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# Stopping Three Big Inflations

## (Argentina, Brazil, and Peru)

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and
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Episodes of hyperinflation in Argentina, Brazil, and Peru in the 1980s were important because they helped to dispel the myth that it is possible to maintain a stable high rate of inflation on a long-term basis without harmful effects on growth.

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Much existing literature fails to recognize that high inflation (annual rates in three digits) is a distinctly different phenomenon from moderate inflation and hyperinflation. The failure to understand the specific features of the inflation process in the chronic high inflation economies has many times led to a wrong diagnosis of the underlying reasons for changes in inflation in those economies, and the policies needed to stabilize prices in those countries. This lack of understanding extends to the interpretations of the recent hyperinflation in some economies.

Argentina, Brazil, and Peru in the 1980s were certainly high-inflation countries. The recent episodes of hyperinflation in these countries were not isolated — instead, they were the culmination of an unstable process, in which inflation crept up gradually for many years before accelerating explosively. These episodes were important because they helped to dispel the myth that it is possible to maintain a stable high rate of inflation on a long-term basis without harmful effects on growth.

The causes of the new hyperinflations were not as clear as in the classical episodes, as they originated from a combination of fiscal and nonfiscal factors. The chronic fiscal imbalances eventually became an insurmountable obstacle, and inflation moved away from the fragile high inflation equilibrium into hyperinflation. The interesting feature of the new episodes (especially in Argentina and Brazil) is that they were not triggered by a large increase in the budget deficit; instead, because the initial equilibrium was so fragile, inflation was in the end destabilized by financial shocks.

One important lesson of the new hyperinflations is that the process of restoring price stability has been longer and more costly than in the classical cases. The main reason for this has been that it was not clear in the minds of the public where inflation would settle once hyperinflation was stopped. In the classic hyperinflations of Europe in the 1920s, expectations were that inflation would return to the low levels that had prevailed before. In the new episodes, there is no compelling reason for agents to expect that the economy would go back to low inflation. Experience showed that inflationary expectations initially settled near the level where inflation was prior to hyperinflation. As a result, the disinflation process must continue once hyperinflation is stopped.



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# Stopping Three Big Inflations

(ARGENTINA, BRAZIL AND PERU)

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# Stopping Three Big Inflations

## I. Introduction

The recent hyperinflations in Argentina, Brazil and Peru defy much of the widely accepted views regarding the origins and ends of hyperinflations. These "classical" views essentially state that hyperinflations have clear causes, exceptionally large budget deficits financed by money creation, and are brought to a sudden end, through a comprehensive stabilization program. In addition, the stabilization is achieved without much costs in terms of growth and unemployment. Sargent (1982) provides convincing empirical evidence for these propositions based on the European hyperinflations in the mid-twenties. The more recent hyperinflation and stabilization in Bolivia by and large conforms with this view.[1]

In contrast, the more recent hyperinflations in Argentina and Brazil have less clear origins. Prior to the hyperinflation, deficits, while large, did not reach enormous proportions while seigniorage levels were not higher than in the previous two decades. The fiscal situation did not reach the crisis proportions of the classical hyperinflations. Instead, these hyperinflations appear to have been the final stage of a long process of high and increasing rates of inflation, in which a final explosion was all but unavoidable. The origins of the Peruvian hyperinflation, on the other hand, is more similar to the classical episodes.

The process of stopping hyperinflation is also much more cumbersome than in the classical cases. While experiences varied from country to country, a quick glance at the episodes suggests that policies that have much in common to those that were successful in stopping hyperinflation in its tracks in Europe and in Bolivia, did not yield the same outcomes in the recent three episodes. Although these countries also adopted orthodox stabilization programs of different intensities, based on fiscal balance and

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[1] The Bolivian hyperinflation and the ensuing stabilization is described in Sachs (1986) and Morales (1988) among others.

tight money, and some of the programs went a long way in demonstrating a change of regime of the type discussed by Sargent, the results were mixed. They all succeeded in stabilizing the exchange rate and in bringing down inflation drastically from the peak of the hyperinflation; however, inflation did not stop in its tracks, instead, in the more successful cases it remained stuck for a while at rates that on average ranged from 5 to 10 percent a month, while there were some bouts of high inflation. The programs did not succeed in stabilizing prices in the same way as after the classical hyperinflations did.

This paper will examine the main reasons for the differences between the classical and the new hyperinflations regarding their origins, and the characteristics of the stabilization process that brought them to an end. We recognize that the recent hyperinflations do not constitute a perfectly homogenous group. Nevertheless, in broad terms there are distinctive features which are observed to different degrees in the new episodes that stand in sharp contrast with the classical hyperinflations.

A central message of this paper is that the recent episodes were different because they took place in countries that had a relatively long history of high inflation. Once inflation is high, it can be destabilized into a hyperinflationary path even by relatively small shocks. Likewise, the process of bringing down inflation is generally longer and it is more difficult to sustain in these countries. Previous failed stabilizations undermines the credibility of a new program. It takes time and persistence to convince the public that prices will be stabilized on a long term basis.

We will also argue that by and large, in the recent episodes countries had more control over the inflation process, as well as on the damaging effects of inflation. Brazil and Peru, for example, experienced high rates of inflation (between 20 and 49 percent per month) for prolonged periods without facing a full blown acceleration. This ability to maintain these extreme inflation rates within bounds is unique to these high inflation economies. Likewise, the ability to limit the damaging effects of inflation

is evidenced by the evolution of tax revenues during hyperinflation. In the classical episodes hyperinflation induced a collapse of tax revenues (as a result of the Olivera-Tanzi effect). In contrast, Argentina and Brazil were able to limit the fiscal damage of hyperinflation.

The paper is organized as follows. Section II presents some basic facts about the behavior of inflation in the episodes that we study, and show that Brazil and Peru had more control over inflation than the other episodes included in our study. Section III examines the whole process of hyperinflation and stabilization in the classic hyperinflations, with especial attention on the Bolivian case. Section IV will concentrate on the causes of the hyperinflations in Argentina, Brazil and Peru. It is argued that the new episodes are indeed of a different nature, mainly because they took place in countries with a tradition of high inflation. We of course recognize that there were clear differences within this group. Peru has more similarities with traditional episodes regarding the causes, though it managed to avoid a full acceleration of inflation. In Argentina and Brazil the hyperinflation was triggered by different forces. Section V investigates in what respects the recent stabilization process in Argentina, Brazil and Peru can be considered as a departure from previous, less comprehensive stabilization attempts, and to what extent can we consider them as representing a change of regime. We also briefly examine the impact of these programs on inflation, and discuss the differences with the classical hyperinflations. We conclude in section VI with some final remarks.

## II. Basic Features of Inflation

Table 1 illustrates some of the differences between the classical and the new hyperinflations.[2] We used Cagan's criterion for determining the beginning and end of a hyperinflation. In his own words "I shall define hyperinflations as beginning in the month the rise in prices exceeds 50

[2] The tables A.1 and A.2 at the end of the paper provide more detailed data of the evolution of inflation.

percent and ending in the month before the rise in prices drops below that amount and stays below for at least a year" (Cagan 1956), p.25). In most cases it is easy to establish the beginning and end of the episodes. Peru is the only grey area in our sample because although inflation reached 114 percent in September 1988, the next month it fell below Cagan's 50 percent benchmark and remained at the lower level for almost two years. Thus, if we use Cagan's definition in a strict sense, Peru experienced 2 hyperinflations one in 1988, that lasted just one month, and another in 1990, this one for two months. However, we do not think that this would be a good representation of what happened. The fact that Peru did not experience a full blown hyperinflation at that time was mainly a fluke, since it was on the verge of it in several occasions. In this paper we take the view that Peru's hyperinflation started in September 1988 and analyzed it in this fashion.[3]

[3] In table 3, on the other hand, we follow Cagan's definition strictly, so we show that the hyperinflation was shorter.

TABLE 1

| | (1) Approximate Beginning | (2) Approx. Duration | (3) # of Months Inflation Above 50% | (4) hyper-inflation Cycles | (5) # of Months Inflation Between 20 and 49% |
|---|---|---|---|---|---|
| AUSTRIA | 10/ 1921 | 12 months | 6 | 3 | 7 |
| BOLIVIA | 04/ 1984 | 18 months | 9 | 4 | 10 |
| GERMANY | 08/ 1923 | 17 months | 14 | 3 | 7 |
| HUNGARY | 03/ 1923 | 12 months | 5 | 3 | 8 |
| POLAND | 01/ 1923 | 13 months | 9 | 3 | 7 |
| | | | | | |
| ARGENTINA | 05/ 1989 | 11 months | 6 | 2 | 5 |
| BRAZIL | 12/ 1989 | 4 months | 4 | 1 | 15 |
| PERU | 07/ 1990 | 2 months | 2 | 1 | 25 |

A comparison of these episodes indicates that the classical hyperinflations were by and large longer, and more extreme than those of Brazil and Peru. Argentina, is the only recent episode where the pattern of inflation is similar to the classical episodes. The second column of table 1 indicates the duration of these episodes. Bolivia is the longer within this group, it lasted for 18 months, while the shorter of the classical hyperinflations were Austria and Hungary (12 months). Argentina comes close, as it lasted for 11 months. The new hyperinflations in Brazil and Peru were much shorter. In Brazil it only lasted four months, in Peru it lasted it was short, although it was on the verge of it for a long time.

There is also a distinction regarding the intensity of the episodes. Germany is unique in our sample for the exorbitantly high inflation rates. But even abstracting from that case, it is clear that the other classical

episodes were more extreme than Peru or Brazil, while Argentina is not clear cut. Three crude indicators are the number of months in which inflation exceeded Cagan's 50% benchmark, the number of extreme inflationary bouts within the whole span of each hyperinflationary episode, and the ability, or lack of it, to maintain inflation below 50% for prolonged periods. According to the first indicator, described in column (3), the classical episodes were more extreme, as inflation exceeded the 50 percent benchmark 14 months in Germany, and 9 months in Bolivia and Poland. Argentina is similar to Austria and Hungary. At the other extreme we find Peru, where inflation exceeded 50 percent for only 2 months in 1990 and for 1 month in 1988.

A second feature is the number of episodes in which inflation started below the 50 percent per month threshold and later on exceeded it. The reductions in inflation below 50 percent (after the initial rise) were usually associated with unsuccessful stabilization attempts. This measure indicates the ability of the authorities to keep the process under "limited" control, the larger the number of accelerations, the more difficult it was to avoid a full explosion of inflation. Column (4) shows that there were fewer cycles in the recent episodes thus indicating that the authorities were able to contain inflation better than in the classical ones.

