore, MBS launched soon after elections may serve the purpose of blaming the past administration for the harsh recession that inevitably follows. A different explanation might be related to the credibility aspect. MBS programs were launched exactly after the new elected governments took power.[6] As a result, their stock of credibility was very high, allowing them to adopt a strict strategy to stabilize inflation, even at a cost of a deep recession. Inversely, ERBS could be thought as an instrument in order to increase the stock of credibility (reputation) prior to elections. Figures 1 and 2 show the relationship between GDP growth and the timing of the stabilization attempts and elections for Argentina and Brazil.

[6] The only exception here is BONEX in Argentina. It took Menem 6 months to adopt the program after trying different policies to stabilize the rate of inflation. All other MBS programs were adopted right after the elected president took power.

Figure 1: Quarterly GDP Growth Rates (Argentina 1980-2000)

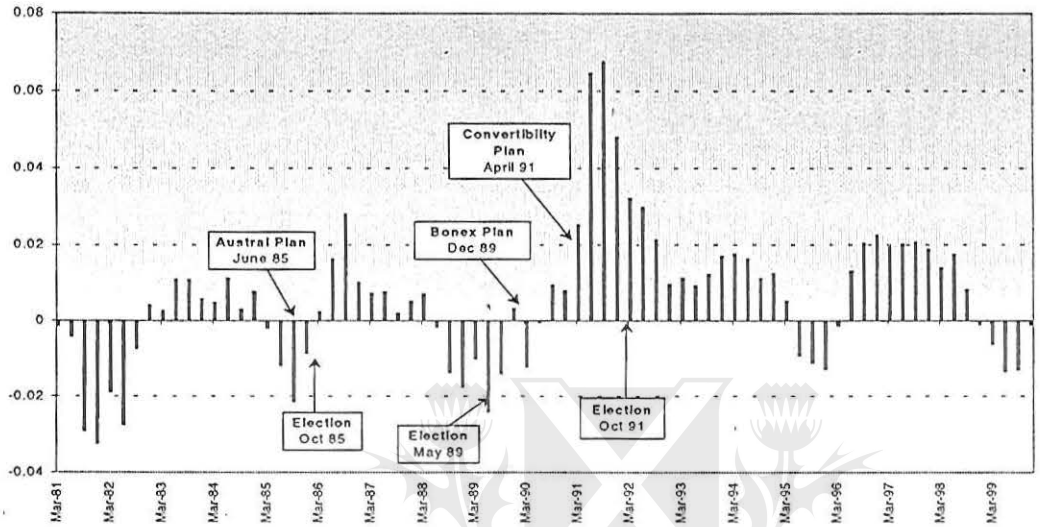


Figure 2: Quarterly GDP Growth Rates (Brazil 1980-2000)

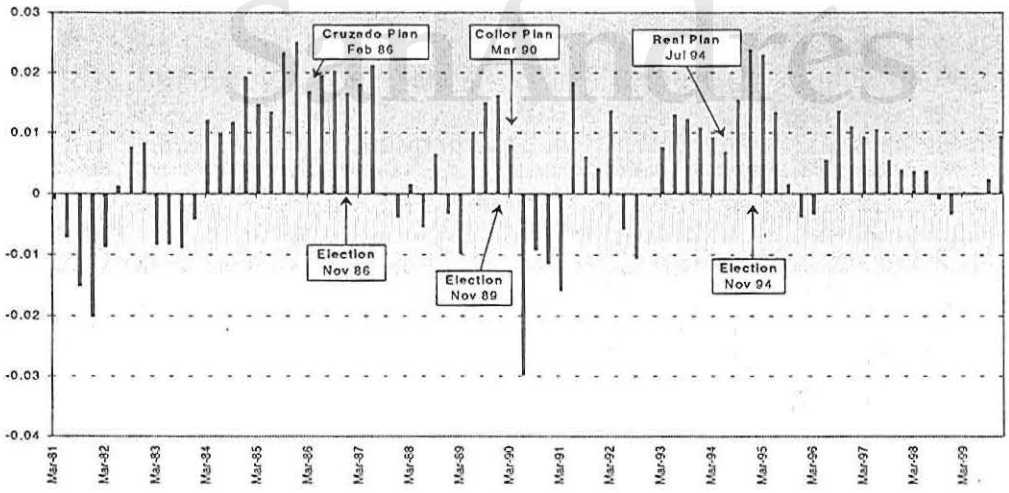


Figure 3 is another indication of the strong relationship between the timing of the stabilization programs and elections. In the figure, t^* indicates the starting time of the different

stabilization attempts. The figure shows that the MBS programs are launched always after the elections whereas ERBS are mostly launched before elections.

