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# The Inflation-Stabilization Cycles in Argentina and Brazil

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The repeated use of price and wage controls is likely to destabilize inflation in the medium run. The similar cyclical pattern of inflation observed in the aftermath of the failures of the Austral plan in Argentina and the Cruzado plan in Brazil is mostly linked to anticipations about the introduction of price controls. The heterodox approach is risky if not accompanied by an adequate adjustment in the budget deficit.

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## WORKING PAPERS

## Macroeconomic Adjustment and Growth

WPS 443

This paper — a product of the Macroeconomic Adjustment and Growth Division, Country Economics Department — is part of a larger effort in PRE to examine stabilization policies. It was funded by the research project "Stopping High Inflation" (RPO 674-24). Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Raquel Luz, room N11-057, extension 34303 (35 pages with figures and tables).

The Austral plan in Argentina and the Cruzado plan in Brazil were the first stabilization programs in recent years that succeeded (albeit temporarily) in drastically reducing inflation in the short run. They also had a lasting effect in the sense of changing the pattern of inflation in both countries.

Before these programs, inflation was higher, more unstable, and more clearly fiscal in Argentina than in Brazil. These differences all but disappeared after the Austral and Cruzado programs, as both countries underwent similar inflation-stabilization cycles.

There is a pattern to those cycles. Inflation falls dramatically in response to a stabilization program based on wage-price controls and remains low for months. Then inflation accelerates as controls are removed and eventually becomes explosive, often reaching hyperinflationary levels. A new round of controls sets the stage for the new cycle.

Kiguel and Liviatan address the question of why neither country succeeded in sustaining a high but *stable* rate of inflation.

In their view, the type of instability that emerged after the failure of the heterodox shocks came about because the countries relied heavily on income policies to stop inflation. The repeated use of these controls, together with firms' and workers' pessimism about future government actions, caused the instability.

One of the main problems in these countries is to establish a minimum degree of credibility in

the government's disinflationary policies and in the sustainability of the fiscal adjustment, something no stabilization program has done in Argentina in the last 30 years.

Presumably this will require implementing basic fiscal reform aimed at convincing the public that adjustment is sustainable. Relying on high public sector prices and a fall in real wages during the freeze is not enough because these measures are not immune to inflationary shocks.

It is also necessary to restore credibility in the governments' commitment to stand behind the nominal anchors, whatever the cost. This is a different kind of credibility issue. The governments must be willing now to maintain the announced exchange rate or monetary target even if pessimistic expectations result in overvalued currency or high real interest rates.

Given their cyclical recent histories, there is no way to avoid the confrontation between pessimistic expectations and the effort to set nominal anchors. This confrontation will result in a monetary crunch or in overvaluation of the currency, depending on whether the monetary supply or the exchange rate is used as an anchor. In either case, growth will suffer in the short or medium run.

Argentina and Brazil should shift toward orthodox stabilization programs and avoid price controls (particularly a wage-price freeze in the private sector) to restore credibility to conventional anchors.

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## The Inflation-Stabilization Cycles in Argentina and Brazil

Miguel A. Kiguel and Nissan Liviatan

### I. Introduction

The Austral plan in Argentina and the Cruzado plan in Brazil were major stabilization attempts with lasting effects on the inflation process in both countries. They were different from previous scabilization efforts at least in two respects: first, they were the first programs that succeeded, albeit temporarily, to reduce inflation drastically in the short run, and second, they had a lasting effect in the sense that they changed the pattern of inflation in both countries.

Inflationary developments in the two countries have become surprisingly similar after the failure of the heterodox shocks (see figure 1). This stands in contrast with the differences in the characteristics of the inflation process in previous years in the two countries. Before these programs inflation was higher, more unstable, and had a clearer fiscal nature in Argentina than in Brazil. These differences have all but disappeared in the aftermath of the Austral and Cruzado programs as both countries underwent similar inflation-stabilization cycles.

There is a systematic pattern in the cycles. Inflation falls dramatically in response to a stabilization program based on price-wage controls, and remains low for a number of months. Inflation then starts to accelerate as controls are being removed, and eventually becomes explosive, many times reaching hyperinflationary levels. This explosion is stopped

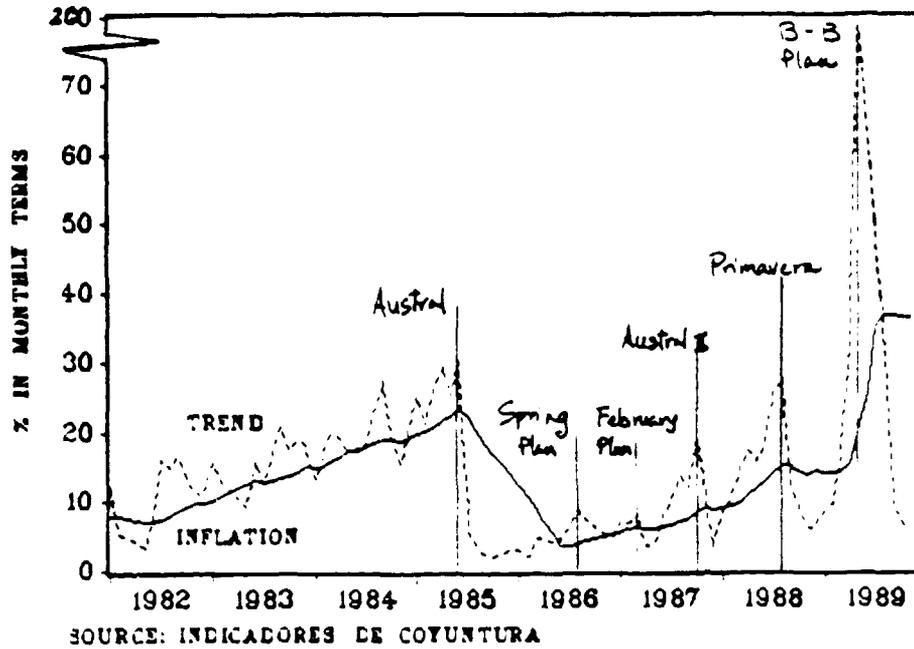
1-a

Figure 1

(a)

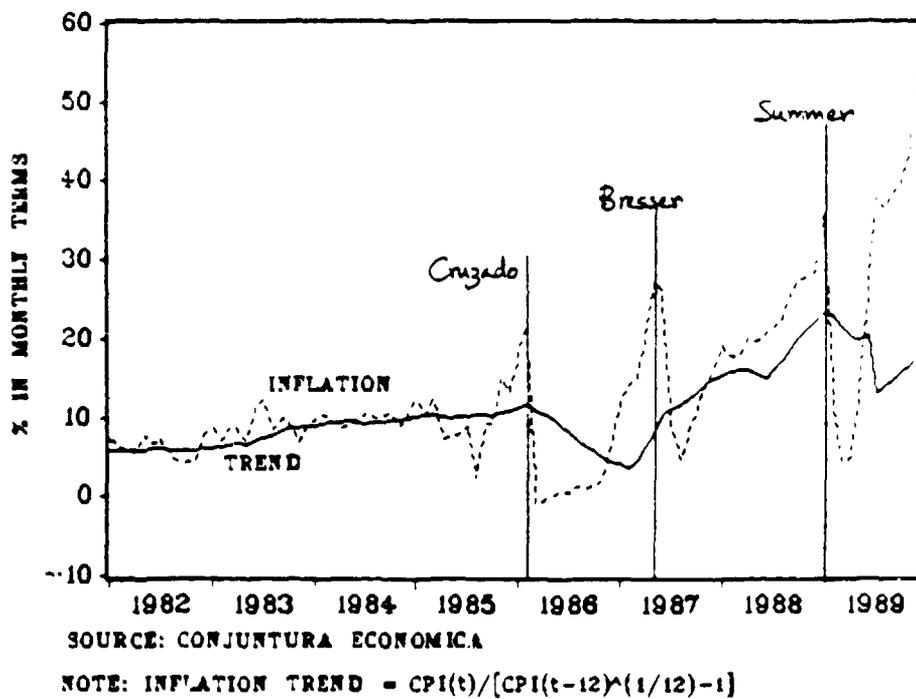
CPI INFLATION AND INFLATION TREND

ARGENTINA



(b)

BRAZIL



nough a new round of controls, which sets the stage for the new cycle. The system has become more unstable over time, inflation reaches new record high levels in each successive cycle while the period of low inflation following the imposition of controls has become shorter over time.

The purpose of this paper is to understand the reasons that led to the large instability in inflation in both countries during this period, and to explain why neither country succeeded in sustaining a high, but stable rate of inflation. This instability was not accompanied by a noticeable increase in the average rate of inflation. In Argentina inflation was in fact lower on average during the first three years after the Austral plan than in the three years before while in Brazil the increase in the average rate of inflation after the Cruzado plan was not dramatic.

In our view, the type of instability that emerged following the failure of the heterodox shocks was a consequence of the large reliance on income controls for stopping inflation in the Austral and Cruzado plans and in the follow-up programs. It was the repeated use of controls accompanied by expectations and anticipations about government actions by firms and workers that introduced the observed instability during this period.

The current cycles are difficult to explain using the fiscal approach. In this course, it could be argued that the fiscal imbalance made low inflation an unreachably high target, and that lack of fiscal discipline was the most important factor for the eventual collapse of the Austral and Cruzado plans. But this does not mean that inflationary developments during this period can be easily linked to the government budget. The fiscal approach does not help us to understand why inflation was so unstable during the cycle regime. In addition, it fails to explain why we did not observe a high but stable

inflation level during the period, or why were the hyperinflation explosions not accompanied by massive budget deficits or extremely high seigniorage levels as was the case in most of the European hyperinflations.