Finally, column (5) shows the number of months when inflation remained in the high ranges, but below Cagan's hyperinflation level. Once again, the numbers indicate a clear distinction between the classical episodes and Argentina on the one hand, and Brazil and Peru on the other. The latter countries were able to exert much better control over high inflation, in the sense that these high rates did not explode into hyperinflation territory.

The overall impression conveyed by table 1 is that in the new episodes (as a group), the authorities were able to exert more control over inflation, and managed to limit the real negative effects of inflations.

## III. The Classical Hyperinflations

### The Origins of the Hyperinflations

The European hyperinflations of the 1920s (in Austria, Germany, Hungary, Poland and Russia) and the more recent hyperinflation in Bolivia constitute the sample of what we call classical hyperinflations (CH). The most distinctive feature of these episodes is that they had clear origins (large budget deficits financed by money creation), and that they were stopped suddenly, by an orthodox program that addressed the fiscal imbalance, and convinced the public that the central bank would not print money to finance the budget deficit.

The origins of these large deficits were clear and typically resulted from unusual circumstances. In the 1920s they were linked to the costs of reconstruction and to the war reparation payments in the losing countries, while in Bolivia it was directly related to a sudden halt in the availability of external financing in a situation in which the country could not produce a sufficiently large fiscal adjustment to service its external obligations.

The background of the hyperinflations in the 1920s was the end of World War I. The losing countries ended up owing reparations to the allies while they underwent major domestic instability, which in many cases included difficulties in establishing and securing the countries borders. Germany had the heaviest burden of reparation payments, Austria, inherited the largest part of the bureaucracy from the old Austro-Hungarian empire and not enough

resources to finance them, Hungary underwent dramatic political instability, including a brief communist regime, and wars with Czechoslovakia and Rumania. Poland became a new nation after the War, and had to fight Russia to secure its borders.

The hyperinflations of the 1920s thus took place under unusual circumstances, in countries that were devastated by the effects of the War. Domestic factors --namely political instability and large deficits-- worked in conjunction with external ones --the burden of reparation payments and unsecured borders-- to generate a especial environment for the extreme phenomenon of hyperinflation.

The more recent hyperinflation in Bolivia was linked to a severe external shock: a sudden and important reduction in the availability of external financing (see Sachs (1986) and Morales (1987a)). During most of the seventies and early eighties Bolivia received positive external net resource transfers as net new lending exceeded net interest payments. The situation took a drastic turn in 1982 and by 1983 net external resource transfers, which had already turned negative in 1982, reached -5.6 percent of GDP (see table 2). This external transfer (as a share of GDP) was larger than the cash reparations payments required from Germany after World War I!

The unusually adverse circumstances described in all these episodes created conditions that were especially favorable for the emergence of hyperinflation.

There is little dispute that the classical hyperinflations were caused by large budget deficits financed primarily by money creation. Table 3 shows some fiscal indicators for the classical hyperinflations. Two features are clear. First, in all cases revenues were only covering a small fraction of total expenditures. In Europe, tax revenues covered less than half of

# Table 2
# Bolivia: Annual Indicators

| Period | Infla-tion | GDP Growth | Seignio-rage | M1/ GDP | PubExp/ GDP | PubDef/ GDP | CurrAcc/ GDP | TraBal/ GDP | Terms of Trade | Real Exch. Rate | Net Transfers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970-1974 | 21.68 | 4.40 | 2.02 | 10.92 | _ | _ | 1.46 | 5.75 | 62.04 | 113.03 | 3.17 ** |
| 1975-1979 | 10.14 | 4.06 | 1.98 | 10.50 | _ | _ | -5.78 | 0.08 | 92.00 | 101.39 | 5.14 |
| 1980-1982 | 69.73 | -1.47 | 5.77 | 9.93 | 45.53 | 9.97 | -3.27 | 4.44 | 94.90 | 79.70 | 0.93 |
| 1983 | 269.00 | -4.50 | 9.70 | 7.24 | 43.30 | 18.70 | -2.40 | 3.97 | 88.80 | 73.78 | -4.26 |
| 1984 | 1281.40 | -0.60 | 15.80 | 5.15 | 46.00 | 25.10 | -2.70 | 4.90 | 88.30 | 68.39 | -4.84 |
| 1985 | 11749.60 | -1.00 | 8.30 | 3.04 | 23.90 | 10.10 | -5.50 | 3.14 | 84.40 | 27.67 | -5.32 |
| 1986 | 276.30 | -2.50 | 2.50 | 3.37 | 22.90 | 3.40 | -9.90 | -1.31 | 61.40 | 106.08 | 0.50 |
| 1987 | 14.60 | 2.60 | 1.07 | 4.64 | 24.10 | 7.80 | -9.90 | -2.96 | 50.50 | 106.68 | 4.45 |
| 1988 | 16.00 | 2.96 | 3.83 | 5.20 | 27.80 | 6.60 | -6.90 | -1.09 | 57.00 | 116.25 | 0.44 |
| 1989 | 15.00 | 2.72 | 1.95 | 5.44 | 27.60 | 5.00 | -5.80 | -0.13 | 59.10 | 123.17 | 0.40 |
| 1990 | 17.12 | 2.71 | 2.13 | 5.57 | 27.80 | 3.30 | -4.50 | 1.23 | n.a. | 132.44 | -0.00 |

**SOURCES**

*Seigniorage* : ANDREX based in Monetary base.

*M1* : M1 average ANDREX

*Public Expenditure* : current+capital expenditure, consolidated non financial public sector deficit. UDAPE for 1980-1984; IMF and World Bank after 1985.

*Public Deficit* : Overall Deficit, consolidated non financial public sector deficit. UDAPE for 1980-1984; IMF and World Bank after 1985.

*External Sector* : as a % of GDP; ANDREX.

*Exchange Rate* : nominal exchange rate, period average. IFS.

*Terms of Trade* : Terms of trade index 1980=100. ANDREX

*Real Exch.Rate* : Real multilateral exchange rate index with respect to the top twenty trading partners. 1980=100.

*Net transfers* : World Debt Tables, short and long term net transfers including IMF.

**/ 1971-1974

government expenditures, and at the peak of the hyperinflation revenues represented just 12 percent of expenditures in Germany and 16 percent in Austria. In Bolivia, government revenues fell from around 85 percent of revenues in 1980 to around 50 percent for the period 1983-85. Second, there was a collapse of government revenues coinciding with the rise in inflation (an extreme form of the Olivera-Tanzi effect). At the height of the hyperinflation revenues in Germany were around one third of what they were before. Likewise, in Bolivia revenues plummeted from 32 percent of GDP in 1982 to just 13 percent in 1985. The collapse in tax revenues was more dramatic, as they fell from 8 to 3 percent of GDP between 1981 and 1983 as inflation increased from 30 to 270 percent. As we will show in the next section, these features were extreme in the recent hyperinflations.

Seigniorage was extremely large in the classical hyeprinflations. Figure 1 shows estimates of the revenue from money creation for Germany and Bolivia. What happened in Bolivia is well known, seigniorage increased five-fold from around 2 percent of GDP in 1979-81 to over 10 percent of GDP in 1983-85. In Germany seigniorage[4] increased six fold at the outbreak of the War, and remained high till the end of the hyperinflation. In both episodes the level of seigniorage was too large, in the sense that it lied above the Laffer curve, and hence it could not be financed by any stable (no matter how high) rate of inflation. The result was hyperinflation.[5]

An important feature of these episodes is that the rise in seigniorage preceded the actual emergence of hyperinflation. This evidence is consistent

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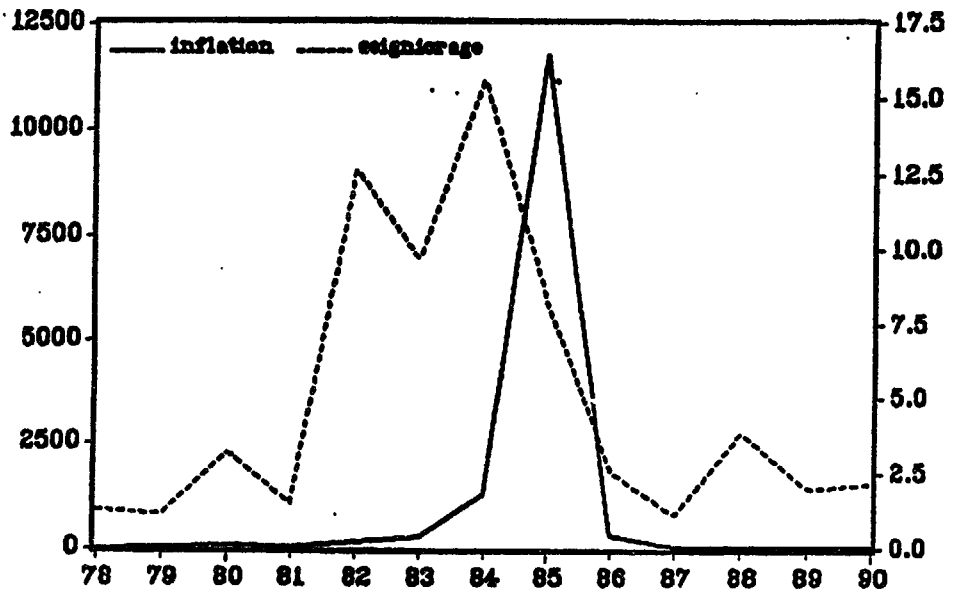
[4] Seigniorage in Bolivia is calculated as the change in money based relative to GDP. In Germany we do not have reliable data on GDP, so we approximated seigniorage by the change in base money deflated by the average price level.