Figure 3: Stabilization Plans and Timing of Elections

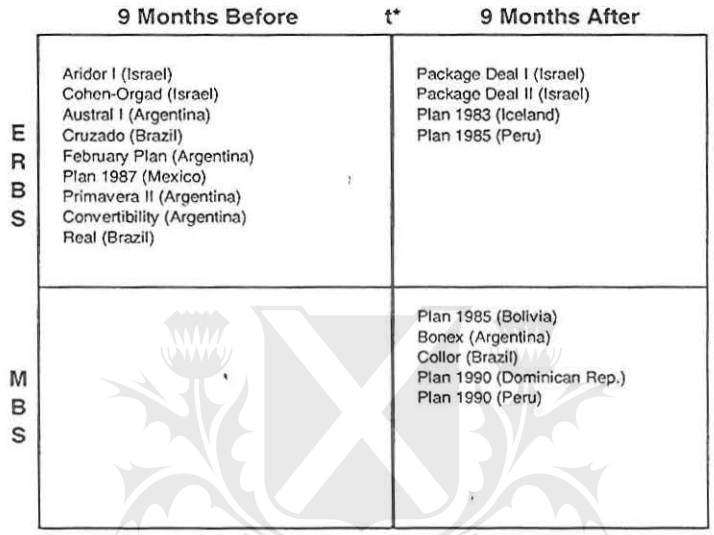


Table 3, below, shows all the stabilization programs undertaken in countries that suffered from chronic inflation, the type of stabilization (MBS or ERBS) they adopted and the closest election (presidential or congressional) date before and after the stabilization.[7]

According to Table 3, many stabilization programs were adopted close to either, a presidential or congressional election. Many others such as Israel 1985 or Uruguay 1990 seem to have been adopted far from elections. Another interesting feature derived from the table is the change in the policy strategy most commonly used to stabilize the economy. From seven stabilization plans throughout the military regime, only one used a monetary anchor

[7] It should be pointed out that some countries had no democratic regimes when some stabilization programs were launched and therefore there were no elections. Israel is the only country with a parliamentary regime without presidential elections. Elections are either presidential or congressional. With the exception of the November 1984 Israeli poll (it was antecipated 1 year) , all elections considered in the sample are exogenous to the Government, which means that they were neither advanced nor postponed from its original schedule. They were exogenously approved and determined in advance by the countries' legislators.

(Chile 1975). All others relied on the exchange rate as the nominal anchor. When redemocratization took place starting in the 1980's for most of the countries, the use of monetary anchors became more frequent. At least five stabilization programs relied on monetary aggregates after the introduction of elections in countries such as Argentina, Bolivia, Brazil, Chile and Uruguay. The use of monetary anchors was significantly higher in democratic regimes compared to military regimes. This provides strong evidence that a relationship between elections and the choice of stabilization strategy exists. Another interesting feature derived from Table 3 is the fact that the size of the election cycle seems to affect the number of plans a country adopts. This result may suggest that smaller election cycles in countries like Argentina, Brazil and Israel may increase inflation and, therefore, the need to reduce it through stabilization programs. However, longer cycles in countries like Mexico may entail less volatile inflation and a smaller quantity of stabilization attempts.[8] In the next sections a more profound analysis is considered to test the hypothesis that the timing of elections affects the starting time of stabilization programs.[9]

[8] It is quite possible that the size of the election cycle affects a wide spectrum of important macro-economic variables. This is an interesting topic for future research.

[9] Clearly, ERBS are more frequently used than MBS. Even though many explanations could be provided to why this happens, it is very important that future research deeply investigates the reasons behind this policy-makers' preference.