Likewise, it is difficult to link the instability of inflation to the foreign debt overhang in both countries. The debt overhang became apparent in 1982 and was perhaps a major reason for the increase in inflation prior to the cycle period. But the external debt situation did not deteriorate in any significant way during the period of the cycles<sup>1</sup>. Lack of external financing might explain why inflation was high, but not why it was so volatile.

The paper will be organized as follows. In section II we present a brief summary of the process of inflation in both countries prior to the heterodox shocks, and the basic features of the new regime that emerged after their failure. In section III we examine the limitations of the fiscal and "inertial inflation view" to explain the increasing instability of inflation during this period. We provide an alternative explanation for these cycles which places more emphasis on expectations and the repetitive use of controls as an anti-inflation device. We argue in this section that both countries are experiencing a new type of inertia, inertia in processes. A more in depth analysis of the cycles is presented in section IV, including a discussion of the reasons that led to the freeze, those that forced the authorities to flexibilize controls, and the eventual explosion of inflation. We conclude in section V with some thoughts about the sustainability of the regime, and the implications of these developments for the design of stabilization plans in both countries.

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<sup>1</sup> In fact Argentina and Brazil have recently suspended service on their external debt.

## II. Inflation Before and After the Heterodox Shocks

### . Inflation Before

The inflation process in these two high chronic inflation countries was very different prior to the heterodox shocks (HSs) of the eighties. As can be noticed from figures 2.a and 2.b, which show the evolution of annual inflation and seigniorage<sup>2</sup> for the two countries since the early 1970s, inflation was more unstable in Argentina than in Brazil during this period, while its fiscal nature was more apparent in the former than in the latter.

### Argentina

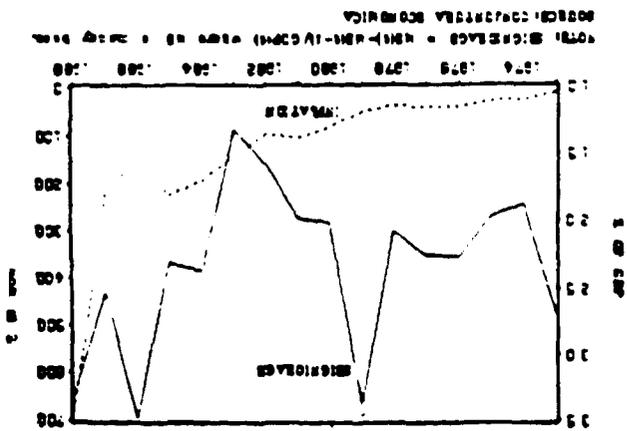
Changes in inflation in Argentina were closely related to changes in the budget deficit and seigniorage in the same direction. As can be noticed from figure 2.a, the 1973-75 and 1983-85 explosions in inflation occurred in periods of extremely high budget deficits in which seigniorage had reached unsustainable levels (exceeding 7 percent of GDP). Although the fiscal view explains a significant part of the behavior of inflation, non-fiscal factors also had a bearing on the inflation process. The long tradition of failed stabilization attempts, for example, implied that each new anti-inflation program had to confront severe credibility problems that added to the downward rigidities of the inflation process. In practice this meant that

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<sup>2</sup> Seigniorage is measured as the change in central bank non-interest bearing liabilities (typically the monetary base) as a percentage of GDP. Given the type of remuneration on bank reserves in Argentina, M1 is the basis of seigniorage and inflation tax. The level of seigniorage is an indicator of the amount of resources the government extracts from the private sector thanks to its monopoly in printing money. The figures of budget deficit and inflation, available from the authors upon request, present a similar pattern.

FIGURE 2 SEIGNIORAGE AND CPI INFLATION

BRAZIL



ARGENTINA

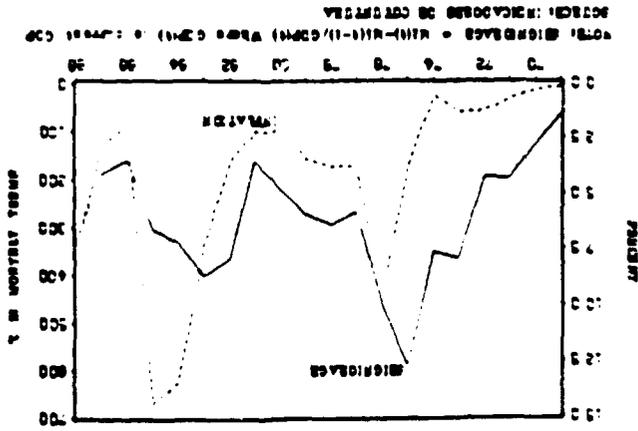
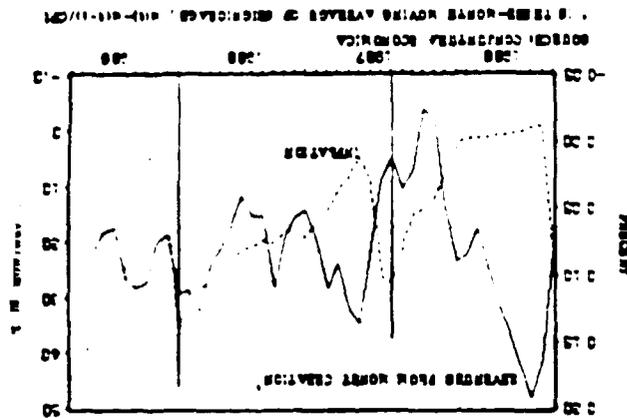


FIGURE 3 REVENUES FROM MONEY CREATION AND INFLATION

BRAZIL



ARGENTINA

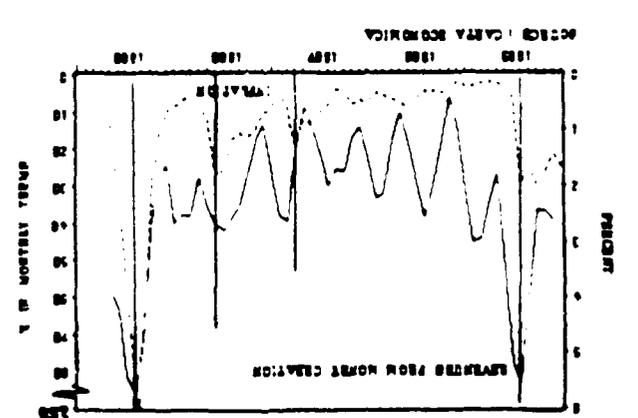
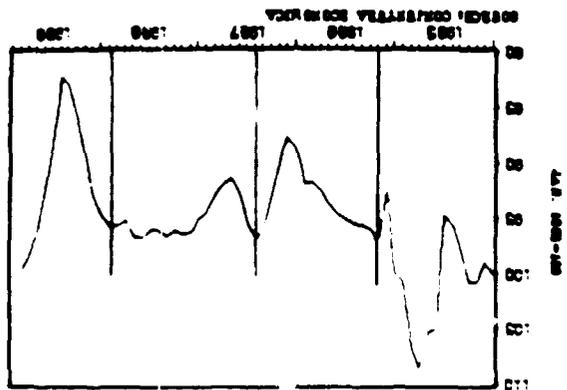
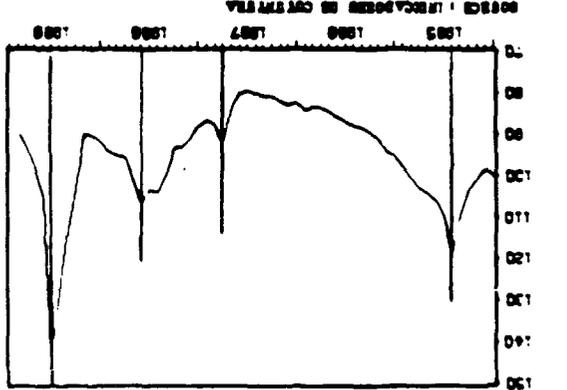


FIGURE 4 RATIO OF NON-AGRICULTURE WPI TO CPI (JAN 1985=100)

BRAZIL



ARGENTINA



stabilization attempts based on orthodox programs did not succeed in achieving rapid reductions in inflation. The slow pace of the reduction in inflation during the Martinez de Hoz period can be explained by lack of credibility about the ability of the government to enlarge and sustain the fiscal adjustment, but perhaps as important was the lack of credibility on the maintenance of the nominal anchors. Doubts about whether the government would stick or not to the preannounced exchange rate rule (the tablita) when faced with an overvalued currency certainly added to the downward rigidity of inflation that eventually led to the failure of the attempt. Indeed, there is an important difference between credibility on the commitment to the fiscal adjustment and credibility on the adherence to the nominal anchor.<sup>3</sup>

### Brazil

The inflation process is more difficult to explain in Brazil since jumps to higher inflation plateaux over the years were not associated with conspicuous increases in seigniorage, which by and large has remained fairly stable over the years (ranging between 1.5 and 3.5 percent of GDP). Instead, they resulted from the adoption of a set of policies that induced an asymmetric behavior of inflation, inflation moved up in response to adverse (external) shocks, but did not come down as a result of favorable developments. The use of accommodating monetary and exchange rate policies and the widespread use of indexation in the labor and financial markets were instrumental factors for inflation to stabilize at higher plateaux, but as important was the perception that the government preferred to validate inflation rather than fight against it and sacrifice growth. In practice

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<sup>3</sup> In the last section of this paper we present a more thorough discussion of this issue.

this view can explain why inflation roughly doubled and stabilized at new higher plateaux after the large devaluations in response to the two oil crises (in 1974 and 1979), and again in the 1980s in response to the debt crisis (in 1983) rather than generating a temporary inflationary outburst as in other countries.