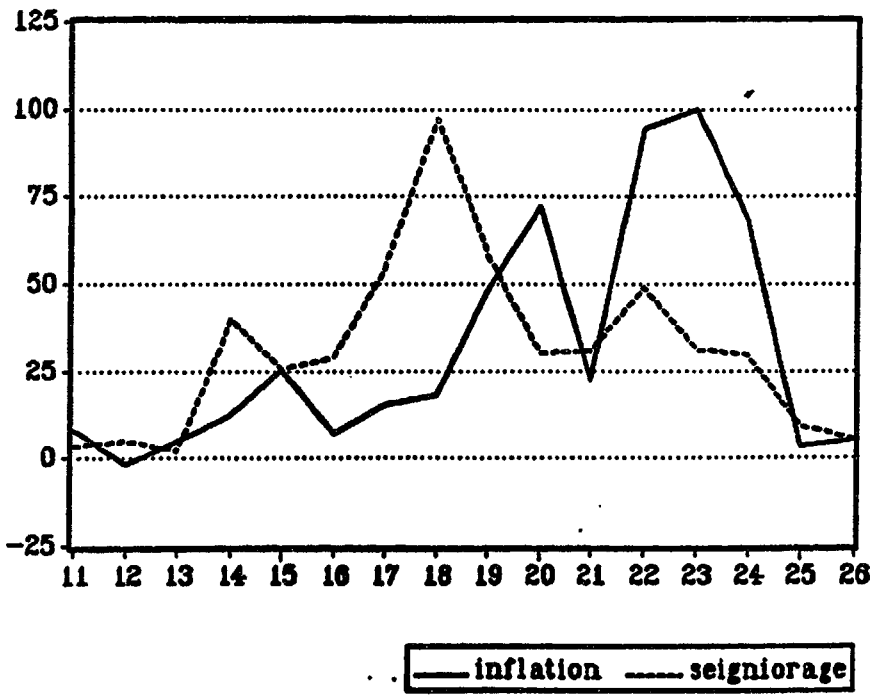
[5] This issue is discussed more extensively in Kiguel and Liviatan (1988).

Figure 1

**BOLIVIA**




GERMANY, INFLATION AND SEIGNIORAGE



with our view that excessive seigniorage led to an acceleration of inflation. In Bolivia, for instance, the increase in seigniorage occurred in 1982 while the hyperinflation became apparent only 1984. The picture is less clear in Germany, because the lag was much longer. A protracted period of very high seigniorage eventually led to the hyperinflation. Annual data indicates, however, that inflation entered into an accelerating trend around 1917, but became unstoppable only in the second half of 1922.

Finally, it is important to keep in mind that the CH took place in countries where high inflation was the exception rather than the rule. The hyperinflations of the twenties occurred when the world was by and large operating under the gold standard, and in an environment where price deflation was not unusual. The norm was definitely low inflation. Likewise, inflation in Bolivia during the sixties and seventies was moderate by Latin American standards. The worse inflationary episodes occurred in the mid-fifties when the annual inflation rate remained above 100 percent for a couple of years. Since then inflation remained fairly low; evidence of this was the fact that the country was on a fixed exchange rate regime since 1959 (with only two devaluations till 1982).

Stopping the Classical Hyperinflations

The classical hyperinflations were stopped always and everywhere abruptly through a comprehensive program that stabilized the exchange rate, reduced the budget deficit sharply, and send a clear signal that the Central Bank would end domestic credit to the government. In Germany, the exchange rate was stabilized on November 20th, and prices stabilized the following week.[6] Likewise, the hyperinflation in Bolivia was stopped in its tracks,

[6] See data in Webb (1986) p.788.

the exchange rate was stabilized on August 29, and during the second week of September the economy experienced deflation.

The stabilization programs that brought the European hyperinflations to a sudden end are extensively discussed in existing works such as Sargent (1982), and Dornbusch and Fischer (1986) among others. In all cases the success was based on fixing the exchange rate, balancing the budget, and making a credible commitment to stopping central bank financing of the deficit (this was usually done by creating an independent central bank). External support was critical in these cases, because a large part of the fiscal deficits resulted from the war reparation payments.

The Bolivian hyperinflation was also brought to a quick end, by a stabilization program based on a firm commitment to balance the budget on a cash basis, and a policy of tight money to stabilize the exchange rate and prices. As shown in Sachs (1986) the program succeeded immediately in stabilizing the exchange rate, and as a result, very quickly hyperinflation came to an end. In this respect, the outcomes were similar to the stabilization programs that ended the European hyperinflations in the mid-twenties and after World War II.

The success in stopping hyperinflation did not require balancing the budget on a longer term basis, though it was necessary to signal unequivocally that the central bank would not issue money to finance the deficit. In fact, after an initial period in which the government ran a balanced budget, deficits have remained relatively large without becoming a destabilizing force. Once the government establishes its determination to sustain price stability, it can run budget deficits which are consistent with the availability of non-inflationary finance. In Bolivia, the deficits were mainly financed externally without resorting to seigniorage (which, as can be

seen from table 2, fell to pre-hyperinflations levels of around 1.5% of GDP). The Austrian stabilization of the 1920s provides another illustration of the complexities of the role of the budget deficit in stopping hyperinflation. In that episode, the government continued to run deficits in 1923 (as shown in table 3), for a whole year after the end of the hyperinflation. Nevertheless, this was not a source of inflation, mainly because the stabilization package was comprehensive enough to remove uncertainty regarding the commitment to the new regime.

A common feature to all the programs that succeeded in stopping hyperinflation was their ability to signal a change of regime (as argued in Sargent). In the 1920s this typically was done by a stabilization package with external support. This was critical because in the absence of a resolution of the reparation payments, there was no way to ensure a strong fiscal position. The programs of the 1920s also included the creation of an independent central bank, thus removing the ability to finance deficits through money creation. The creation of the independent central bank would have not been possible (nor credible) in the absence of clear indications that the budget would be balanced. In Bolivia the change of regime was less clear initially (see Sachs on this issue). On the fiscal side a key action was the creation of a cash committee whose main task was to maintain a balanced budget on a cash basis. This was supported by the reestablishment of external lending, and by far reaching structural reforms that signaled a departure from past inflationary practices. Nevertheless, Bolivia did not go as far as the European countries in reforming the central bank.

The end of the hyperinflation in Bolivia provides mixed signals of the success of the program in changing long term expectations. The persistence of high real interest rates and the slow remonetization of the economy are

# TABLE 3
# POLAND, AUSTRIA, GERMANY AND BOLIVIA
# CLASSICAL HYPERINFLATIONS

| | | EXPENDITURE | REVENUE | REV / EXP | INFLATION |
|---|---|---|---|---|---|
| *POLAND* | 1921 | 880852 | 345311.0 | 0.39202 | 126.9 |
| | 1922 | 879313 | 530428.0 | 0.60323 | 212.0 |
| | 1923 | 1119800 | 426000.0 | 0.38043 | 15636.0 |
| | 1924 | 1629000 | 1703000.0 | 1.04543 | n.a. |
| | 1925 | 1981593 | 1981884.0 | 1.00015 | 6.8 /1 |
| *AUSTRIA* | 1919 | 1309 | 632.3 | 0.48308 | n.a. |
| | 1920 | 1089 | 166.0 | 0.15248 | n.a. |
| | 1921 | 660 | 197.0 | 0.29853 | 842.0 |
| | 1922 | 733 | 116.0 | 0.15830 | 3132.2 |
| | 1923 | 367 | 256.6 | 0.70000 | 135.6 |
| *GERMANY* | 1920 | 11266 | 4223.7 | 0.37492 | 257.4 |
| | 1921 | 11963 | 5336.2 | 0.44604 | 28.7 |
| | 1922 | 9965 | 3580.5 | 0.35931 | 1688.3 |
| | 1923 | 13513 | 1676.7 | 0.12408 | 6.7E+10 |

| | | EXPENDITURE | REVENUE | TAX REVENUE | REV / EXP | INFLATION |
|---|---|---|---|---|---|---|
| *BOLIVIA /2* | 1980 | 48.30 | 40.50 | 9.70 | 0.83851 | 47 |
| | 1981 | 38.90 | 32.00 | 8.30 | 0.82262 | 29 |
| | 1982 | 49.40 | 34.10 | 5.00 | 0.69028 | 133 |
| | 1983 | 43.30 | 24.60 | 3.40 | 0.56813 | 269 |
| | 1984 | 46.00 | 21.00 | 2.20 | 0.45652 | 1281 |
| | 1985 | 23.90 | 13.90 | 2.90 | 0.58159 | 11750 |
| | 1986 | 22.90 | 19.40 | 4.50 | 0.84716 | 276 |
| | 1987 | 24.10 | 16.20 | 6.20 | 0.67220 | 15 |

***SOURCES :***

*POLAND, Sargent. AUSTRIA, Dornbush & Fischer. GERMANY, Young.*
*BOLIVIA, Country Economic Memorandum.*

*/1 : December rate of change over the three months preceding.*
*/2 : Total expenditures and Revenues as % GDP.*

just some indicators of the difficulties in reversing long term expectations. While they came down from the extremely high levels that prevailed during the first year (of around 100 percent), they are still very high by international standards (exceeding 20 percent per year). Also puzzling is the very small increase in real money balances. By 1989 with an inflation of just 15 percent, M1 as a share of GDP was slightly larger than at the peak of the hyperinflation. This slow remonetization of the Bolivian economy stands in sharp contrast with the rapid increase in real money balances in the 1920s. Money supply increased dramatically once price stability was achieved. These expansions in the money supply were not inflationary, as they accommodated a rapid increase in money demand.

## IV. Origins of the New Hyperinflations in Argentina, Brazil and Peru

### i. The Background of High Inflation

The more recent hyperinflations occurred in countries with a long tradition of high inflation (see tables 5.a to 5.c). Argentina had continuously experienced three digit annual rates of inflation since the mid-seventies. In Brazil annual inflation was already at 40 percent in the mid-seventies and reached three digits in the early eighties. Peru started to experience high inflation later, in the second half of the seventies, but by the early eighties it was also suffering from inflation rates in the three digits.

This long history of inflation had its roots in large budget deficits and the continuous growth of the public sector. As shown in table 3, budget deficits were already very large in Argentina and Peru in the early seventies, while in Brazil they became large in the second half of the

decade. In addition, the size of the central government and of public sector enterprises mushroomed during the decade. However, in contrast to the classical episodes, these countries were able to maintain limited control over inflation, it did not get out of hand.

The links between seigniorage and inflation were not as sharp as in the classical hyperinflations. Figure 2 shows annual seigniorage and inflation for these countries. The contrast with Germany and Bolivia is clear; there was no six-fold increase in seigniorage in any of these countries. Seigniorage in Argentina had been large at least since the early seventies, but except for a few short episodes it never went out of control. The story in Brazil is even more puzzling, where seigniorage has been relatively moderate and stable since the seventies. The increases in inflation in 1975, 1979 and 1982 were not associated with any noticeable increases in seigniorage (which in fact remained at around 2 percent of GDP). These increases in inflation instead resulted from devaluations that were accommodated through easy money and wage indexation. The Peruvian experience, on the other hand, is much more similar to the classical episodes, the rise in seigniorage leads the outbreak of hyperinflation.