Table 3: The Sample of Stabilization Programs

Stabilization Program	Beginning Date	Type	Elections Before	Elections After
Brazil 1964	Mar-64	ERBS	---------	---------
Argentina 1967	Mar-67	ERBS	---------	---------
Uruguay 1968	Jun-68	ERBS	---------	---------
Chile 1975	Apr-75	MBS	---------	---------
Chilean Tablita	Feb-78	ERBS	---------	---------
Uruguayan Tablita	Oct-78	ERBS	---------	---------
Argentine Tablita	Dec-78	ERBS	---------	---------
Israel – Aridor I	Dec-80	ERBS	May-77	Jun-81
Israel – Aridor II	Sep-82	ERBS	Jun-81	Jul-84
Iceland 1983	May-83	ERBS	Apr-83	Apr-87
Israel – Cohen-Orgad	Dec-83	ERBS	Jun-81	Jul-84
Israel – Package Deal I	Jul-84	ERBS	Jun-81	Jul-84
Israel – Package Deal II	Nov-84	ERBS	Jul-84	Nov-88
Israel – Package Deal III	Feb-85	ERBS	Jul-84	Nov-88
Argentina – Austral I	Jun-85	ERBS	Oct-83	Oct-85
Israel - New Shekel	Jul-85	ERBS	Jul-84	Nov-88
Bolivia 1985	Aug-85	MBS	Jul-85	May-89
Peru 1985	Aug-85	ERBS	Apr-85	Apr-90
Brazil – Cruzado Plan	Feb-86	ERBS	Nov-82	Nov-86
Argentina – Primavera Plan I	Aug-86	ERBS	Oct-85	Oct-87
Argentina – February Plan	Feb-87	ERBS	Oct-85	Oct-87
Brazil – Bresser Plan	Jun-87	ERBS	Nov-86	Nov-89
Argentina – Austral II	Oct-87	ERBS	Oct-85	Oct-87
Mexico 1987	Dec-87	ERBS	Jul-82	Jul-88
Brazil – Gradualist Plan	Apr-88	ERBS	Nov-86	Nov-89
Argentina – Primavera II Plan	Aug-88	ERBS	Oct-87	May-89
Brazil – Summer Plan 1988	Jan-89	ERBS	Nov-86	Nov-89
Argentina - BONEX	Dec-89	MBS	May-89	Oct-91
Brazil – Collor Plan	Mar-90	MBS	Nov-89	Oct-94
Dominican Republic 1990	Aug-90	MBS	May-90	May-94
Peru 1990	Aug-90	MBS	Apr-90	Apr-95
Uruguay 1990	Dec-90	ERBS	Nov-89	Nov-94
Nicaragua 1991	Mar-91	ERBS	Feb-90	Oct-96
Argentina – Convertibility Plan	Apr-91	ERBS	May-89	Oct-91
Brazil – Real Plan	Jul-94	ERBS	Nov-89	Oct-94

Source: Kiguel and Liviatan (1991), Calvo and Vegh (1999), Veiga (1999) and Lijphart elections archives.

5 Data Sources and the Sample

What is considered a stabilization program is an important and controversial question. In order to construct a sample one must first define a stabilization attempt. The literature has basically two methods to define a stabilization attempt: the mechanical approach and the episodical approach. The former uses a mechanical rule to define a stabilization whereas the latter considers the use of well known case studies mentioned in the economics literature to determine what can be considered an inflation stabilization plan.

Easterly (1996) is an important paper in the mechanical tradition that sets that *stabilizations are all episodes in the cross-country data of movement from two years or more of above 40% annual inflation to two years or more of below 40% annual inflation.*[10] Hamann (1999) also advocates the use of mechanical rules defining more flexible criterions than Easterly (1996) in order to determine what is an inflation stabilization attempt. The shortcomings of this tradition are that episodes found do not necessarily represent fully-fledged stabilization attempts. Besides, the mechanical rules tend to be biased towards successful stabilizations leaving the unsuccessful attempts out of the list of stabilization episodes.

Calvo and Vegh (1999), Veiga (1999) and Veiga (2000) adopt the episodical approach to determine their lists of stabilization programs. The main shortcoming of the episodical method is that it may fail to consider stabilizations that have occurred in the world but were not heavily addressed by the literature. This is especially true if some of the stabilization attempts took place in remote countries.

[10]The written sentence in italic comes from Easterly's paper "When is stabilization expansionary - Evidence from high inflation".

In the analysis of political opportunism, it is important to consider only fully-fledged stabilization programs. There are many episodes of inflation reducing policies (traditional monetary and fiscal policies) that cannot be characterized as fully-fledged stabilization programs.[11] Besides, the more these programs were publicly announced by policy makers, the more consistent they are with respect to the episodical approach and, therefore, the more suitable they are for the sample. Adopting rules that could leave unsuccessful stabilizations out of the sample and including programs who were not really inflation stabilization plans undermine the use of the mechanical approach[12] . Even though the episodical approach has its limitations, it is adopted because it seems to be more appropriate for the research question of the paper.[13]

The stabilization programs used in the empirical analysis are those of table 3 with the exception of those programs that took place during the military regimes. Therefore, the sample has 29 episodes of inflation stabilization. Data for elections are available for the

[11]Fully-fledged stabilization programs are announced "packages" containing a diverse array of policies. Some programs adopt traditional orthodox (fiscal and monetary policies) and others adopt non-traditional heterodox policies (price and wage controls, income policies and "social pacts" among different pressure groups). Most of them include monetary reforms and measures to reduce price and wage indexation. These programs, therefore, completely differ from the policies implemented by the Central Bank and the Treasury of different countries on a daily basis. This is true even when these policies are implemented in order to reduce inflation rate by a few percentage points.