It is useful in this respect to analyze the macroeconomic developments after the 1982-83 debt crisis. The adjustment to the new situation was based on a policy of a sharp fiscal contraction, a stepping up of the rate of devaluation, and a reduction in the real wage. In a non-indexed economy this last objective can be achieved by a one time devaluation. However, with full backward wage indexation and downward rigidity in the real base wage, the real wage can be brought down only by an increase in the inflation plateau. We thus observed the somewhat paradoxical situation of joint reduction in the fiscal deficit and an increase in the inflation plateau in 1983-85 (these developments are described more fully in Kiguel and Liviatan (1988)).

ii. The change in Regime after the HSs

The failure of the HSs marked the beginning of a new era in the inflation processes in the two countries. This can be readily noticed from figures 1.a and 1.b which show monthly inflation rates and the overall trend in inflation from 1982 onwards. The striking element in these figures is the increased inflation instability and the similar pattern of inflation stabilization cycles that emerged after the failure of the Austral and Cruzado plans.<sup>4</sup> Two countries where the causes and characteristics of

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<sup>4</sup> The problems with the design of the Austral and Cruzado plans and the reason for their failure are discussed in Bruno et al. (1988), Heymann (1987), and (1990), Kiguel (1989), Machinea (1989), and Cardoso and Dornbusch (1987) among others.

inflation were different are now undergoing a similar inflation pattern.

The common element in the Austral and Cruzado plans was the use of income policies as a stabilization instrument. In both countries, the motivation for using controls was the perception that non-fundamental forces (expectations, indexation, etc.) were important in explaining the short run dynamics of inflation. The Austral plan was better designed, paid more attention to the fiscal imbalance and followed more prudent monetary and wage policies at the outset, but that was not enough to prevent the ensuing similar outcome. The use of controls in both countries became more apparent in the follow-up programs. The main features of the various stabilization attempts in the two countries are summarized in table 1.<sup>5</sup> It can be noticed from there that there was as systematic use of controls, while little attention was devoted to the correction in the fundamentals.

The pattern of the cycles has been similar in both countries. Typically, we observe very drastic accelerations of inflation, in some instances possibly positioning the economy on a unstable hyperinflationary path, which were stopped abruptly, in all cases, through a program based on price and wage controls. Price stability usually lasted for a short span, and was followed by a rekindling of inflation which very quickly exploded into a new inflationary outburst, generally stronger than the previous one.

It would be inaccurate to say that there was no attempt to use nominal anchors in the follow-up programs. Tighter monetary policy was used in Argentina in the spring plans of 1986 and 1988. In Brazil, tight money was one of the main policy means in the summer plan of 1989. However, these policies were not pursued persistently because of their recessionary effects

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<sup>5</sup> See also Heymann (1990) and Cardoso (1990).

Table 1  
Heterodox Stabilizations in Argentina

	Austral I June 1985	Spring Plan I August 1986	February Plan February 1987	Austral II October 1987	Plan Primavera II August 1988	88 Plan August 1989
Reduction (fr ) in Inflation (to)	30.5% in June 3.1% in August	8.8% in August 6.1% in October	6.5% in February 3.4% in April	19.5% in October 3.4% in December	27.6% in August 9.0% in October	196.6% in July 5.4% in November
Acceleration in Inflation Prior to Prog	29.5% in April 30.5% in June	4.5% in June 8.8% in August	4.7% in Dec '86 6.5% in Feb '87	13.7% in August 19.5% in October	18% in June 27.6% in August	78.5% in May 196.6% in August
Duration of low Inflation (below 5%)	11 months	2 months	1 month	1 month	-----	-----
Type of Income Policy	Freeze	CAP on increases	Freeze	Freeze	CAP on increases	Price Guidelines Freeze Exchange Rate Public Sector Prices
Wage Policy	Freeze	CAP on increases	Freeze	Freeze	Guideline	Guideline
Monetary Policy Interest Rates (from - to) Money Growth	31% to 5% Accommodating	8% to 4% Tight	No change Tight	from 15% to 9% Tight, later accommodating	from 22% to 9% Tight	150% to 7.5% (monthly) Tight
Fiscal Policy	Large freeze, adjustment	No adjustment	No adjustment	Announced adjustment not affected	minor and temporary reduction in the deficit	Tax Reform - Announce- ment Privatization

Heterodox Stabilizations in Brazil

	Cruzado Plan February '86	Brooker Plan June '87	Graduist Plan April '88	Summer Plan January '89
Reduction in (from) Inflation (to)	22% in February -0.5% in April	25.8% in June 4.5% in August	No change	36.5% in January 4.3% in March
Acceleration Prior to Program	13.2% in December 22.4% in Feb '86	20.1% in April 23.8 in June	17.8 in February 20.3% in April	27.9% in Dec '88
Type of Income Policy	Freeze	Freeze	CAP on increases	Freeze
Duration of Low Inflation	9 months	1 month	-----	1 month
Monetary Policy Interest Rate	13% in February 0.7% in March	24% in May 8.9% in July	20% in April 18.6% in May	18.9% in February 11.5% in April
Money Growth	Expansionary	Accommodating	Accommodating	Accommodating
Fiscal Policy	Expansionary	Unchanged	Unchanged	Unchanged

and because they were not supported by appropriate adjustments on the fiscal side.

It is easy to point out the inconsistency between price freezes and continuing fiscal deficits for the failure of the various stabilization attempts. It is more difficult to explain why a relatively high, but stable, level of inflation could not be maintained in the post Austral-Cruzado period. For example, following the flexibilization of the exchange rate in Argentina in April 1986 and prices in May the objective for inflation was not a freeze but rather a stable crawl. This was also the case in the spring plan of August 1988. Similarly, Brazil's policy in 1988 was to stabilize inflation even at extremely high rates. Thus towards the end of 1988 a social pact was invoked in order to stabilize inflation at 26.5% per month (!). In spite of the readiness to accommodate a high, but stable inflationary path the realities of the situation did not make this possible.

There was an important difference in the manner in which the two countries entered the unstable regime. In the case of Argentina, the Austral I was already a reaction to a possible hyperinflationary trajectory which may have had its origins in the extremely high levels of seigniorage in 1982-84. On the whole, the repeated use of controls in the post-Austral period aggravated an existing instability problem. By contrast, the inflationary process in Brazil prior to the Cruzado plan (since 1984) was quite stable (excluding the few months just preceding the plan where the freeze was possibly anticipated). Therefore in the case of Brazil the connection between over reliance on income policies and inflationary instability comes out more clearly.

#### ii. Process Inertia

The recurrent pattern of the cycles indicates that the two countries experienced a new type of inertia: inertia in the inflation process. Traditionally, the concept of inflation inertia was used to denote a situation in which past inflation rates set the norm for current inflation, past developments tend to repeat themselves. This notion is not useful to explain a process in which inflation continuously accelerates. Nevertheless, a reinterpretation of this concept can still be appropriate. The current cycles have established a pattern, stabilization is short lived, followed by an acceleration in inflation that comes to an abrupt end through an income policies based stabilization program. This "inertia" in the process observed during the cycles regime is a new feature, one that emerged due to the failure of the HSs.

This systematic pattern is reflected in the use of anchors during this regime and expectations. They fluctuated from multiple and very strong anchors during the period of the freeze, to lax and almost non-existing ones after flexibilization. Indeed, the exchange rate, wages, and public and private sector prices all served as nominal anchors during the period of the freeze. However, the economies were left without any effective nominal anchor once flexibilization started. Prices and wages were freely determined while the exchange rate and prices of public sector enterprises were in practice indexed to past inflation. On the whole, the freeze, even if it lasted for a relatively short period, proved to be the nominal anchor during this regime providing some stability to the system. The usefulness of this anchor decreased over time as the duration of controls and periods of low inflation became shorter, in effect resulting in a protracted increase in inflation.

As the new regime became better understood by private agents, it was incorporated in the way in which they form their expectations. This added to the instability observed in the period. Any new shock that resulted in an increase in inflation very rapidly gave rise to a new acceleration in inflation that eventually was expected to end through a new round of controls.

### III. Alternative Explanations for the Inflation-Stabilization Cycles

The pattern of inflation in this period raises a number of interesting questions. Why did both countries experience a similar cyclical inflation pattern despite a history of very different inflationary policies? Why could not inflation in both countries stabilize at a constant (possibly high) level, compatible with the fundamentals? Were the explosive parts of the cycles the result of repressed inflation during the period of controls? Were these economies in an overall hyperinflationary path or was it once again chronic high inflation? Were these causes the same in both countries? The last question is especially interesting because the underlying causes for the chronic inflation in the two countries were, as we already discussed, very different.

Traditional approaches can at best provide a partial answer to these questions. Neither the fiscal approach, which was instrumental to understand inflationary developments in Argentina prior to the Austral plan, nor the "inertia"/indexation view usually employed to understand Brazilian inflation provide a satisfactory and comprehensive explanation of the inflationary processes after the HSs.

### i. The Fiscal View

There are basically two alternative ways to rationalize the drastic and rapid acceleration in each cycle using the fiscal view. First, it could be argued that the underlying fiscal situation was characterized by massive budget deficits that would eventually result in a full blown, "traditional" hyperinflation. The role of controls was to repress this outcome, but they could only be applied temporarily given the feeble fiscal balance. The removal of controls paved the way for the inevitable explosion of inflation. An alternative way to use the fiscal approach is to argue that there was a stable level of inflation consistent with the needs to finance the deficit through money creation. Controls repressed inflation temporarily below this "fiscal" equilibrium, but then inflation overshot during the flexibilization period to compensate for the lost revenues during the periods of controls. This framework implicitly assumes that the acceleration in inflation was a temporary phenomenon which would be reversed at a later stage as inflation stabilizes at a level consistent with the needs to finance the deficit through money creation. Neither of these possibilities, however, appears to "fit" the stylized facts of the period.