Their ability to avoid hyperinflation for such a long time was related to the development of mechanisms that allowed them to live with inflation. We already mentioned that in the classical episodes government revenues collapsed, usually before the full hyperinflation set in (e.g. in Bolivia tax revenues more than halved as inflation reached three digit levels). On the other hand, Argentina and Brazil were able to maintain government revenues at stable levels in spite of the increases of inflation (see table 4). There is no noticeable loss of revenues in Brazil in spite of dramatic increases in inflation since 1986. Likewise, in Argentina, for which we have quarterly

# TABLE 4
## ARGENTINA, PERU AND BRAZIL HYPERINFLATIONS /1
## (as % GDP)

| | | EXPENDITURE | REVENUE /2 | TAX REVENUE | REVENUE / EXPEND. | INFLATION /3 |
|---|---|---|---|---|---|---|
| ARGENTINA | 1985 | 42.26 | 38.82 | 22.04 | 0.91860 | 672.2 |
| | 1986 | 39.18 | 36.96 | 21.96 | 0.94334 | 90.1 |
| | 1987 | 39.28 | 33.75 | 20.81 | 0.85922 | 131.3 |
| | 1988 | 34.08 | 28.97 | 16.21 | 0.85006 | 343.0 |
| | I | 35.68 | 28.83 | 17.39 | 0.80847 | 179.9 |
| | II | 34.20 | 30.50 | 16.64 | 0.89181 | 480.0 |
| | III | 30.56 | 27.93 | 15.97 | 0.91394 | 954.8 |
| | IV | 36.47 | 29.19 | 15.90 | 0.80036 | 220.2 |
| | 1989 | 30.65 | 27.58 | 16.16 | 0.89400 | 3079.8 |
| | I | 37.15 | 28.86 | 15.74 | 0.77685 | 189.2 |
| | II | 36.68 | 26.76 | 11.52 | 0.69183 | 12459.0 |
| | III | 22.49 | 24.06 | 14.71 | 1.06981 | 198171.2 |
| | IV | 36.01 | 30.27 | 17.80 | 0.84060 | 350.9 |
| | 1990 | 26.06 | 28.07 | 16.95 | 1.07713 | 2314.0 |
| | I | 22.62 | 21.23 | 12.35 | 0.93855 | 35399.7 |
| | II | 31.28 | 29.27 | 17.40 | 0.93574 | 1807.3 |
| | III | 30.59 | 28.88 | 17.28 | 0.94410 | 352.0 |
| | IV | 29.52 | 28.51 | 17.13 | 0.96579 | 192.1 |
| PERU | 1985 | 23.50 | 14.60 | 14.30 | 0.62979 | 163.4 |
| | 1986 | 21.30 | 12.60 | 12.20 | 0.59155 | 77.9 |
| | 1987 | 16.20 | 9.20 | 9.30 | 0.56549 | 85.8 |
| | 1988 | 15.60 | 9.20 | 9.10 | 0.58974 | 667.0 |
| | I | 18.90 | 10.90 | 11.20 | 0.57672 | 310.4 |
| | II | 14.00 | 9.10 | 9.50 | 0.65000 | 424.2 |
| | III | 17.50 | 7.70 | 7.90 | 0.44000 | 2615.3 |
| | IV | 14.70 | 9.70 | 9.30 | 0.65986 | 6501.3 |
| | 1989 | 13.20 | 6.00 | 6.50 | 0.45455 | 33398.6 |
| | I | 14.40 | 9.10 | 9.40 | 0.63194 | 6830.6 |
| | II | 12.70 | 7.70 | 7.90 | 0.60630 | 4579.9 |
| | III | 12.40 | 5.50 | 6.00 | 0.44355 | 1362.4 |
| | IV | 13.60 | 5.70 | 6.20 | 0.41912 | 1527.6 |
| | 1990 | 14.50 | 7.60 | 7.90 | 0.53793 | 7481.7 |
| | I | 12.70 | 4.80 | 5.00 | 0.37795 | 2403.8 |
| | II | 21.30 | 5.40 | 5.70 | 0.25352 | 3728.5 |
| | III | 13.70 | 6.60 | 6.70 | 0.48175 | 524510.2 |
| | IV | 14.40 | 8.60 | 8.70 | 0.59722 | 942.4 |
| BRAZIL | 1986 | 29.20 | 27.10 | 20.30 | 0.92808 | 145.2 |
| | 1987 | 31.90 | 27.00 | 18.10 | 0.84639 | 229.7 |
| | 1988 | 30.70 | 28.30 | 17.80 | 0.92182 | 682.3 |
| | 1989 | 34.90 | 26.20 | 18.40 | 0.75072 | 1287.0 |
| | 1990 | 32.70 | 31.50 | 23.90 | 0.96330 | 2937.8 |
| | 1991 /4 | 28.30 | 27.60 | 20.30 | 0.97527 | 440.8 |

***SOURCES :***

*ARGENTINA, Ministry of Economy. PERU, Central Bank of Peru. BRAZIL, Brazil-Recent economic Development.*

*/1 : Consolidated Public Sector (Brazil and Argentina), Central Government (Peru).*

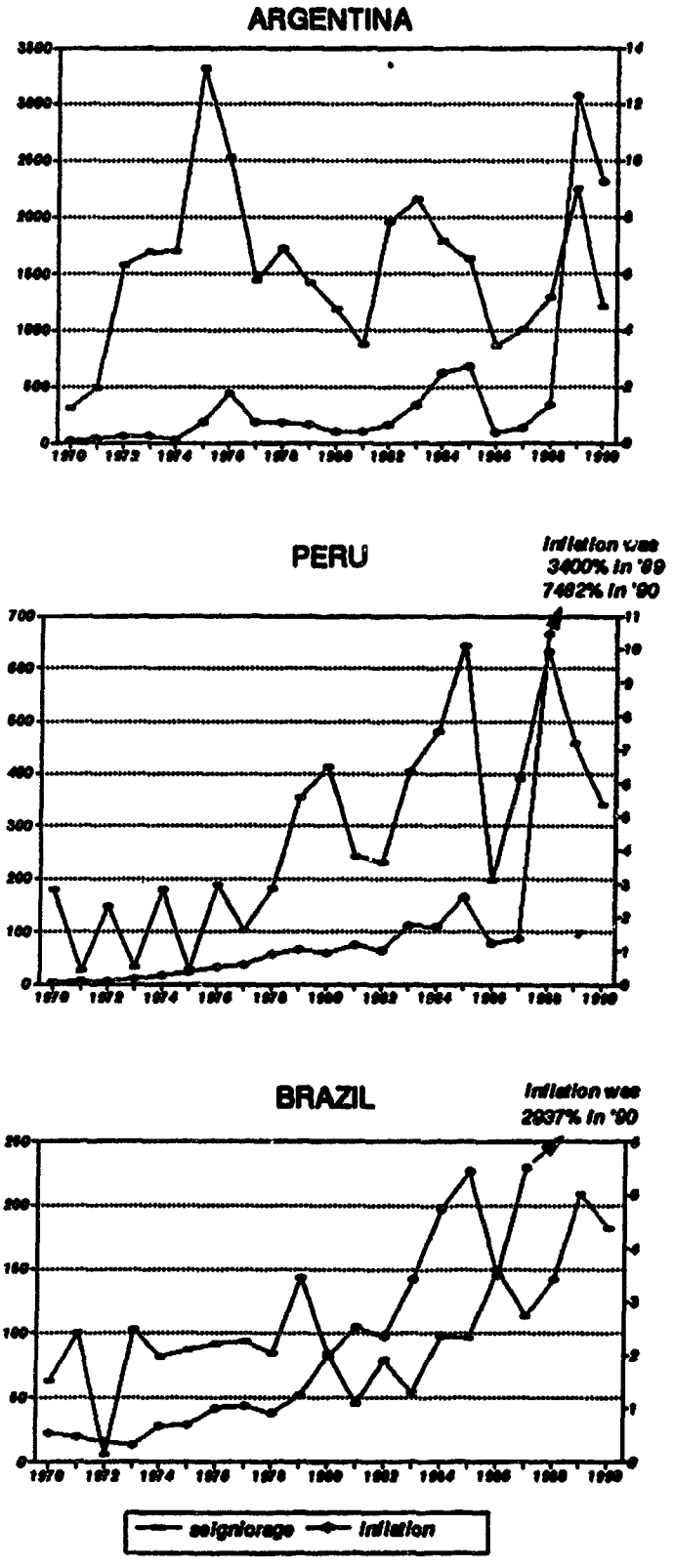
*/2 : Total revenue, except for Peru is only the current revenue.*

*/3 : The quarterly datas are annualized.*

*/4 : projected*

Figure 2

# INFLATION - SEIGNIORAGE



# Table 5a
# Argentina: Annual Indicators

| Period | Inflation | GDP Growth | Seignorage | M1/ GDP | PubExp/ GDP | PubDef/ GDP | CurrAcc/ GDP | TraBal/ GDP | Terms of Trade | Real Exch. Rate | Net Transfers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970-1974 | 38.30 | 3.47 | 4.60 | 15.10 | 40.19 | 4.93 | -0.35 | 0.96 | 141.52 | 135.50 | -0.07 (**) |
| 1975-1979 | 227.58 | 1.84 | 8.36 | 8.88 | 45.53 | 6.84 | 0.44 | 2.07 | 112.44 | 187.39 | 0.38 |
| 1980-1982 | 123.34 | -3.39 | 5.37 | 7.07 | 50.51 | 5.54 | -3.47 | 1.26 | 96.03 | 140.59 | 2.42 |
| 1983 | 343.82 | 2.92 | 8.61 | 5.12 | 55.59 | 10.71 | -3.77 | 5.75 | 96.20 | 218.85 | -0.46 |
| 1984 | 626.72 | 2.46 | 7.12 | 4.01 | 51.86 | 7.65 | -3.21 | 5.12 | 97.00 | 184.78 | -4.58 |
| 1985 | 672.15 | -4.38 | 6.51 | 3.89 | 52.09 | 2.16 | -1.46 | 7.41 | 89.80 | 207.83 | -6.36 |
| 1986 | 90.10 | 5.40 | 3.46 | 5.20 | 50.58 | 2.22 | -3.63 | 3.10 | 85.30 | 200.51 | -6.04 |
| 1987 | 131.33 | 2.37 | 4.03 | 4.43 | 50.05 | 5.54 | -5.13 | 1.23 | 81.80 | 215.13 | -4.99 |
| 1988 | 342.96 | -2.75 | 5.17 | 3.24 | 37.53 (*) | 5.10 | -1.75 | 4.73 | 86.20 | 222.21 | -2.54 |
| 1989 | 3079.81 | -3.77 | 9.00 | 3.05 | 33.26 | 3.27 | -2.16 | 9.47 | 89.60 | 165.25 | -5.04 |
| 1990 | 2313.97 | -1.96 | 4.81 | 2.38 | 31.08 | 0.97 | 2.29 | 11.05 | n.a. | 176.09 | -3.57 |