[12]Nevertheless, the inclusion of some stabilizations such as Iceland (1983) and Nicaragua (1991) were extracted from Hamann (1999). The author found their existance using a mechanical rule but their ultimate inclusion was only possible when case studies of the stabilizations were found. This procedure is consistent with the episodical approach, although it may be considered a mixture of both methodologies.

[13]A fair question to ask is whether the higher number of ERBS compared to MBS could show that it is more convenient to announce ERBS rather than MBS. In particular, according to this view, policy-makers would try to avoid the announcement of MBS prior to elections even if they existed. In this case, a selection bias could exist in favor of ERBS over MBS. A priori, however, it is not obvious that policy-makers may prefer to announce one strategy over the other to stabilize inflation. Strategies chosen and announced should depend largely on the election cycles. Furthermore, it is difficult to assume that MBS actually happened but were not announced by policy-makers. The countries in the sample are very sensitive to inflation stabilization policies and it is hard to imagine politicians mitigating their adoption just by failing to announce their existence.

whole period from the Lijphart Archives. Monthly data for all the variables[14] come from the IFS (International Financial Statistics from the IMF) and the Central Banks of the countries in the sample.

6 Econometric Model

Figure 4 and 5 below show the distributions of the most important variables used in the regression analysis according to the nominal anchor. The distribution of months to next election clearly indicates a high frequency in the range of 0-17 months for ERBS as well as a high frequency in the range of 35 and above months to next election for MBS. On the other hand, the distribution of months from past election shows high frequency in the range 0-12 months for MBS as well as a high concentration of ERBS in the range of 13 months and above from past election. The figures suggest the existence of a close relationship between the election cycle and the choice of nominal anchor. The regression analysis below will help determine the existence of such relationship.

[14]Data used for GDP is quarterly.

Figure 4: Distribution of ERBS - MBS by Months to the Next Election

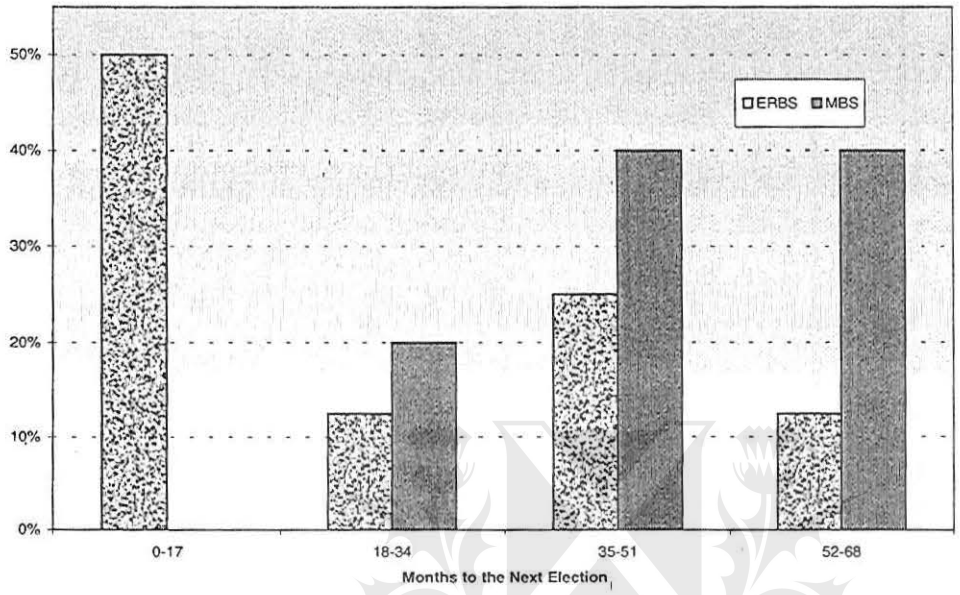
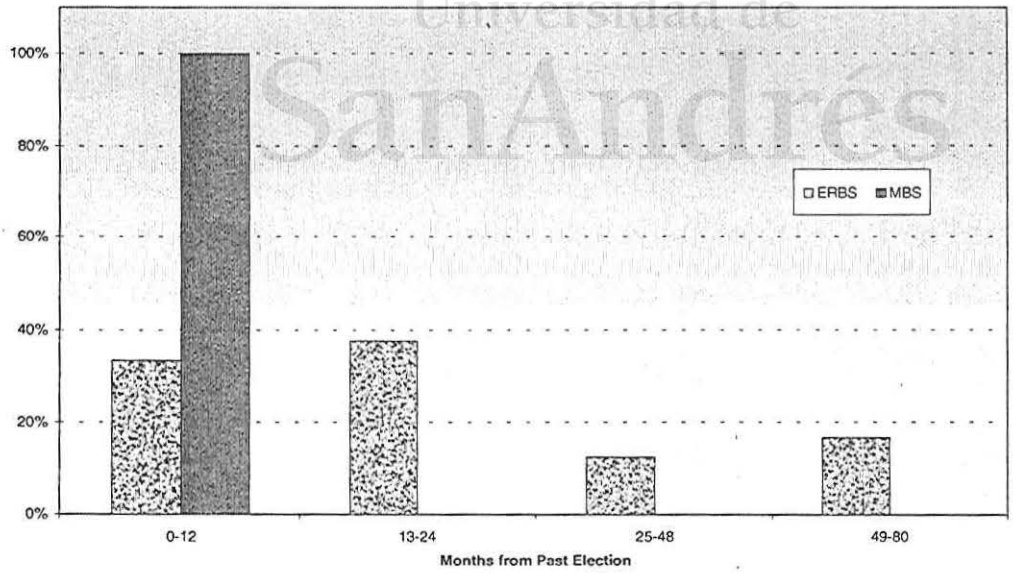