We consider first the plausibility of the hyperinflation view. In our opinion, for most of the period the level of seigniorage did not warrant a hyperinflation. Two features have characterized traditional hyperinflations; extremely large budget deficits and seigniorage levels, and a relentless acceleration of the rate of inflation. In Brazil, seigniorage never exceeded 3.5 percent of GDP while the operational deficit was on average lower than in the pre-Cruzado period. Likewise, in Argentina, the deficit was much lower than during the pre-Austral period while seigniorage remained below pre-

Austral plan levels in 1986 and 1987; although there was an increase in seigniorage in 1988, this took place toward the end of the year and by then two large accelerations in inflation had already taken place. Neither case resembled the fiscal situation of Bolivia where the hyperinflation developed due to deficits in excess of 15 percent of GDP and seigniorage levels continuously exceeding 12 percent of GDP.

This view is consistent with the overall trend in inflation in the two countries. While there was a continuous increase in average inflation in the post HS period following the initial fall inflation, this was not accompanied by a clear increase in average seigniorage. This is confirmed by the evidence presented in figures 3.a and 3.b which show monthly real revenues from money creation (RMC)<sup>6</sup>. They indicate that in Brazil, and to a lesser extent in Argentina, there was no clear upward trend in RMC over the period, except for the recent hyperinflation in Argentina. Further evidence on this respect can be obtained from table 2 which shows that the coefficient of the inflation trend (row 1) in Argentina and Brazil in the post HS period was only about one third of that of Bolivia. It is only if we include the 1989 acceleration in Argentina that we approach the Bolivian coefficient.

The autoregression coefficients in the same tables (rows 2 and 3) may shed additional light on the nature of the inflationary instability. We note that in Bolivia, which represents a classical hyperinflation, the coefficients indicate a very weak inertia, or a low persistence of

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<sup>6</sup> RMC is defined here as the three month moving average of  $\Delta H/CPI$ , where H denotes the non-interest bearing liabilities of the central bank. For Argentina the relevant monetary aggregate is M1 while for Brazil it is the monetary base. This concept is basically similar to seigniorage just discussed, except that the latter is defined as a percent of GDP.

Table 2

## Auto-Regressive of Inflation in Argentina, Brazil, and Bolivia

Period	Equation	Independent Variables			Adjusted R-Square	D.W.
		Constant	CPINF(t-1)	Trend		
<b>1. Argentina: Before and After the Austral</b>						
1981.01-1985.05	(1)	-0.7404 (- .59)		0.3770 (12.56)	0.7508 (167.66)	1.21
	(2)	-0.3353 (- .29)	0.3953 (3.04)	0.2292 (4.09)	0.7854 (96.15)	1.81
	(3)	2.3429 (2.10)	0.8568 (11.59)		0.7193 (134.28)	2.10
1986.08-1988.08	(1)	-44.8594 (-4.56)		0.6103 (5.67)	0.5453 (32.18)	0.83
	(2)	-21.3554 (-1.97)	0.6291 (3.34)	0.2843 (2.13)	0.6769 (28.23)	1.82
	(3)	1.6280 (1.06)	0.9231 (8.74)		0.6309 (45.45)	2.04
1988.06-1989.08	(1)	-141.554 (-3.24)		1.6797 (3.75)	0.2558 (14.06)	0.97
	(2)	-70.3082 (-1.64)	0.5137 (3.61)	0.8380 (1.85)	0.4382 (15.82)	1.75
	(3)	8.4197 (1.52)	0.6245 (4.86)		0.3732 (23.63)	1.70
<b>2. BRAZIL: Before and After the Cruzado</b>						
1980.02-1985.12	(1)	4.5829 (9.84)		0.0832 (7.51)	0.438 (59.33)	1.24
	(2)	2.8617 (4.14)	0.3755 (3.29)	0.0532 (3.79)	0.4988 (35.83)	2.04
	(3)	2.7086 (3.59)	0.6568 (8.93)		0.4019 (48.05)	2.27
1987.01-1989.12	(1)	9.7948 (3.03)		0.6622 (4.34)	0.3379 (18.86)	0.55
	(2)	2.0479 (.77)	0.7681 (5.82)	0.2187 (1.65)	0.6635 (35.51)	1.31
	(3)	3.5029 (1.36)	0.8928 (8.06)		0.6465 (65.02)	1.35
<b>3. BOLIVIA: Hyper-Inflation</b>						
1983.01-1985.08	(1)	-81.7774 (-2.71)		2.1944 (3.88)	0.3121 (15.06)	1.84
	(2)	-75.3915 (-2.22)	0.0791 (.43)	2.0252 (2.91)	0.2928 (7.42)	1.96
	(3)	21.2929 (2.67)	0.3842 (2.26)		0.1171 (5.11)	2.01

Figures in parentheses under the estimated coefficients are t-statistics.  
Figures in parentheses under the adjusted R-square are F-statistics.

Notes: Equation 1  $CPINF(t) = C + TREND$   
Equation 2  $CPINF(t) = C + CPINF(t-1) + TREND$   
Equation 3  $CPINF(t) = C + CPINF(t-1)$

Notations: CPINF = CPI Inflation  
CPINF<sub>T</sub> = Trend of CPI Inflation  $(CPI(t)/CPI(t-12)) - 1$

inflationary shocks (which include also stabilization attempts). By contrast, persistence remained at high levels in Argentina and Brazil in the post HS period, suggesting a different process -presumably not a fiscal hyperinflation.

There are also difficulties in using the alternative fiscal view, i.e. that the underlying fiscal imbalance required a high but stable level of inflation towards which the cycles tend to converge. A pattern of inflation consistent with this approach would start with an acceleration coinciding with the removal of controls, after which inflation would tend to stabilize at a level consistent with the fundamentals. An initial overshooting of inflation during the flexibilization stage is consistent with the basic arguments of the approach, but this increase should be reversed at a later stage as inflation stabilizes so that the inflation tax revenue stays in line with the need to finance the deficit through money creation.

This view that inflation was converging to a stable level is not supported by the available evidence. Table 3 shows the results of the autoregressive equations for the individual cycles. In both countries the large size of the coefficient of the trend in equation (1) shows that inflation was not converging to a stable level. They indicate that within each cycle the dynamics of inflation were akin to inflation explosions characteristic of hyperinflations, as opposed to the "inertia" observed in these two countries prior to the HSs. In fact, the coefficients of  $cpinf(-1)$  and the trend in equation (2) for the second and third cycle in Argentina bear striking resemblance to those of the Bolivian hyperinflation. The only non-explosive cycle corresponds to the period between the Bresser and Summer plans in Brazil, when as a result of a gradual stabilization attempt between

Table 3

## Individual Inflation Cycles in Argentina and Brazil

Period	Equation	Independent Variables			Adjusted R-Square	D.W.
		Constant	CPINF(t-1)	TREND		
<b>1. Argentina</b>						
1985.09-1986.08	(1)	0.6656 (.96)		0.5091 (5.43)	0.7216 (29.50)	1.36
	(2)	0.1348 (.16)	0.3841 (1.06)	0.3841 (2.55)	0.7249 (15.49)	1.78
1987.04-1987.10	(1)	0.1893 (.12)		2.4745 (6.85)	0.8844 (46.91)	3.03
	(2)	0.7203 (.3484)	-0.1678 (-.49)	2.6968 (4.47)	0.8636 (19.99)	2.94
1987.12-1988.08	(1)	2.2123 (1.44)		2.7098 (9.90)	0.9238 (97.96)	1.80
	(2)	2.7599 (1.48)	-0.1612 (-.59)	3.0463 (4.77)	0.9160 (44.60)	1.63
1988.11-1989.07	(1)	-51.7816 (-2.0)		20.8247 (4.52)	0.7087 (20.46)	0.66
	(2)	-12.5410 (-1.38)	1.4550 (8.42)	3.8108 (1.55)	0.9735 (147.91)	3.11
<b>2. Brazil</b>						
1986.04-1987.05	(1)	-7.1441 (-3.25)		1.9385 (7.52)	0.8103 (58.51)	0.42
	(2)	-0.5881 (-.42)	1.0998 (6.77)	0.2784 (1.02)	0.96 (156.85)	1.38
1986.10-1987.05	(1)	-3.3267 (-2.25)		3.5226 (12.01)	0.9534 (144.18)	1.69
	(2)	-2.3238 (-.94)	0.2737 (.52)	2.7393 (1.79)	0.947 (63.52)	1.59
1987.08-1989.01	(1)	6.6856 (6.07)		1.4063 (13.83)	0.9179 (191.15)	0.91
	(2)	4.705 (2.14)	0.3065 (1.04)	1.017 (2.62)	0.9183 (98.59)	1.16
1989.03-1989.12	(1)	0.795 (.20)		5.2552 (8.20)	0.8805 (67.30)	0.99
	(2)	0.7958 (.20)	0.331 (1.07)	3.7191 (2.37)	0.8827 (34.86)	1.03

Notes: Equation (1):  $CPINF(t) = C + TREND$   
Equation (2):  $CPINF(t) = C + CPINF(t-1) + TREND$

Figures in the parentheses under the estimated coefficients are t-statistics.  
Figures in the parentheses under the adjusted R-square are F-statistics.

Notations: CPINF = CPI Inflation

March and August 1988, there was a pause in the increase in inflation.

It could be argued that while the fiscal view can not explain the pattern of inflation during the cycles, it can still be useful to understand the overall increasing trend in inflation in the post-HS period. The data presented in table 4 suggests that while this argument could still be made for Argentina, where the reduction in average inflation was accompanied by a reduction in average fiscal deficits, the increase in average inflation in Brazil during these years has been accompanied by relatively stable (and according to some estimates falling) budget deficits and seigniorage levels.