*SOURCES*

*Seigniorage* : *Based in M1.*
*M1* : *M1 average. ANDREX.*
*Public Expenditure* : *current+capital expenditure, operations of the Consolidated Public sector. 1970-1985 FIEL, 1986-1990 Central Bank.*
*Public Deficit* : *Overall Deficit, operations of the Consolidated Public sector. 1970-1985 FIEL. 1986-1990 Central Bank.*
*External Sector* : *ANDREX.*
*Exchange Rate* : *Nominal exchange rate, oficial market. Period average. IFS.*
*Terms of Trade* : *Terms of trade index 1980=100. ANDREX.*
*Real Exch.Rate* : *Real multilateral exchange rate index with respect to the top twenty trading partners. 1980=100.*
*Net transfers* : *World Debt Tables, short and long term net transfers including IMF.*
*(*)* : *starting in 1988 it excludes most transfers.*
*(**)* : *1971-1974*

# Table 5b
# Brazil: Annual Indicators

| Period | Inflation | GDP Growth | Seignorage | M1/ GDP | PubExp/ GDP (*) | PubDef/ GDP | CurrAcc/ GDP | TraBal/ GDP | Terms of Trade | Real Exch. Rate | Net Transfers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970-1974 | 19.67 | 11.61 | 1.53 | 15.58 | 35.79 | _ | -2.00 | -1.04 | 167.22 | 69.99 | 3.05 (**) |
| 1975-1979 | 41.22 | 5.98 | 2.38 | 11.18 | 47.12 | _ | -3.96 | -1.26 | 135.06 | 73.90 | 2.33 |
| 1980-1982 | 95.38 | 1.75 | 2.01 | 6.86 | 48.26 | 5.76 | -5.17 | -0.16 | 94.03 | 88.39 | -0.73 |
| 1983 | 142.14 | -3.47 | 1.30 | 4.59 | 45.97 | 4.80 | -3.30 | 3.14 | 91.00 | 100.75 | -1.43 |
| 1984 | 196.98 | 5.17 | 2.34 | 3.36 | 43.83 | 2.70 | 0.02 | 6.14 | 94.00 | 109.85 | -1.22 |
| 1985 | 226.86 | 8.26 | 2.32 | 4.03 | 49.11 | 4.30 | -0.10 | 5.47 | 89.10 | 111.97 | -2.80 |
| 1986 | 145.24 | 7.54 | 3.60 | 8.69 | 29.20 | 3.60 | -2.00 | 3.06 | 110.00 | 109.31 | -3.46 |
| 1987 | 229.66 | 3.63 | 2.73 | 4.95 | 31.90 | 5.50 | -0.50 | 3.68 | 97.20 | 100.10 | -2.80 |
| 1988 | 682.30 | 0.01 | 3.41 | 3.07 | 30.70 | 4.80 | 1.20 | 5.47 | 116.80 | 91.27 | -2.65 |
| 1989 | 1286.98 | 3.60 | 5.02 | 2.25 | 34.90 | 6.90 | 0.23 | 3.59 | 120.10 | 74.78 | -1.72 |
| 1990 | 2937.82 | -4.28 | 4.36 | 3.75 | 32.70 | -1.30 | 0.05 | 2.11 | n.a. | 62.60 | -0.74 |

*SOURCES*

*Seignorage* : *based in Monetary Base.*
*M1* : *M1 average, Central Bank.*
*Public Expenditure* : *total expenditures of the Operations of the Central Gov.+Operat. of Public Enterp.,1960-1985: Werneck.*
*Public Deficit* : *Public sector operational deficit. Brazilian Institute of Geography and Statistics.*
*External Sector* : *ANDREX*
*Exchange Rate* : *Nominal exchange rate, period average, IFS.*
*Terms of Trade* : *Terms of trade index 1980=100. ANDREX.*
*Real Exch.Rate* : *Real multilateral exchange rate index with respect to the top twenty trading partners. 1980=100.*
*Net transfers* : *World Debt Tables, short and long term net transfers including IMF.*
(*) : *after 1985: nonfinancial expenditures of the Public sector, IMF.*
(**) : *1971-1974*

# Table 5c
# Peru: Annual Indicators

| Period | Inflation | GDP growth | Seigniorage | M1/ GDP | PubExp/ GDP | PubDef/ GDP | CurrAcc/ GDP | TraBal/ GDP | Terms of Trade | Real Exch. Rate | Net Transfers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970-1974 | 9.08 | 6.27 | 1.53 | 14.86 | 29.08 | 2.84 | -1.21 | 1.17 | _ | 68.93 | 0.34 (**) |
| 1975-1979 | 43.94 | 1.59 | 2.41 | 13.45 | 40.62 | 6.38 | -3.36 | -0.06 | _ | 87.60 | 2.85 |
| 1980-1982 | 66.34 | 3.28 | 2.35 | 8.34 | 41.41 | 6.10 | -4.63 | 0.91 | 123.83 | 88.78 | -1.68 |
| 1983 | 111.13 | -12.64 | 2.87 | 6.58 | 56.03 | 10.23 | -4.39 | 1.47 | 110.60 | 88.42 | 2.66 |
| 1984 | 110.21 | 4.81 | 2.45 | 5.57 | 48.17 | 6.51 | -1.07 | 4.82 | 101.00 | 88.39 | 2.34 |
| 1985 | 163.41 | 2.27 | 9.86 | 6.09 | 48.30 | 2.51 | 0.75 | 6.50 | 90.60 | 105.67 | -0.62 |
| 1986 | 77.92 | 9.24 | 4.23 | 8.69 | 39.53 | 5.20 | -4.02 | -0.24 | 66.40 | 82.31 | -1.39 |
| 1987 | 85.85 | 8.31 | 5.74 | 8.58 | 34.35 | 6.90 | -3.37 | -1.19 | 66.90 | 56.98 | 0.29 |
| 1988 | 667.03 | -8.22 | 7.69 | 5.04 | 34.20 | 7.59 | -2.97 | -0.26 | 74.90 | 42.52 | 0.41 |
| 1989 | 3398.58 | -11.61 | 6.10 | 3.43 | 23.50 | 6.16 | 0.80 | 3.24 | 72.50 | 41.11 | 0.40 |
| 1990 | 7481.66 | -4.85 | 5.42 | 3.96 | 22.90 | 3.04 | -1.60 | 0.69 | 65.00 | n.a. | 0.24 |



*SOURCES*

*GDP* : *Central Bank of Peru, millions of Intis 1979.*

*CPI* : *Consumer Price Index for Metropolitan Lima.1979=100. INE.*

*Seigniorage* : *Monetary Base : Currency + Bank Deposits. Central Bank.*

*M1* : *M1 average, IFS*

*Public Expendit* : *current+capital expenditure, non financial public sector operation. Central Bank.*

*Public Deficit* : *Overall Deficit, non financial public sector operation. Central Bank.*

*External Sector* : *Central Bank. Millions of US$.*

*Exchange Rate* : *nominal exchange rate, official market. Period average. Central Bank.*

*Terms of Trade* : *Terms of trade index 1978=100. Central Bank.*

*Real Exch.Rate* : *Real multilateral exchange rate index with respect to the top twenty trading partners,1980=100.*

*Net Transfers* : *World Debt Tables, short and long term net transfers including IMF.*

*(**)* : *1971-1974*

data, we find that the hyperinflation had only a discernable impact on revenues during the second quarter of 1989. Only in Peru we find some evidence of a fall in revenues, although the most dramatic fall occurred relatively late in the inflation process (between the 3rd quarter of 1989 and second quarter of 1990).

The ability to cope with high inflation, which was absent in the classical episodes, can explain why these economies were able to avoid hyperinflation for a long time. In spite of large budget deficits and short periods of high seigniorage, inflation was high but not exploding. This was possible because revenues did not collapse (as was the case in the classical hyperinflations) and hence the governments were able to take the required fiscal actions to avoid excessive seigniorage and keep inflation within the boundaries of high inflation.

Nevertheless, as time went by and high inflation persisted it became more difficult to avoid hyperinflation. One important development in this respect was the gradual shrinking of money holdings (relative to GDP) over time, which slowly increased the fragility of the financial system. In Argentina, M1 dropped from 14% of GDP in 1970 to just 3% in 1990; likewise, in Brazil, it fell from 16% in the early seventies to just over 3% of GDP in the late eighties (the drop in the monetary base was similar). As a result, the central bank diminished its ability to offset shocks, and the economy became more susceptible to being destabilized by adverse developments. For example, if the government needs to rely on seigniorage to finance a temporary shortfall in taxes that amounts to 3 percent of GDP, this would have amounted to an approximate 20 percent increase in the monetary base in the early seventies, while in the eighties this would have represented an almost 100 percent expansion. The size of the shocks are dramatically

different, and the inflationary effects are likely to be much larger in the second case. Likewise, shifts in private portfolios are also likely to be more destabilizing the smaller the size of the monetary base relative to domestic liquid assets. This problem is particularly acute in Brazil where the monetary base is just 2 percent of GDP while M4 is close to 30 percent of GDP. In this situation it is almost impossible for the central bank to offset any changes in the demand for domestic assets through open market operations. In particular, a generalized run out of domestic assets will almost certainly result in a significant increase in domestic interest rates or else in a large increase in inflation.

ii. Direct Origins of the Recent Hyperinflations

A distinctive feature of the new hyperinflations was that they were not clearly driven by a single cause; there is no unique simple explanation that can rationalize each of them. This stands in contrast from the CH where the origins were very clear. Instead, they resulted from a combination of several domestic and external factors. In Argentina and Brazil, the hyperinflations were the culmination of a long process of deterioration in the fiscal accounts, increased fragility in the financial system, and a tendency to accept high inflation. As inflation became entrenched at higher plateaus it was more difficult to avoid a final explosion. Of course, the situation was complicated by limited access to external financing since the beginning of the debt crisis, weak monetary and fiscal control, and very limited availability of non-inflationary domestic financing to the government. But each of these elements by themselves need not had caused á hyperinflation.