Figure 5: Distribution of ERBS- MBS by Months from Past Election



I use a Probit model on the sample of 29 stabilization programs to estimate the influence

of elections on the choice of stabilization anchor used by policy-makers. Y_i is the model's discrete dependent variable that may take the following values:

$$Y_i = 0, 1$$

if a money-based or exchange-rate-based stabilization is selected. The general model to be estimated is therefore:

$$P(Y_i = 1) = \Phi(X_i'\beta) = \Phi(\beta_0 + \beta_1 \ln(X_{1i}) + \beta_2 \ln(X_{2i}) + \beta_3 X_{3i} + \beta_4 X_{4i})$$

where $\Phi\left(X_i'\beta\right)$ is the standard normal distribution defined as:

$$\Phi\left(X_i'\beta\right) = \int_{-\infty}^{X_i'\beta} \frac{1}{\sqrt{2\pi}} \exp\left(\frac{-z^2}{2}\right) dz$$

The X_i matrix is composed by the following regressors[15] :

X_1 : months to next election

X_2 : months from past election[16]

X_3 : international reserves.[17]

X_4 : quarterly GDP growth rate.[18]

The main objective of the estimation process is to determine the sign of $\beta_1$and β_2 as well as its statistic significance. The smaller the distance in months to the next election,

[15]Some additional control variables could be included in this list. However, since the sample is small, adding explanatory variables increases the variance of the coefficients reducing their statistic significance simply due to the few degrees of freedom inherent to small samples.

[16]The inclusion of both months to next election and months from past election is important because it is implicitly taking into account the different sizes of the election cycle of the different countries.

[17]International reserves are calculated as the ratio Reserves/M3. This is a useful way that takes into account the relative sizes of the countries when considering the distinct amount of international reserves they possess.

[18]The growth rates considered have two quarters lag from the starting month of the stabilization program. This assumes that policy-makers only knew two-quarter lagged growth rates when he or she decided the anchor that would be used to stabilize inflation.

the higher should be the probability of adoption of an ERBS since it is more likely that the consumption boom will occur close to the next elections Therefore, theory predicts that β_1 should have a negative sign. On the other hand, the greater the distance from the previous election, the higher should be the probability of adoption of an ERBS. Therefore, theory predict taht β_2 should have a positive sign.

It is also very interesting to examine the possibility of other variables affecting the choice of stabilization anchor. The intuition for the level of international reserves is straight forward. A higher level of international reserves should result in a higher probability of the adoption of an ERBS since the government has more ability to sustain the fixed level of the exchange rate.[19] Finally, GDP growth may influence the choice of stabilization anchor since, if a country is in a recession, it is more likely to implement an ERBS given that adopting a MBS will further depress the economy, increasing the overall costs of the program. In fact, Gould (2001) finds that international reserves and growth are very important to determine the anchor used in a stabilization program. In particular, his results imply that policy-makers do not choose exogenously which anchor they wish to use to stabilize inflation. Therefore, the anchor employed would be ultimately determined by the current situation of the economy. According to this view, the very existence of the consumption boom-bust cycles driven by the adoption of either stabilization strategy is uncertain. Given the level of international reserves and current growth rate, the economy would follow the consumption patterns described by Calvo and Vegh (1999) independently of the anchor employed in the stabilization. Since

[19]This is only true if it is assumed that the country cannot count on external help from the IMF for example. Ideally, one would like to have a measure of potential international reserves.