#### ii. The Inertia-Indexation Approach

The recent events are also difficult to explain using the inertia-backward indexation view, formalized by Bacha and Lopez (1983) and Modiano (1988) among others. Broadly speaking, this approach argues that due to wage indexation there is significant short term inertia (or persistence) in inflation, and that increases in inflation are usually associated with attempts to erode the average real wage. Two features observed during the cycles cast doubts on the validity of this approach. First, inflation was accelerating during the upward part of the cycle rather than staying stable at past inflation levels. Second, in contrast to the predictions of this approach, in some of the cycles, especially in Brazil, the accelerations in inflation coincided with increases in real wages.

The relatively ineffectiveness of this approach to explain inflation does not mean that inertial inflation disappeared in the post-HS period. As the regressions discussed earlier indicated, there continued to be persistence in the inflation process. The degree of price synchronization observed in Bolivia, is not apparent in either economy.

### iii. An Alternative View: Anticipations of Recurrent Controls

In our view the main explanation for the regime of explosive inflationary cycles that emerged in both countries after the failure of the Austral and Cruzado plans lies in the nature of the policies adopted to fight inflation during this period. In particular, it was the repeated use of price controls in stabilization programs, which were not accompanied by appropriate supporting policies, which generated the new regime. The very use of price controls undermined the credibility in the government's resolve in implementing and sustaining a fiscal adjustment and in using more traditional nominal anchors, such as the money supply, nominal bank credit or the exchange rate. In addition, anticipations by private agents of the use of controls created a perverse mechanism that exacerbated the instability of inflation.

The various price freezes during the cycles attempted to stop inflation by synchronizing wages, prices and the exchange rate, thus putting an end to the spiral. However, time and again were these attempts frustrated by inflationary acceleration which got out of hand. In the post-HS period the lack of credibility in stabilization seems to have generated expectations that accelerations are most likely to be stopped by reimposition of controls. The realization that this would be the stabilization strategy induced a corresponding behavior pattern on the part of the private sector.

Suppose that firms know that once inflation exceeds a certain level, price controls (in the form of a freeze) are likely to be introduced, but there is uncertainty regarding the rate of inflation that would trigger their

imposition. Firms will attempt to enter the freeze in a favorable position.<sup>7</sup> They would need to balance the foregone profits they could incur by setting their prices "too high" against the potential losses resulting from setting their prices "too low." Once inflation exceeds a critical level the probability that the government attempts to stop inflation through controls increases. Firms will then increase prices further in an attempt to anticipate the government action. If monetary and exchange rate policies are basically accommodating, inflation will thus continue to increase and firms will raise prices further resulting in an acceleration of inflation of the type observed in Argentina and Brazil prior to the freeze.

#### IV. Analysis of the Cycles

##### i. Phases of the Cycles

There are typically three phases in the cycles. The first phase corresponds to the imposition of the freeze which results in a rapid reduction in inflation. In the second phase, when controls are removed, inflation usually accelerates rapidly in this period and reaches very quickly the level of inflation prevailing prior to the last stabilization effort. After the initial acceleration there is usually a short period in which there is a pause in the rate of acceleration of inflation, only to be followed by a drastic explosion in the third and last phase.

The best example of these phases is the period that goes from the

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<sup>7</sup> Since the freeze involves a maximum price each firm has an incentive to set its price high to gain a safety margin and then provide a discount if necessary. This margin can allow for increases wages that might take place during the price freeze.

Bresser plan to the Summer plan in Brazil (see figure 1.b). Inflation accelerated very rapidly during the flexibilization stage between September and December 1987, but there was then a sharp drop in the rate of increase of inflation once it reached the 20 percent per month level. Inflation then crept up slowly for almost 8 months, but exploded towards the end of the year. A similar pattern is observed in Argentina between the Austral II and the Plan Primavera.

### The Fall in Inflation

The price-wage-exchange rate freeze was usually implemented once inflation was on an explosive hyperinflationary path (as argued by Canavese and Di Tella (1988)). Prior to the Australs I and II, and the Plan Primavera in Argentina, and the Cruzado, Bresser and Summer plans in Brazil hyperinflation was all but unavoidable in the absence of a heterodox shock. In most cycles, the rapid acceleration of inflation immediately preceding the introduction of controls was largely induced by anticipations about the use of controls.<sup>8</sup>

Since controls had been anticipated it is not surprising that inflation fell so quickly in all instances following the introduction of controls, even in cases in which there was no adjustment in the fundamentals.<sup>9</sup> Firms were willing to abide by the freeze since their prices had already been increased in anticipation of the freeze. Figures 4.a and 4.b tend to support the view

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<sup>8</sup> The one exception is the BB plan in Argentina which addressed a full blown hyperinflation.

<sup>9</sup> In almost all cases controls did not result in widespread shortages. The Cruzado plan was the only exception in this respect where after a short span in which the above mentioned pattern occurred, a generalized situation of excess demand led to the emergence of shortages and black markets.

that the freezes were indeed anticipated by the private sector. Controls were primarily applied mainly in the industrial sector, usually at the wholesale level. We can readily observe that in both countries the ratio of industrial prices to consumer prices substantially increased prior to the freezes.

Prior to the freeze there had been a deterioration on the fiscal side due to a loss in tax revenues resulting from the Olivera-Tanzi effect (see figure 5.a), and a drastic deterioration in the prices of public sector enterprises (see figure 6.a for Argentina). This fiscal deterioration was partly offset by the reduction in real interest rates because nominal rates did not catch up with the rapid increase in inflation. On the other hand, measures had been taken to improve external position prior to the program. Holdings of international reserves and the trade balance were usually at a relatively comfortable level, thus adding credibility to the ability of the central bank to fix the exchange rate in the short run.

The short run sustainability of the stabilization effort was made possible by an initial, transitory, improvement in the fiscal accounts. In the recent heterodox programs, at least in Argentina, the prices of public sector enterprises were increased significantly at the beginning of each program, while tax revenues rose from the Olivera-Tanzi effect working in reverse. In addition, the acceleration of inflation preceding the stabilization package had eroded the real value of internal debt.<sup>10</sup> The only problems on the fiscal side were caused by the higher real interest rates

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<sup>10</sup> In most instances, however, this gain was transitory and domestic debt increased rapidly during the freeze. As opposed to other hyperinflationary outbursts, domestic debt was not fully eroded in the process.

18-a  
FIGURE 5

REAL TAXES AND CPI INFLATION

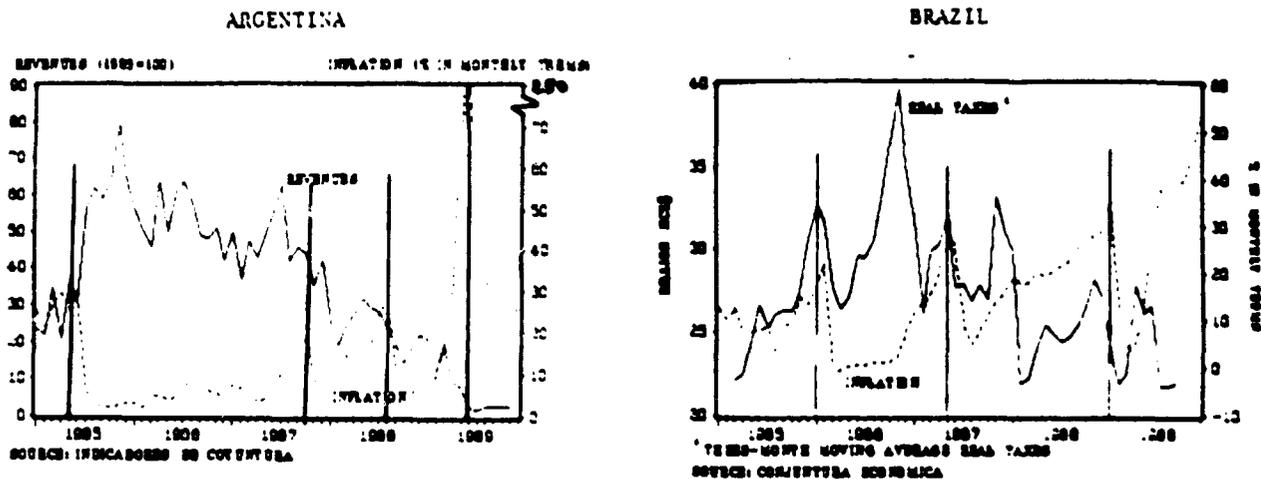


FIGURE 6

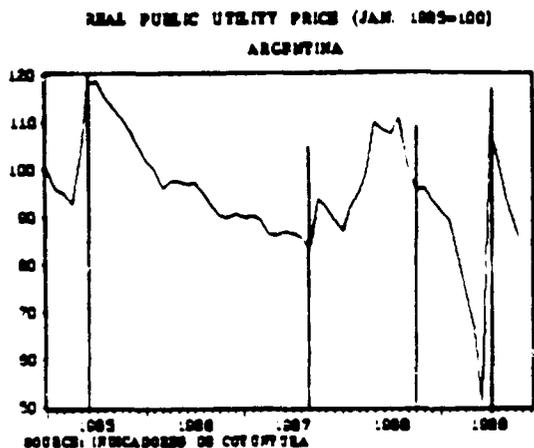
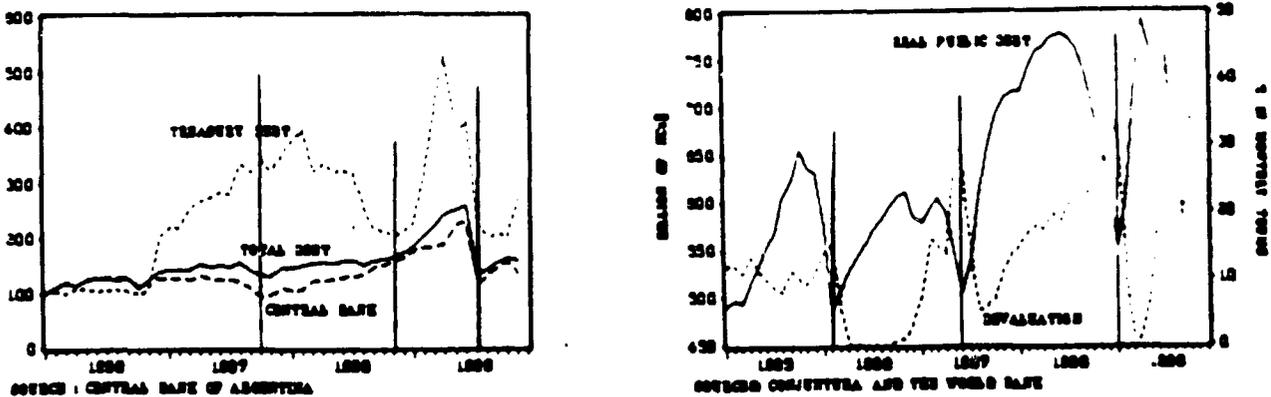


FIGURE 7

REAL PUBLIC DEBT AND OFFICIAL DEVALUATION



usually observed at the beginning of each stabilization effort. However, these pressures were not necessarily inflationary in the short run because in most cases they were financed by issuing domestic interest bearing debt, even if the strategy was unsustainable in the medium term.