The story in Peru is somewhat different, because outright populist policies played a big role in starting the hyperinflation. In this respect, the causes were clearer. Nevertheless, after the initial outbreak, the Peruvian hyperinflation and the ensuing stabilization process shared many common elements with those of Argentina and Brazil. In this respect, it does not look like a CH.

It is useful to take another quick look at the relationship between seigniorage and inflation in these three countries (this time using monthly data) before examining each of these experiences more closely. Figure 3 shows the monthly inflation and estimates of the revenue from money creation (or seigniorage) for the three countries.[7] It is clear that in Peru, the beginning of the hyperinflation era was linked to excessive money creation in 1985 and 1986, which eventually led to an explosion in inflation starting in 1988. Likewise, the hyperinflation outburst of 1990 was preceded by a large increase in seigniorage. This episode resembled the CH. In contrast, the relationship between seigniorage and inflation is less clear in Argentina and Brazil. In both cases, seigniorage appears to have increased in response to the beginning of the hyperinflation rather than the opposite as a result of an extreme Olivera-Tanzi effect. Inflation was pulling up seigniorage in the hyperinflations of 1989.

This evidence indicates that the causes of the recent episodes are not as clear as in the classical cases. In what follows we will examine each experience in more detail and indicate in which respects the new episodes are different.

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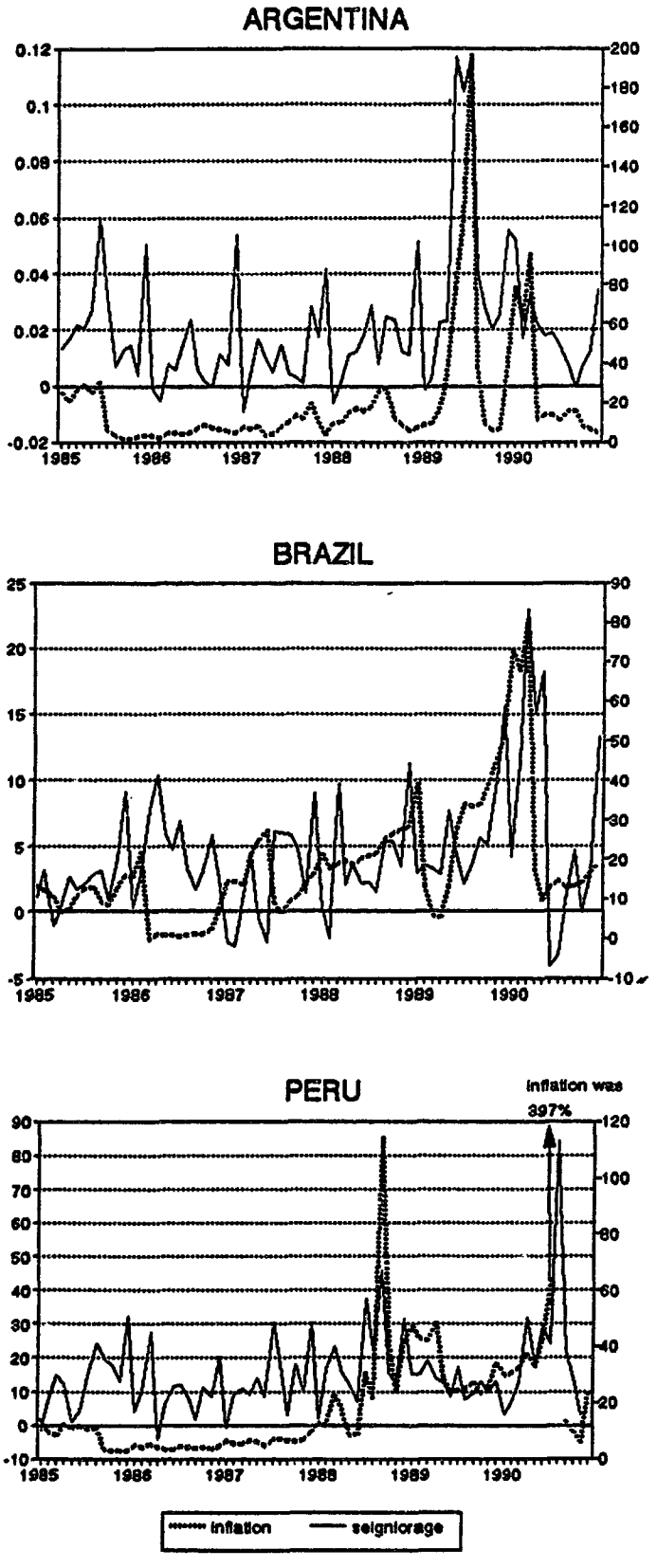
[7] The revenue from money creation is calculated as the change in the money base divided by the price level.

Figure 3

## SEIGNIORAGE AND INFLATION



a. Peru

The hyperinflation in Peru resulted from the over-expansionary domestic policies of Alan Garcia (annual data for Peru is presented in table 5.c). In August 1985, his administration launched a so called stabilization program aimed at reducing inflation which was mainly based on income policies, in the form of price and wage controls, and a fixed exchange rate. This was accompanied by expansionary monetary and fiscal policies. While monthly inflation initially fell from 10 to 3 percent, the success was short lived, as could have been easily predicted. The government succeeded in preventing a full blown increase in inflation by keeping public sectors prices and the official exchange rate artificially low, and by financing the expansion in economic activity through losses in international reserves. In the end, however, the government ran out of reserves, and this triggered the beginning of a long hyperinflation.

One unique and intriguing feature of this hyperinflation was that, by and large inflation did not accelerate in an explosive manner, except at the very end. This stands in contrast with the CH, where once inflation reached hyperinflation levels it very quickly exploded (see figure 3.c). There was an extreme increase in inflation in September 1988 (when inflation exceeded 100 percent), but, to a large extent, this was equivalent to a once and for all increase in the price level in non-inflationary economies. Inflation then remained at the 40 percent per month step for around 7 months, and then fell to the 30 percent per month step for around a year. This ability to maintain relatively stable inflation at rates as high as 30 or 40 percent per month is unique to Peru, since the available evidence from high inflation economies indicates that inflations in excess of 20 percent per month are unstable and lead to hyperinflation (that was the case in Argentina and

Brazil). This in itself is an indication that Peru is part of the high inflation economies and hence that its.hyperinflation has many features in common with those of Argentina and Brazil.

Figure 3.c shows that in Peru, this period of high but stable inflation was accompanied by decreasing seigniorage, thus suggesting that this was probably an important factor in explaining the limited control that the government was able to exert over inflation. This period is generally seen as one of tight money (e.g. Lago (1991)), hence indicating that tight money could be used to avoid an explosion in inflation even in situations where the fiscal position is out of control.

b. Argentina and Brazil

The origins of the hyperinflations in Argentina and Brazil are somewhat different. We already argued that they were not directly generated by unusually large increases in seigniorage. Seigniorage levels, while high, were not out of line with historical levels.

In our view, the more immediate origin of the hyperinflations in these two countries was an increase in the instability of inflation in economies that already were facing very high rates of inflation. This instability developed as a result of stop and go policies towards inflation, in which most stabilization attempts were based on a large dose of income policies. The Austral plan in Argentina and the Cruzado plan in Brazil represent the beginning of this period of inflation-stabilization cycles.[8] In the end, the recurrent failed stabilization attempts destabilized inflation in the longer term, and gave rise to similar hyperinflations in both countries.

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[8] These cycles are examined in more detail in Kiguel and Liviatan (1991).

Of course, failed stabilization attempts would not have resulted in hyperinflations if the economies were not already experiencing high inflation. Likewise, high inflation could have been avoided by the adoption of policies to bring it down at an earlier stage. It was the combination of high inflation and the induced nominal instability, caused by unsound stabilization strategies, that created the conditions for inflation to explode.

The most relevant features of the period of the cycles in Argentina and Brazil can be readily noticed from figures 3.a and 3.b. The 1985 Austral plan in Argentina represented a break with previous stabilization efforts as it was the first comprehensive stabilization program in many years. It was a heterodox program, as it combined orthodox elements --namely a reduction in the budget deficit and a fixed exchange rate-- with the heterodox component --wage and price controls--. The initial success was later reversed, and as inflation started to picked up momentum, it was stopped through a new heterodox program (the first plan Primavera) with less emphasis on fiscal discipline and more on income policies. The failure of this program gave rise to new cycles, which were subsequently stopped by the February plan, the Austral II plan and the better known Plan Primavera. The failure of this last plan gave rise to a full blown hyperinflation.

A similar pattern is apparent in Brazil, where the cycles started with another so called heterodox program: the Cruzado plan. As the Austral plan, it also relied on price and wage controls; unlike the Austral plan, it did not perform any adjustment on the fiscal side. In the end, however, this difference did not matter much, as inflation in Brazil evolved in a similar manner as in Argentina. The follow-up stabilization programs --the Bresser

Plan, the Summer plan, etc.-- shared a similar stabilization strategy, and the ultimate outcomes were essentially the same.

The cycles set the stage for the outbreak of the hyperinflations. In each new cycle, inflation reached a new higher peak, while the periods of low inflation that followed the implementation of each stabilization attempt became shorter. The inflation-stabilization cycles thus became shorter and more pronounced, eventually exploding into hyperinflation in both countries. Hyperinflation was all but unavoidable.

The outbreak of the hyperinflation in Argentina coincided with the collapse of the Plan Primavera. According to most analysts (e.g. Machinea (1990)), the situation was complicated by the possibility that the domestic debt would be repudiated; a situation that led to a flight out of domestic assets. In Brazil, inflation probably accelerated in anticipation of a new income policies based stabilization program to be implemented by the Collor de Melo administration, and the possibility that the government would also repudiate its mushrooming domestic debt (especially once Argentina took those steps in December 1989).

In both cases, however, the specific circumstances that triggered the beginning of the hyperinflation cannot be separated from the overall conditions prevailing at the time. The cycles were explosive, and it is very likely that hyperinflation would have taken place even if there were no expectations that the government would repudiate its domestic debt. Anything short of a major stabilization package capable of changing inflationary expectations in a dramatic way would have been insufficient to avoid hyperinflation.

## V. Programs to Stop Three Big Inflations

### i. Basic Features of the Programs

In the span of a year, Argentina, Brazil and Peru implemented major stabilization programs aimed at stopping hyperinflation. The launching of these programs coincided with the inauguration of a new administration in each country: July 1989 in Argentina under the Menem Administration, March 1990 in Brazil under the Collor de Mello administration, and August 1990 in Peru under the Fujimori administration.