Gould (2001) has not considered how elections affect policy-makers incentives and decisions, the estimates of the regression analysis should shed some light on this controversy.

Below, table 4 presents the results of a set of regressions using different combinations of the variables months to next election and months from past election, reserves and growth rates as regressors.

Table 4 - Regression Variants for the Unrestricted Probit Model

	(1) ERBS	(2) ERBS	(3) ERBS
Months to Next Election	-0.479	-2.278	-0.476
	(0.84)	(3.07)	(0.95)
Months from Past Election	0.954**	3.241	0.954**
	(0.47)	(2.12)	(0.48)
Reserves		45.849	
		(33.44)	
Growth			-0.207
			(28.79)
Constant	0.788	-3.548	0.778
	(3.37)	(7.68)	(3.66)
Prob > Chi2	0.0058	0.0006	0.0163
Pseudo R2	0.40	0.67	0.40
Observations	29	29	29

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The sign of the coefficients for months to next election and months from past election as well as the sign of the remaining regressors is coherent with the basic intuition exposed previously. Nevertheless, only months from past election is significant in most of specifications. In order to improve the estimation a more restricted model was specified.

The following restriction is imposed on the unrestricted model:

$$\beta_1 + \beta_2 = 0$$

and the restricted model becomes:

$$P(Y_i = 1) = \Phi(X_i'\beta) = \Phi(\beta_0 + \beta_1 \ln X_{1i} - \beta_1 \ln X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i})$$

The restricted model could also be expressed in the following way:

$$P(Y_i = 1) = \Phi(X_i'\beta) = \Phi(\beta_0 + \beta_1 \ln(X_{1i}/X_{2i}) + \beta_3 X_{3i} + \beta_4 X_{4i})$$

The logarithm of the ratio (X_{1i}/X_{2i}) is now capturing the effects of both months to and months from election in a different way. A smaller ratio of the combined distances[20] should have a positive effect on the probability of adoption of an ERBS ($\beta_1 < 0$).[21] The results for the restricted model are presented in table 5 below.

Table 5 - Regression Variants for the Restricted Probit Model

	(1) ERBS	(2) ERBS	(3) ERBS	(4) ERBS
Distance (Ratio)	-0.842**	-3.453	-5.311	-0.861**
	(0.41)	(2.44)	(5.99)	(0.43)
Reserves		49.557	83.161	
		(38.45)	(97.18)	
Growth			-34.76	5.248
			(42.85)	(25.82)
Constant	2.306**	-0.014	-1.069	2.303**
	(1.02)	(1.59)	(2.45)	(1.03)
Prob > Chi2	0.0015	0.0002	0.0004	0.0063
Pseudo R2	0.39	0.66	0.70	0.39
Observations	27	27	27	27

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

[20]Notice that the monthly unit, usually employed for distance, is no longer valid for the ratio above.
[21]This is true either because there are not many months to the next elections and/or because there may be several months since last elections occurred.

The most important result from the estimation is the negative relationship between distance (ratio) and the probability of an ERBS adoption. The coefficient for distance is significant at 5% in regressions (1) and (4).

Neither of the control variables are statistically significant, even though their signs are consistent with expectations. International reserves are positively related to the probability of using the exchange-rate as an anchor for stabilization while GDP growth is negatively related to this probability in most of the regressions. These results contradict the idea implied by Gould (2001) mentioned previously. The estimates indicate that policy-makers have the ability to choose the anchor to stabilize inflation and reserves and GDP growth do not seem to constrain them substantially.[22]

Even though the low pseudoR-squared in some regressions indicates that additional regressors could be included to improve the explaining power of the regressions, all regression variants are accepted at 1%. A Likelihood-Ratio (LR) test is computed for the validity of the hypothesis that $\beta_1 + \beta_2 = 0$, and compared to the Chi-squared distribution cut-off point with one degree of freedom (number of restrictions).[23]

$$LR = 0.099 < \chi^2_{(1,5\%)} = 3.841$$

The hypothesis cannot be rejected at 5% confidence level. The restricted model seems to be a better specification than the unrestricted model. Nonetheless, in spite of the specifi-

[22]As mentioned before, considering potential international reserves could be a better control variable instead of current international reserves. Unfortunately, it is difficult to establish a reasonable way to measure the potential stock of international reserves.