Why were the freezes introduced at higher rates of inflation in each subsequent cycle? This is probably related to an increasing reluctance over time on the part of the authorities to use controls as a stabilization instrument. Thus, the trigger point for the introduction of controls was higher after each failure. But since firms thought that inflation would be eventually stopped through a new round of controls, rather than by orthodox measures, they continued to engage in anticipatory pricing. In the end the authorities gave up and controls were imposed, confirming the firms' forecasts, but only after experiencing a higher rate of inflation.

#### The rise in Inflation during the flexibilization stage

While it was easy to bring inflation down during the freeze, it was difficult to maintain it at this low level for a prolonged period. A common reason for flexibilization were misalignments in relative prices and wages in most cases combined with a deterioration in the fiscal and external accounts, high real interest rates, a build-up of domestic debt, and a large premium for the parallel exchange rate. The flexibilization stage generally marked the beginning of the inflationary outbursts.

The deterioration of the fiscal accounts over time was primarily due to the transitory nature of the initial fiscal adjustment. On the revenue side, there was a slow but steady erosion in real prices of public sector enterprises (one of the key anchors of the programs) because inflation was

not fully eliminated.<sup>11</sup> On the expenditure side, the high real interest rates were the main problem, as they were rapidly leading to a build up of domestic debt. This issue was particularly acute in the Plan Primavera in Argentina and the Summer plan in Brazil.

The increase in real interest rates and the related build up of domestic debt during the period of the freeze were critical factors in some of the cycles for the abandonment of the freeze. As can be seen from figures 7. and 8. a and b, there was a noticeable cyclical pattern, high real interest rates and debt accumulation are characteristic of the early stage, with the pattern reversed at the end of the cycle. These cycles were marked in Brazil while they were milder in Argentina. It can be seen that the accelerations of inflation in Brazil prior to the Bresser and Summer plans generated negative real interest rates thus eroding the build up of domestic debt during the previous part of the cycle. However, this was a temporary phenomenon as the stock of debt increased rapidly during the first stage of the HS programs, quickly exceeding previous stocks, and real interest rates turned strongly positive. A similar story is observed in the Argentine data. The debt cycle is more apparent for central bank debt, with a small build up after the Austral II and a large one during the first phase of the Plan Primavera. One remarkable feature of these episodes is that neither in

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<sup>11</sup> It might be puzzling that even during the period of the freeze inflation was not fully eliminated. There are two reasons for this. First, due to the way the in which price indices are computed, current inflation rates usually reflect past inflation with one or two months lags. Second, and probably more important, in most cases controls were not applied as drastically as to avoid completely any increases in prices; exceptions would be made if justified by increases in costs of imported inputs or if prices were markedly out of line at the time of the freeze. In addition, prices of agricultural products subject to seasonal fluctuations were by and large not subject to controls.

20-a  
FIGURE 8

REAL INTEREST RATES

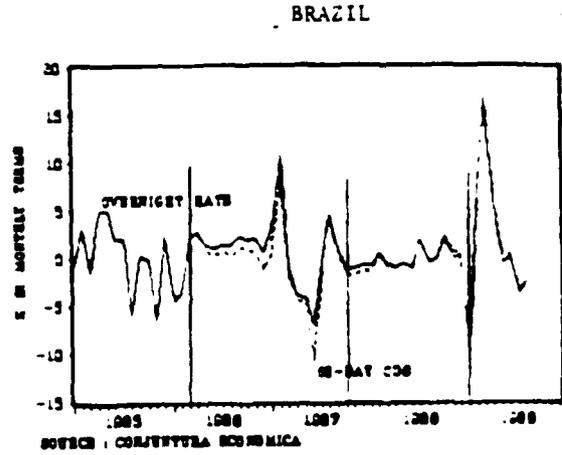
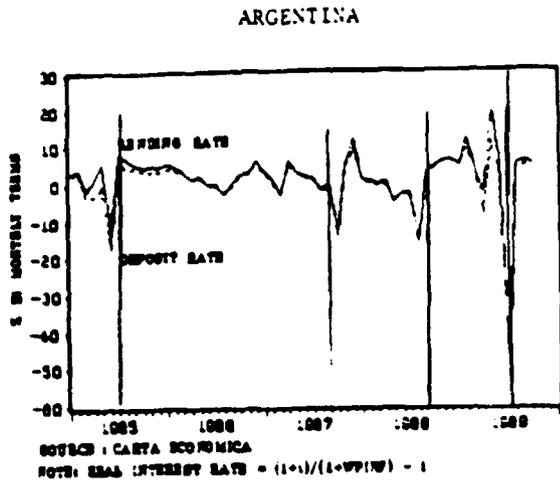


FIGURE 9  
COMPOSITION OF MONEY: M1, M3, AND M4

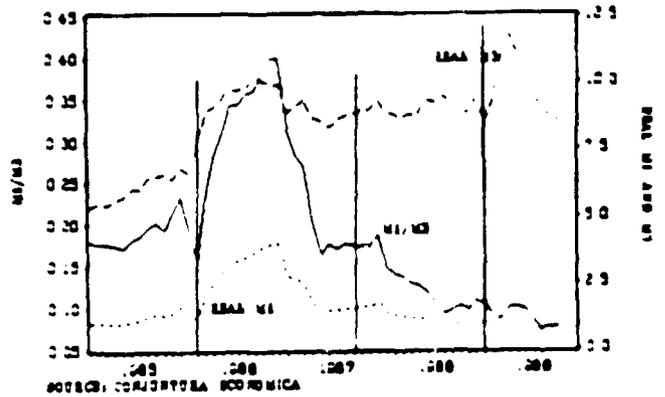
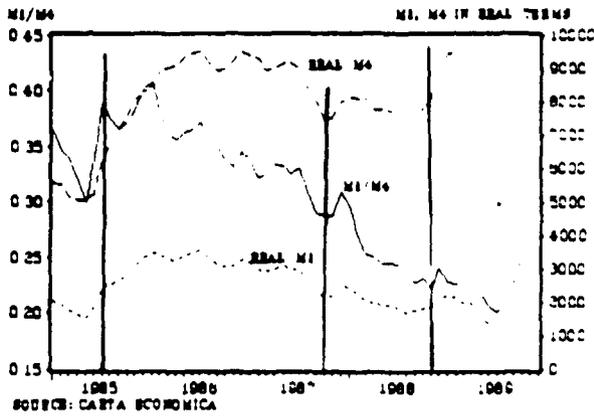
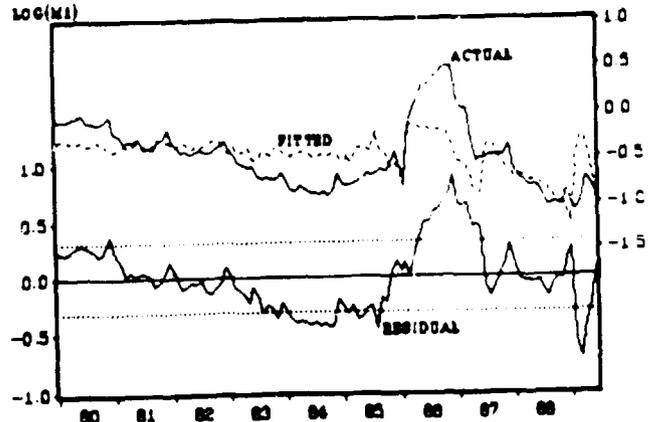
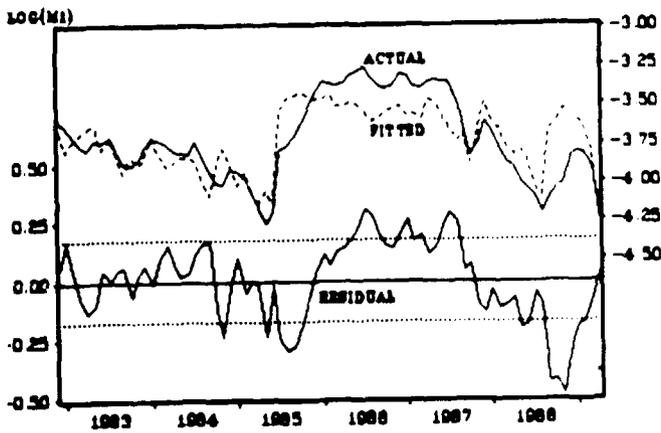


FIGURE 10  
RESIDUALS DEMAND FOR MONEY



Argentina or Brazil hyperinflationary outbursts were effective in eroding the debt in the medium term.