The three stabilization programs represented a break from previous disinflation attempts. There was a clear shift with more emphasis on orthodox measures and only a limited use of income policies, which was done mainly to demonstrate a departure from previous stabilization strategies that were identified with failure. Balancing the budget on a cash basis became an explicit objective of the three programs, and Peru and Brazil were relatively successful in sticking with it. In addition, there was a clear shift in the choice of nominal anchor, relying more on money rather than on the exchange rate (the latter also being associated with failed stabilization attempts). In Peru and Brazil this was done from the outset, while Argentina shifted to a money based program later on (in December) after a failed attempt to stabilize the exchange rate. Finally, the programs were announced as comprehensive efforts also aimed at changing the long term prospects for growth, and for this purpose they included major structural reforms, mainly privatization of public sector enterprises and trade liberalization.

The comprehensiveness of these programs indicates that in all cases policy makers were seriously attempting to bring the economies back to a path

of continuous price stability. The thoroughness of the stabilization attempts and the adherence to fiscal discipline (especially in Peru) indicates that the basic strategy was comparable to the one that succeeded in stopping hyperinflation in Bolivia.

The effectiveness of these programs has been mixed. True, they all succeeded in bringing down inflation quickly from the peaks of the hyperinflation to much lower levels. Nevertheless, inflation has been stubborn, in that the sense that it did not fall to low or moderate levels (unlike the case of Bolivia where it fell to around 20 percent per year). In Argentina, the initial attempt was followed by other deeper stabilization programs, and despite mixed results for a long time, inflation appears to be finally receding; but this took over two years. In Brazil the situation is more difficult, because after the failed stabilization attempt inflation was again on the rise, it then stabilized at around 20 percent per month, and the possibility of a new hyperinflation cannot be ruled out. Finally, Peru is still fighting to get inflation down in a sustainable manner. While the worse part of the hyperinflation seems to be over, the authorities are still fighting monthly rates of inflation which remain stubborn at around 4 percent.

We will now discuss the main features of the programs and examine the reasons for the difficulties that these countries are facing in bringing down inflation in a sustainable manner. In particular, we will argue that it is much more difficult to generate a change of regime after hyperinflation in the high inflation economies than it was in the CH.

ii. Classic Stabilization Programs with Non-Classic Outcomes

a. Peru:

The stabilization program in Peru, launched in August 1990, was designed along the lines of the very effective Bolivian stabilization program, but did not achieve the same degree of success. There was a clear commitment to balancing the budget, and for this purpose the government created a cash committee that would operate under a strict rule of keeping payments in line with revenues, similar to one that operated in Bolivia. The committee in fact has abided by this rule, although some arrears mounted along the way. On the monetary side, the program aimed at restraining monetary growth, although there were no explicit targets except for domestic credit to the government. While the program did not use the exchange rate as the nominal anchor, on the contrary it allowed it to float freely, the exchange rate was stabilized very quickly, as in the CH.

The fiscal adjustment was primarily effected by increasing revenues, which had all but collapsed during the hyperinflation. Government expenditures were already very low, and reducing them further was not a realistic possibility. The increase in revenues was achieved by levying emergency taxes (on trade, real estate, etc.), elimination of tax exemptions and by drastically increasing public sector prices (e.g. the price of gasoline was increased twenty-fold).

In addition, the government announced an ambitious program of structural reforms with the objective of reversing the detrimental effects of widespread government intervention. The foreign exchange market was unified, bank deposits denominated in dollars were authorized, and the economic team quickly started to work on reforming labor market legislation, de-regulation

and trade liberalization, tax reforms, rationalization of public sector expenditures and privatization of public sector enterprises. This was accompanied by a determined effort to reinsert Peru in the world financial markets, reapproaching the multilateral organizations as well as the commercial banks.

This program was very ambitious, and its scope and depth clearly marked a break with the old regime of populism and widespread government intervention. It had many elements that showed a definite commitment to low inflation. In its design, the program did not look very different from the 1985 Bolivian stabilization effort. Both programs combined a commitment to stabilization with structural reforms. While it could be argued that the Peruvian program was fragile, the same could be said about the Bolivian one.

A puzzling aspect of the Peruvian program was that stabilizing the exchange rate was not enough to stabilize prices. Sachs (1986), in discussing the Bolivian experience, argues that in the short run stabilizing the exchange rate was enough to stabilize prices. This, however, was not the case in Peru. So why did Bolivia manage to stop inflation in its tracks while Peru could not?

Our interpretation is that these two countries differed in an important way: Bolivia did not have a tradition of high inflation, while Peru did. The hyperinflation in Bolivia was an unusual event, one that was perceived as clearly out of line with the low rates of inflation that Bolivia had in the past. Once hyperinflation came to an end the economy went back to the "normal" 20 percent annual rate of inflation. Peru, on the other hand, had traditionally been a high inflation country. The hyperinflation was the culmination of a long process in which inflation went up over the years. The hyperinflation was an extreme event, but the fact that it lasted as long as

it did is an indication that the economy could function (though not very well) with extremely high rates of inflation (around 25 percent per month for over 2 years). The final inflationary explosion (over 300 percent in just one month) was not enough to eliminate the perception that Peru was an "inflationary" economy. Inflation remained alive, though at much reduced levels, mainly because the public had entrenched inflationary expectations, which in the end became self-fulfilling.

b. Brazil

The Brazilian stabilization program of March 1990, the Collor Plan, also started along very orthodox lines and shared many elements with programs that stopped hyperinflation. The program also included a comprehensive package of structural reforms clearly indicating a change of regime. The main objective was to reduce the role of the state in the economy, and it included privatization of public sector enterprises, trade liberalization and reforms in the labor market. On the fiscal side, there was a firm commitment to eliminate the budget deficit, and to generate a surplus in the primary and operational balances in 1990, an objective that was achieved. The available information indicates that the primary surplus between April and December 1990 was around 2.5% of GDP. This was a major achievement, given that the government had been running deficits in previous years.

Income policies played a secondary, temporary role only at the beginning of the program. This represented a clear departure from previous stabilization strategies, which put more weight in fighting the "inertial" forces of the inflation process, and essentially viewed as unnecessary any adjustment in the fundamentals.

A central, though controversial, component of the program was a mandatory freeze of approximately 70 percent of the financial assets for 18 months. While depositors lost access to their money during the freeze, the funds were supposed to earn indexation plus 6 percent per annum, with no servicing till September 1991. Until the freeze was enacted, most public's financial assets were in fact domestic government debt, with one day maturity and at a floating interest rate. The financial system acted primarily as an intermediary for the government. The main purpose of the freeze was to improve the fiscal balance (by postponing payment on the service of domestic debt) and to regain control over the monetary aggregates.[9]

As a result of the freeze liquidity fell from around 30 percent to just 9 percent of GDP. This drastic reduction in liquidity started to exert severe recessionary pressures early on, prompting the authorities to implement a partial reversal of policies. As a result, by the end of April liquidity increased to around 15 percent of GDP. In spite of this reversal, money continued to be tight in the sense that monetary aggregates remained well below the levels where they were prior to the Collor Plan.

In contrast to the Argentine and Peruvian programs, the exchange rate continued to be managed as in the past. It was not used as the nominal anchor, in fact, most of the time the exchange rate had a passive role and simply accommodated inflation. Nevertheless, as in the other two programs the parallel exchange rate was stabilized.

As in the other recent experiences, despite a major stabilization effort inflation was not eliminated. On the contrary, after an initial fall from 81 percent in March 1990 to just 9 percent in May, inflation climbed

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[9] Zinni (1992) provides a more detailed description and analysis of the freeze.

back to 19 percent in December and has remained high since then.[10] The final effect of this program was thus not very different from previous ones that did much less in terms of fiscal and monetary adjustment. A frustrating outcome.

A new set of measures, the Collor II plan, was announced on January 31, 1991 to deal with the resurgence of inflation. One component of the new program was an attempt to deepen the fiscal adjustment, by dealing with the finances and the debt overhang of the state and local governments. However, this orthodox message was accompanied with the old practice of price and wage controls (which proved ineffective in the past), and attempts to new regulate financial markets, this time by eliminating overnight operations.

These mixed signals had a negative effect on the government's image. The initial attitude of the Collor administration of being tough and willing to pay the costs of disinflation, gave way to one where the authorities were concerned about reducing the costs of this process. In addition, the use of old failed policies also affected expectations in an adverse way, as they were associated with quick increases in inflation.

c. Argentina

The Argentine stabilization program of July 1989, the Bunge & Born (BB) plan, was the first stage of what has been a long term effort to stop hyperinflation. In contrast to the programs in Brazil and Peru, the BB plan used the exchange rate as its nominal anchor, though as the others, it was solely based on orthodox measures and explicitly avoided the imposition of any type of controls on prices or wages. It also relied on a major fiscal

[10] Monthly data disguises the fact that prices were fully stabilized for around 3 weeks early on.

adjustment, and it announced major structural reforms. Among them was the privatization of the national telephone company (ENTEL) and the national airline (Aerolineas Argentinas).

The program evolved through a number of phases, as new waves of increases in inflation forced the introduction of new measures to stabilize in a sustainable manner. The BB plan was followed by three stabilization efforts, each of them strengthening the prospects for price stability: the Plan Bonex, of December 1989 included a forced rescheduling of the domestic debt (similar to the one later implemented in Brazil), aimed at improving control on the money supply and reducing the budget deficit by severing the links between tight money and high interest rates. Liquidity was cut sharply, because short term time deposits were exchanged for long term bonds which were transacted in the secondary market at around 30 percent of their face value. The Plan Bonex also represented a change in the stabilization strategy, as the exchange rate was allowed to float and money took the role of nominal anchor. This harsh program failed to control inflation, and the government responded with a new stabilization effort in March 1990 (the Decree 435). This program essentially supplemented the previous one by deepening the fiscal adjustment (through cuts in subsidies and public employment as well as some revenue enhancing measures). Once again, there was a reversal on the inflation front with a brief acceleration in January and February 1991. In response to the latest reversal, a new economic team (led by minister Cavallo) announced a major stabilization effort, the convertibility or Autumn plan, the most recent and audacious effort to stop inflation. Not only was there a stronger effort on the fiscal side, especially through higher revenues, but the new economic team went further and tied its own hands by adopting full currency convertibility at a fixed

exchange, and imposing strict limits on the amount of central bank financing to the non-financial public sector. Under the convertibility scheme, the central bank is required to hold enough international reserves to back the monetary base, while any devaluation will need to be approved by congress.[11] The program is showing signs of success, as of November 1991 inflation was still falling, and converging to international levels, though there has been a slight setback in January 1992, as inflation reached 3%. While it is still too early to assess the sustainability of this program, it seem clear that the economy is much closer to securing price stability than it has been in the last four decades.

iii. Why has Inflation been so Persistent?