[23]The Likelihood-Ratio is a large-sample test and should not be employed in small samples like the one used in this paper. Nonetheless, its calculation serves as an indication of the validity of the restriction considered.

cation chosen, the clear result of this regression analysis is that the election cycle is relevant for the determination of the nominal anchor to stabilize inflation.

7 Concluding Remarks

The most important result of this paper is the observed pattern in the timing and the anchors chosen to stabilize the economy. This hypothesis was formally tested and the results supported the existence of this pattern. The evidence indicates that policy-makers choose opportunistically the nominal anchor to stabilize inflation taking the election cycle into account. Other analysis that do not account for election cycles may be omitting an important predictor (explanatory variable). The results of this empirical study suggest that politicians choose among the different anchors taking the election cycle into account. This fact provides a rational for why policy-makers may choose a hard MBS. It seems advantageous to do it right after elections for two reasons. First, because economic recovery will take place during the term of office of the politician and second, because the politician may blame the previous government for the costs implied by the adoption of the MBS. In particular, this study supports the view that there is a rational for the "recession-now-versus-recession-later hypothesis" and that not all stabilization programs are expansionary.

Additional, though secondary, contributions of this work include the creation of a more comprehensive list of stabilization attempts completely independent on their achievements. The episodical approach adopted relied on the existing literature to add stabilization programs not very familiar to many in the profession.

Many questions were raised by the study and should be investigated in the future. For example, theoretical models should help explain why ERBS are more frequently adopted than MBS and also the mechanisms behind the politicians' decision which anchor to choose and when to stabilize. Issues regarding voters' behavior and their high discount rate, are a possible explanation but not the single one. It is possible that the creation of consumption booms favors the political approval of tax cuts that entail positive wealth effects in the economy such as the reduction of distortions caused by the excessive taxation. This, in turn, may generate an advantage of the ERBS over MBS. Many possible theoretical routes can be taken from these initial thoughts but this is not the purpose of this study. This analysis should be viewed as an initial contribution aiming to establish valuable facts and assisting economists interested on the political economy of inflation stabilization to advance their future research.

References

[1] Agenor, P. and Montiel, P.J.: "Development Macroeconomics", Part 3, Chapter 10, Second Edition, 1999.

[2] Alesina, A., Cohen, G.D., Roubini, N.: "Political Cycles and the Macroeconomy", *MIT Press, 1999.*

[3] Alesina, A. and Tabellini, G.: "Voting on the Budget Deficit", *The American Economic Review*, Vol. 80, Issue 1, 1990.

[4] Alfaro, L.: " Why Governments implement Temporary Stabilization Programs", *Journal of Applied Economics*, Vol. II, No 2, 1999.

[5] Andersen, P.S. and Guomundsson, M: "Inflation and Disinflation in Iceland", *Bank of Internatinal Settlements*, Working Paper No.52, 1998.

[6] Bonomo, M. and Terra, C.: " The Political Economy of Exchange Rate Policy in Brazil: An Empirical Assessment", *Getulio Vargas Foundation*, 1999.

[7] Bonomo, M. and Terra, C.: "Elections and Exchange Rate Policy Cycles", *Getulio Vargas Foundation*, 2000.

[8] Calvo, G. A. and Vegh, C. A.: "Inflation Stabilization and BOP Crises in Developing Countries", *NBER Working Paper* 6925, 1999.

[9] Cardoso, E.: "From Inertia to Megainflation: Brazil in the 1980s", in Bruno, M., Fischer, S., Helpman,E., Liviatan, N. and Meridor, L., "Lessons of Economic Stabilization and its Aftermath", *The MIT Press 1991*, 143-178..

[10] Cardoso, E.: "Brazil's Currency Crisis: The Shift from an Exchange Rate Anchor to a Flexible Regime", in Wise, C. and Roett, R. eds., *Exchange Rate Politics in Latin America.* Washington D.C: Brookings Institute 2000, 70-92.

[11] Dornbusch, R. and Werner, A.: "Mexico: Stabilization, Reform, and No Growth", *Brookings Papers on Economic Activity, 1:1994.*

[12] Easterly, W.: "When is stabilization expansionary? Evidence from high inflation", *Economic Policy*, 1996.