The initial rise in real interest rates was endogenous to the program.<sup>12</sup> They were primarily due to lack of credibility on the sustainability of the program. The high nominal interest rates embodied a risk premium to compensate for the possible collapse of the program. If the program succeeds and keeps inflation low for some time the high nominal rates will result in high real ex-post interest rates, although real rates were not high on a ex-ante basis. The high real interest rates complicated the fiscal balance in Argentina and Brazil (especially in the more recent period) because they occurred in association with a high level of domestic debt.

Flexibilization was many times also prompted by difficulties on the external side, though this aspect was more conspicuous in Argentina. The maintenance of the fixed exchange rate led to an appreciation of the real exchange rate, although in most cases it did not reach significant proportions because controls were also maintained on domestic prices and wages. Nevertheless, as the end of the freeze was becoming apparent there was typically a large deterioration in the reserve position of the central bank, resulting from short term speculation against the currency, and an increase in the premium for the black market exchange rate. In some instances, as in the Plan Primavera, the run on central bank reserves was the trigger for the final collapse of the program.

#### Importance of the Flexibilization Stage

The flexibilization stage is the key period in a heterodox programs.

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<sup>12</sup> The reasons for the high ex-post real interest rates are discussed in the existing literature (see for example Dornbusch (1986), Dornbusch and Fischer (1986) and Sachs (1986)).

Ideally, the fiscal situation should remain sound during this stage as prices are liberalized gradually supported by a strong nominal anchor, either the exchange rate or money. The lack of fiscal effort in both countries ruled out the possibility of sustaining low inflation as prices were liberalized. But it was still possible that inflation stabilized at a level consistent with the fundamentals. One surprising feature in both countries is that inflation failed to stabilize on a long term basis once controls were removed. While some initial overshooting of inflation could be a natural response to price liberalization, a well planned flexibilization stage should have succeeded in stabilizing inflation, perhaps at high rates. This required, in addition to the maintenance of the fiscal stance, a clear signal regarding the choice of nominal anchor and the target for nominal changes (e.g. the rate of devaluation or monetary growth). The inability to adhere to a nominal anchor during the flexibilization stage set the stage for the hyperinflationary outbursts that were to follow.

In none of the efforts in Argentina and Brazil there was a clear strategy for getting out of the freeze. This stage was not well planned, and in most instances it involved the simultaneous abandonment of all the nominal anchors. This problem was apparent in the aftermath of the Cruzado plan and the Plan Primavera where, forced by the large existing imbalances, all the nominal anchors (wages, public and private sector prices, and the exchange rate) were released at once, with the resulting rapid acceleration in inflation. But this pattern was also observed, though in a milder way, during the flexibilization phase in the Bresser and Austral II plans.

Despite the lack of strong anchors, there was usually a pause in the increases in inflation once it reached the previous plateau. Inflation then

temporarily stabilized at that level (around 20 percent per month in Brazil and 15 percent per month in Argentina) perhaps because there was a perception that the economy could function with a rate of inflation around that level and hence that the government would not take bold steps to fight it. Since a stabilization program based on controls was not likely to be implemented there was no reason to engage in anticipatory pricing. However, rates of inflation in this range can easily be destabilized by real or nominal shocks. Since the inflation process was basically asymmetric, the response to shocks almost always involved an increase in inflation. This increase very rapidly gained momentum as agents perceived that inflation was once again on a clear acceleration phase and that the imposition of controls became more likely. At this stage the acceleration phase becomes almost unstoppable in the absence of a stabilization shock.

ii. The Erosion of Credibility and Inflation Instability Over Time

The available evidence indicates that the Austral and Cruzado plans, the first of their type in each country, enjoyed more credibility than the programs that followed them. One reason for this difference is that these two programs were the first major attempts for stopping inflation since the beginning of the debt crisis. Moreover, they were the first anti-inflation efforts in many years that succeeded in bringing down inflation in a significant way and to sustain it, even if this stability lasted for just a few months. The programs that followed the Austral and Cruzado plans were less comprehensive while it was clearer that the use of controls was to a larger degree a substitute for the adjustment in the fundamentals.

The smaller amount of credibility enjoyed by each subsequent program made the sustainability of low inflation during the period of controls more

difficult and the explosions that followed more dramatic. The greater credibility attached to the first program was partly due to the fact that this were the first income policy based stabilization attempts. As the same stabilization tactic was used over and over, it became apparent that the approach would not succeed in maintaining low inflation for a long span, and the private sector became better at anticipating public sector behavior.

The erosion of credibility over time was accompanied by a shorter duration of low inflation at the beginning of each cycle and a stronger explosion towards the end. These events were certainly not unrelated. Since the programs were less credible, it was more difficult for the government to maintain low inflation during the period of controls. The combination of events that made possible the maintenance of low inflation in the initial programs (such as relatively large seigniorage and low interest rates) were less favorable in the subsequent ones.

The difference in credibility experienced by the initial vis a vis the follow up programs is apparent from the behavior of money demand during the various stabilization attempts. In figures 9.a and 9.b we show the ratio of M1 to M4 in Argentina and Brazil during the period. This ratio increased significantly in both countries during the Austral and Cruzado plans but did not change in a major way after the implementation of the follow-up programs. In Argentina we only observed a small short lived increase in this ratio during the Austral II program, but no change in the downward sloping trend during the Plan Primavera. A more significant reversal is observed after the BB plan in 1989, but the remonetization did not come even close to the early levels of the Austral plan. Likewise in Brazil, this ratio only increased slightly during the Bresser plan, but the increase was relatively small and

short lived.

Similar indications are obtained from estimations of the demand for money.<sup>13</sup> The results are shown in table 4.<sup>14</sup> Using dummies for the various stabilization attempts we found a clear trend in the shifts in the demand for money. In Brazil, for example, there was an upward shift in money demand between the beginning of the Cruzado plan till the implementation of the Bresser plan. This shift was reversed in the period from the Bresser plan onwards. Likewise, the dummies for Argentina indicate a positive shift in the demand for money during the period of the Austral plan (including the mild cycles), followed by a negative shift during the period of the strong cycles. Finally, as can be seen from figures 10.a and 10.b which show the residuals from the money demand equations, our equations tend to

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<sup>13</sup> The estimations were done using the Cagan demand for money function using monthly data for Argentina and Brazil. The estimation period for Argentina goes from 1982.12 to 1989.04 and for Brazil from 1980.01 to 1989.06. Separate estimations were done for the whole sample and for the period before and after the HSs. We also used dummy variables to find out whether there were shifts in the demand for money in the period.

<sup>14</sup> The estimation was done using OLS. The results reported in this regression use current inflation as a proxy for the expected rate of inflation in the period. The results of these regressions were basically similar when we used a weighted average of past inflations and even future inflation as a proxy for the expected return on domestic money.

TABLE 4  
(monthly data)  
 $\log (M1) = a + b (INF)$

## ARGENTINA

Period	a	b	D1	D3	D4	Adjusted R Squared	D.W.
1982.12-1989.04	-3.4 (-66.4)	-0.023 (-8.3)	0.081 (1.6)	-0.15 (-3.2)	-0.26 (-4.8)	0.73 (52.0)	0.46

D1 = 1 for 85.07-87.03  
D2 = 1 for 87.11-88.09  
D3 = 1 for 88.09-89.04

## BRAZIL

Period	a	b	D1	D2	D3	Adjusted R Squared	D.W.
1980.01-1989.06	-0.28 (-7.2)	-0.026 (-7.2)	0.59 (9.5)	-0.04 (-0.6)		0.64 (67.3)	0.36

D1 = 1 for 86.03-87.06  
D2 = 1 for 87.07-88.06  
D3 = 1 for 86.03-89.06

underestimate money demand during the Austral I and Cruzado plans, but they overestimated for the Austral II, Primavera, Bresser and Summer plans.<sup>15</sup>

### iii. Macro Performance in the Cycle Regime

One striking feature of the macroeconomic performance during the period of the cycles is that despite the large fluctuations in nominal variables, average inflation did not increase significantly in this period. The data in tables 5.a and 5.b show that in Argentina for the period 1986-88 inflation, budget deficits and seigniorage were on average lower than in the pre-Austral period, while growth and the external performance remained at similar levels. In part this is explained because inflation in Argentina was already very high prior to the Austral plan, and the performance during that period had been affected by the high, unstable inflation rates prevailing at the time. Nevertheless, a similar pattern is observed in Brazil where there was no indication of any significant deterioration in macro-indicators during the period of the cycles. True, inflation on average almost doubled in the post-Cruzado period, however, increases of this size were not unusual in Brazil, and already happened in 1975, 1980 and 1983.

Neither did the increased variability in nominal variables result in larger variability in real variables. Table 5.c shows the mean and standard deviation of inflation, interest rates, some key relative prices, real taxes

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<sup>15</sup> The behavior of other financial indicators also points to a difference in perception between the first HSs and the follow-ups. Particularly impressive were the size and relatively long duration of the stock market booms that started almost immediately after the launching of the Austral and Cruzado plans. The evolution of the premium on foreign exchange was also different in the first two programs although the pattern was clearer in Argentina. The premium fell on impact much more in the initial programs than in the follow-ups while the duration of the low premium was longer in the former.