[13] Edwards, S.: "Exchange Rates and the Political Economy of Macroeconomic Discipline", *The American Economic Review*, Vol. 86, Issue 2, 1996.

[14] Fair, R.C., "The Effect of Economic Events on Votes for President", *The Review of Economics and Statistics*, Vol. 60, Issue 2, 1978.

[15] Ghezzi, P., Stein, E. and Streb, J.M.: "Real exchange rate cycles around elections", *CEMA*, 2000

[16] Gould, D.M.: "Does the Nominal Anchor Matter? Endogeneity in the Choice of Stabilization Program", *Institute of International Economics*, 2001.

[17] Heymann, D.: "From Sharp Disinflation tp Hyperinflation, Twice: The Argentine Experience, 1985-1989, in Bruno, M., Fischer, S., Helpman,E., Liviatan, N. and Meridor, L., "Lessons of Economic Stabilization and its Aftermath", *The MIT Press 1991*, 103-141.

[18] Hamann, A.J, .: "Exchange-Rate-Based Stabilization: A Critical Look at the Stylized Facts", *IMF Working Paper*, 1999.

[19] Kessler, T.: "The Mexican Peso Crash: Causes, Consequences, and Comeback", in Carol Wise and Riordan Roett, eds., *Exchange Rate Politics in Latin America.* Washington D.C: Brookings Institute, 43-69.

[20] Kiguel, M.A. and Liviatan, N.: "The Inflation Stabilization Cycles in Argentina and Brazil", in Bruno, M., Fischer, S., Helpman,E., Liviatan, N. and Meridor, L., "Lessons of Economic Stabilization and its Aftermath", *The MIT Press 1991*, 191-239.

[21] Lambertini, L.: "Are Budget Deficits Used Strategically?", *University of California, Los Angeles*, 2000.

[22] Medeiros C.: "A case of a Monetary Stabilization Program: The Dominican Republic's Economic Program, 1990-93", IMF June 1994.

[23] Nordhaus, W. D.: "The Political Business Cycle", *The Review of Economic Studies*, Vol. 42, Issue 2, 1975.

[24] Okun, A. M.: "Efficient Disinflationary Policies", *The American Economic Review*, Vol. 68, Issue 2,
1978.

[25] De Pablo, J.C.: " "Right" Economics, Political Asset: Argentina since 1985", *Novedades Economicas,* 1986

[26] De Pablo, J.C.: "Politica Economica Y Resultados: Argentina, 1957-1994", *Anales de la Asociacion Argentina de Economia Politica, 1994 and Archivos del presente, 1995.*

[27] Paus, E.A.: "Adjustment and Development in Latin America: The failure of Peruvian Heterodoxy, 1985-90", *World Development,* Vol.19, No.5, 1991.

[28] Persson, T. and Svensson, L.E.O.: "Why a Stubborn Conservative would Run a Deficit: Policy with Time-Inconsistent Preferences", *Quarterly Journal of Economics*, Vol. 104, Issue 2, 1989.

[29] Reyes, O.: "Reduccion del Deslizamiento Cambiario. Una Propuesta para disminuir la Inflacion", *Banco Central de Nicaragua, 1999.*

[30] Rodrik, D.: "Premature Liberalization, Incomplete Stabilization: The Ozal Decade in Turkey", in Bruno, M., Fischer, S., Helpman,E., Liviatan, N. and Meridor, L., "Lessons of Economic Stabilization and its Aftermath", *The MIT Press 1991*, 323-353.

[31] Rogoff, K.: "Equilibrium Political Budget Cycles", *The American Economic Review*, Vol. 80, Issue 1, 1990.

[32] Stein, E.H. and Streb, J.M.: "Political Stabilization Cycles in High-Inflation Economies", *Journal of Development Economics*, Vol. 56, 1998.

[33] Stein, E.H. and Streb, J.M.: "Elections and the timing of devaluations", *CEMA*, 2000.

[34] Talvi, E.: "Fiscal Policy and the Business Cycle associated with Exchange Rate-Based Stabilizations: Evidence from Uruguay's 1978 and 1991 Programs", *Inter-American Development Bank,* Working Paper Series 313, 1995.

[35] Tornell, A. and Velasco, A.: "Fixed versus flexible exchange rates: Which provides more fiscal discipline?", *Journal of Monetary Economics*, 45, 2000.

[36] Veiga, F.J.: What causes the failure of inflation stabilization plans?, *Journal of International Money and Finance, 18:1999.*

[37] Veiga, F.J.: "Delays of Inflation Stabilizations", *Economics and Politics,* Vol.12, 2000.