Table 5c

## 1. ARGENTINA

Variables	Pre-Austral (02.01-06.06)				Excluding Hyper-Inflation 1986.07-1989.07				Including Hyper Inflation 1986.07-1989.08			
	Mean	Median	S.D.	S.D./Mean	Mean	Median	S.D.	S.D./Mean	Mean	Median	S.D.	S.D./Mean
CPI Inflation	16.9	17.0	8.3	39.8	8.8	7.0	8.0	89.8	18.6	8.0	31.4	180.3
Non-Agriculture WPI/CPI	106.0	108.6	8.2	6.9	91.6	90.7	8.4	9.2	94.2	92.0	12.3	13.1
Deposit Interest	14.6	12.6	7.1	49.0	9.4	8.3	4.8	61.1	16.8	8.8	24.7	168.3
Lending Interest	17.8	18.6	7.6	42.1	10.1	8.9	4.8	47.6	17.2	9.3	27.9	182.2
Real Exchange Rate	83.8	88.4	9.2	11.0	89.7	89.8	8.9	7.7	96.3	90.3	21.3	22.3
Real Wage	113.0	113.9	12.3	10.9	99.9	99.1	8.1	8.1	98.6	99.1	8.1	8.2
Real Taxes	99.2	97.9	21.4	21.8	182.8	173.8	83.4	39.0	149.0	189.4	87.6	46.3
Industrial Production	84.4	88.7	8.4	7.8	96.1	98.6	8.8	7.2	93.3	94.0	8.2	8.8
GDP Growth	-0.1	0.8	3.2	na	0.4	0.7	2.6	na	-0.0	0.7	3.0	na

## 2. BRAZIL

Variables	Pre-Cruzado (1983.01-1988.02)				Post-Cruzado (08.03-09.08)			
	Mean	Median	S.D.	S.D./Mean	Mean	Median	S.D.	S.D./Mean
CPI Inflation	10.0	9.7	3.3	33.0	17.8	16.8	13.6	76.7
Industrial WPI/CPI	97.6	98.1	3.8	4.0	93.2	94.7	3.7	4.0
Overnight Interest	10.4	10.0	1.8	17.3	16.4	18.6	9.4	61.0
Real Exchange Rate	87.8	78.8	18.8	21.4	98.8	97.0	10.8	21.0
Real Wage	88.0	86.0	10.9	11.4	118.1	119.1	7.2	6.1
Real Taxes	122.2	121.1	28.2	29.8	136.1	120.6	28.8	21.4
Industrial Production	104.0	103.3	10.8	10.2	121.8	122.2	10.6	8.8

Note: \* Based on quarterly data.

and indices of real activity. If we exclude the hyperinflation period in Argentina, the data indicates that the greater variability of inflation in the post-HS periods did not lead to larger variations in relative prices, production, and in Argentina, not even on nominal interest rates. Quite surprisingly, in both countries the real exchange rate was more stable, in the post-HS period.

Although performance was on average similar in both periods, there was a continuous deterioration in the overall situation in the post-HS period over time. For example, while growth in Argentina did not change on average very much before and after the HS, there has been a downward trend over the more recent period. Likewise, inflation has been rising in both countries over time. More dramatic results are obtained if one includes the recent Argentinean hyperinflation in the analysis. Growth, which was slightly negative in 1988, became more so in 1989, and the increase in inflation was accompanied by increased variability in real variables.

#### V. Implications of this Regime and Puzzles

The relatively short experience with the inflation-stabilization cycles analyzed in the previous sections does not allow a thorough evaluation of the regime. We can nevertheless draw some preliminary implications regarding the nature of the inflation process during the period, likely developments in the absence of a change in regime, and what features of the existing regime are relevant for the design and implementation of a successful stabilization program.

#### Is hyperinflation avoidable?

It is difficult to anticipate, however, whether the system could continue functioning in this manner without facing hyperinflation. The average rate of inflation has been constantly increasing over time in both countries. In addition, the cycles have tended to become shorter and inflation peaked at new, higher levels in each new round. All the evidence indicates that it is difficult to avoid hyperinflation while the economy remains in this regime. Argentina faced a full blown hyperinflation after the collapse of the Plan Primavera, and another in the aftermath of the BB plan, now Brazil is going in the same direction.

The Argentine hyperinflation did not follow the pattern observed in other experiences of this type. There seems to be a consensus that the drastic acceleration that started in February 1989 was triggered by a run out of domestic money. This run was driven by the interaction of two factors: first, there was an unsustainable build up of domestic public debt, resulting from very high interest rates to support the exchange rate, that raised fears that a maxi-devaluation was in the making; and second, the increasing likelihood that the Peronist party would be elected in May and that they would follow populist policies, including a further increase in the budget deficit.

Under other circumstances, the run out of domestic currency would have led to a depreciation of the domestic currency, but not necessarily to an acceleration in inflation of the type observed at that time. The main reason why the run led to hyperinflation was that it took place in an already unstable environment, with very weak nominal anchors. It is difficult to rule out the possibility that if the economy had continued under this regime for a long enough period hyperinflation would have developed anyway. In

fact, this is the way things are developing in Brazil where inflation is relentlessly increasing (it exceeded the "Cagan's critical" 50 percent level in January) and hyperinflation appears to be all but unavoidable.

#### The Alternative Scenarios to Price Controls

The failure of Austral and Cruzado programs set the stage for the cycles that were to follow. As we already mentioned, the main destabilizing factor in Argentina and Brazil was the repeated use of price controls. Was there any other feasible way of dealing with inflation in the initial and in the follow up programs?

One option would have been to follow the same fiscal stance adopted in the various programs, but to refrain from using price and wage controls or price guidelines. In Brazil this may have prevented the increased instability which we witnessed after the Cruzado plan. However, this does not mean that the upward trend in inflation could have been prevented. It is unrealistic to assume that inflation can be stabilized in the long run at an annual rate of 200% as claimed many times by the authorities. If inflation persists at this rate the government loses credibility in its ability to reduce inflation and reactions to inflationary shocks become asymmetrical leading eventually to change only in the upward direction.

In Argentina, one plausible option would have been to apply a one time heterodox shock (of the type used in the Austral I) but to refrain from applying price controls, in the subsequent stabilizations. With the reduction in the fiscal deficit to a level financeable by the inflation tax it might have been possible to have a much more stable development than the actual one.

A different option would have been to announce a target for the nominal

anchors and maintain them at a level consistent with the reduced fiscal deficit. We know from recent developments in policy game theory that if the government can establish greater credibility in its monetary (or exchange rate) policy rules then inflation will come down even in the same fiscal setting. Thus the "monetary arithmetic" of Sargent and Wallace is not applicable when credibility issues are involved.

It is difficult to evaluate at present the July 1989 stabilization program in Argentina in terms of a possible changes of regime. Although the program contained freezes of the exchange rate and public sector prices, as in the previous cycles, the official freeze was not extended to wages and prices in the private sector. In addition, the program had the "benefit" of taking place in the wake of a hyper-inflationary experience in the second quarter of 1989 which may have created a more favorable setting for breaking with the past. Finally, a fiscal reform (and more announcements about privatizations) were done on top of the benefits from the Tanzi-Olivera effect (in reverse). Nevertheless, last December inflation exploded once again driven by a depreciation of the free market exchange rate, thus reinforcing the perception that the latest stabilization efforts were not strong enough to break with the old regime.

We mentioned already that tight monetary policies were put into effect in Argentina towards that end of 1986, 1987 and 1988 and in the Summer Plan of 1988-89 in Brazil. However, the governments were unwilling to persist with these policies in view of sharp increases in real interest rates. Consequently these policies were abandoned and eventually a new round of income policies was put into effect. Therefore, the tightening of monetary rules seems to have been an option for which the authorities were not ready.

Until there is sufficient resolve to deal with inflation (and pay the cost of disinflation) there is no way in which the inflationary trend could be reversed in each of these countries. However, much of the excessive instability could have been prevented by avoiding the repeated use of income policies.

#### Implications for a Successful Stabilization Program

What are the implications of the cycles regime for future stabilization programs in Argentina and Brazil? One of the main problems which will confront any stabilization in these countries is the establishment of a minimum degree of credibility in government's disinflationary policies.

In the fiscal area it will be necessary to establish credibility in the sustainability of the fiscal adjustment, a property which was lacking not only in the Austral Plan, but also in all the stabilization programs over the past 30 years in Argentina. Presumably this will require the implementation of basic fiscal reforms with the aim of convincing the public of the sustainability of the adjustments. The mere reliance on the Olivera-Tanzi effect (in reverse), high public sector prices and a fall in real wages during the freeze will not will no suffice, because these measures are not immune to inflationary shocks.

In addition, it is necessary to restore the credibility in the governments' commitment to stand behind the nominal anchors in spite of the costs that this may entail. This is a different dimension of the credibility issue which is not identical with the fiscal aspect. This aspect is important because it is well known that governments can use inflation (or devaluation) to achieve non-fiscal objectives such as a reduction in the real wage or a real depreciation. Since inflation has been used to fulfill these

functions in the past (especially in Brazil to erode the real wage), the fiscal adjustment will not be enough to overcome these difficulties. The critical aspect here is whether the government will be willing to maintain the announced exchange rate or monetary targets if faced with overvaluation or high real interest rates due to adverse expectations. Given the recurrent failures during the cycles period there is no possibility in the present situation of avoiding the confrontation between pessimistic expectations and the effort to set nominal anchors. This confrontation will result in a monetary crunch or in overvaluation of the currency depending on whether the money supply or the exchange rate is used as anchor. In each case the growth of the economy will have to be cut down in the short or intermediate run.

The foregoing remarks imply that stabilization programs should undergo a shift of orientation in the orthodox direction. Further use of price controls should be avoided in order to restore credibility in conventional anchors. There are of course well known arguments for government intervention in nominal contracts in labor and capital markets in order to alleviate the surprise effect of stabilization. In practice, this took the form of constructing "conversion tables" for loans contracted before the stabilization and of temporary suspension of lagged wage indexation combined with a realignment of the base wage. It was especially the latter element which entailed the introduction of price controls as an insurance against erosion of the real wage. However, since it is essential at the present stage to redress the erosion of credibility in both countries as a result of the use of controls, the imposition of a wage-price freeze in the private sector should be avoided.

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