Based on the findings of Sargent (1982) and Dornbusch and Fischer (1986) one would have predicted that given that the three countries were facing acute hyperinflations, and that the three of them launched orthodox stabilization programs which also included all the ingredients that could signal a change of regime (of the type suggested by Sargent), the ensuing outcome would have been price stability. However, this did not happen. Neither was the case that stabilizing the exchange rate was enough to stabilize prices (as argued in Sachs (1986) for his analysis of Bolivia). Argentina and Peru stabilized the exchange rate, but inflation continued at a higher pace.

Much of the existing literature (including Kiguel and Liviatan (1988)) argues that hyperinflations must come to an end because they represent an unsustainable process. Government revenues collapse, production comes to a

[11] See Canavese (1992) for a more detailed analysis of the Convertibility program.

halt, and the whole economy starts to show strains that did not exist before. These costs were apparent in the three new hyperinflations. Argentina and Peru experienced negative growth during the hyperinflations (as was the case in Bolivia), while Brazil barely managed to grow. Regarding government revenues, Peru clearly experienced a collapse in this respects as tax revenues fell to around 4 percent of GDP, while Argentina faced for the first time a deterioration in public receipts in the second quarter of 1989. A second reason that makes stabilization easier is the spread of dollarization, i.e. the use of the dollar as unit of account and store of value. Prices and wages are highly synchronized in these circumstances, and hence a sound orthodox program that succeeds in stabilizing the exchange rate also succeeds in stabilizing prices. Hyperinflation is a bubble which can be brought down very quickly.

These arguments are largely true even for the new hyperinflations. Indeed, the hyperinflations were brought to an end, as they proved to be excessively costly. This was done through the adoption of an orthodox stabilization program that also signalled a change in regime, as was the case in the classic hyperinflations. Though the exchange rate was stabilized this was not enough to stabilize prices.

Traditional wisdom thus failed in one respect: once the bubble was brought down, the economies went back to "normal". In countries that have a tradition of high inflation, normal does not mean price stability (as in Bolivia) but instead inflation rates much above international levels. Where does this rate lie? It would be presumptuous to be precise about this "normal" rate, but it must lie close to rates are considered to be sustainable and at which the economy was able function in the past. In Peru this meant around 4-7 percent per month, in Argentina somewhere between 7-10

percent per month, and in Brazil a rate that is higher. The stabilization process thus continues for a longer time, and only with a drastic and persistent stabilization program will inflation eventually come down. The hyperinflation, however, can make the job of bringing down inflation easier than before, because the public went through this dreadful experience and hence would be willing to accept sacrifices in order to avoid its recurrence.

iv. Was there a Change of Regime?

Supporters of Sargent's view would argue that inflation continued because the authorities did not manage to demonstrate that there had been a change of regime. This argument is difficult to refute because the concept of change of regime is basically subjective and country specific. Nevertheless, people familiar with previous programs aimed at stopping inflation in these countries could easily be convinced that the new programs were a clear departure from the past; they were more daring and comprehensive.

An alternative, more plausible view is that in the high inflation economies the change of regime that is necessary to block hyperinflation is different from the one required to stabilize prices in the long term. Indeed, it is relatively easy to bring down inflation from the heights of hyperinflation to "historical" levels. Once inflation stabilizes at somewhere between 5 and 10 percent per month, additional actions are required to show that a change of regime actually had taken place.

The recent Argentine experience is useful to illustrate this fact. Figure 2 shows quite clearly the period of exploding cycles, that preceded the BB plan, has been followed by another of converging cycles. The BB plan was successful in stopping hyperinflation, though inflation continued at

around 5 percent per month. The initial program was clearly unsuccessful in showing that the new regime was one of price stability. The failure of the initial attempt became apparent when a new inflationary explosion started in December 1989, prompted by a new run towards foreign currency as the government announced the plan Bonex. This new burst of hyperinflation was milder and shorter than previous ones, and again it was brought down very quickly, this time through a program that succeeded in stabilizing the exchange rate (which was at the time flexible). Inflation, however continued at rates far above international levels (around 10 percent per month) for almost a year, and then it experienced a new increase inflation, which was even shorter and milder. Since then inflation has been receding, and recently has been hovering around 1.5% per month, a major achievement.

The new pattern of converging cycles has been induced by a continuous stabilization effort, where each set back (or rekindle of inflation) was fought with a new, more drastic program. The Bonex plan tried to provide a permanent solution to the domestic debt problem that had undermined so many stabilization efforts in the past. Likewise, the Decreto 435 stabilization attempt went much further on the fiscal side than any previous programs. The government was finally confronting the industrial promotion law which provided generous subsidies and open numerous tax loopholes without clearly incentivating industrial activities, and also announced important changes in tax administration and public sector reform. Likewise, the convertibility program went further than the others in imposing fiscal discipline, at the same time that undertook numerous "real" measures to improve enforcement in tax payments.

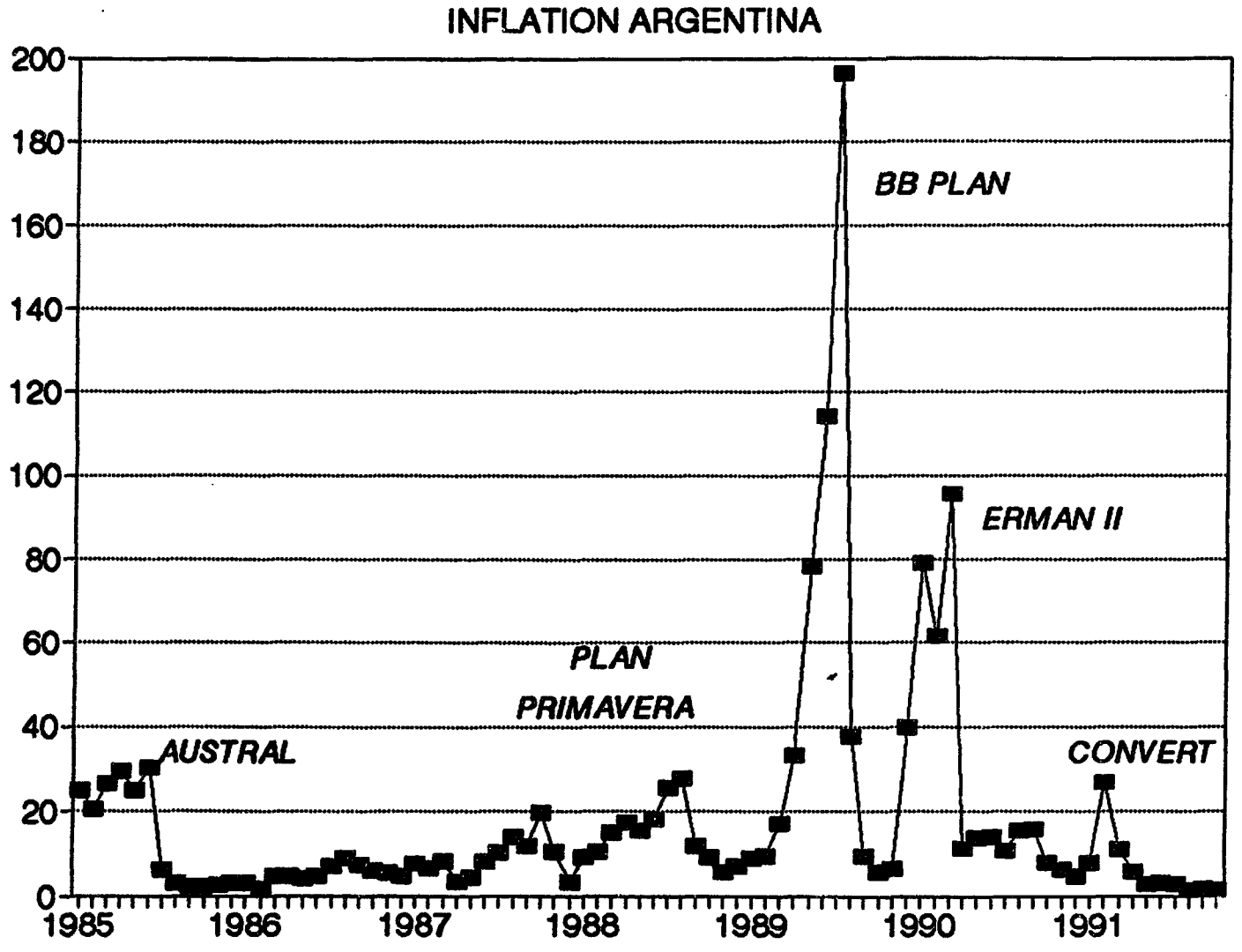
During these two and a half years, in spite of changes in economic teams, the movement has been in just one direction: more fiscal adjustment,

through privatization of public sector enterprises, rationalization of public sector expenditures and better enforcement on tax collection (the latter has recently been accompanied by a simplification and rationalization of the tax system). Not once during these years there has been an important reversal in policies. In addition, unlike the period in which the cycles were becoming more explosive, the authorities have refrained from actively using price and wage controls as a way to bring down inflation, and have instead stressed the importance of getting the fundamentals in place.

The implementation of major structural reforms which unambiguously indicates that the economy is moving away from a model in which growth is based on import substitution with an active participation of the state was an important part of the change of regime. Privatization of public sector enterprises, elimination of subsidies to inefficient industries, elimination of restrictions to international trade and foreign investment are among the measures that have shown unambiguously that the country is relying on a market economy and clear rules of the game to lead growth. These measures complemented the stabilization efforts as they indicated that elimination of inflation was just one part of a much broader project. While inflation was not considered an obstacle for the previous model, it definitely is for an economy that is serious about restoring sustained growth.

Confidence in the program appears to have grown pari passu with the government's commitment to the stabilization effort. Figure 5 shows the evolution of the ratio of market price to the par price of the Bonex (series 1982), a medium term government bond denominated in dollars. It can readily be noticed that the market price of the bonds collapsed during the hyperinflation. On the other hand, there has been a marked and continuous improvement since the BB plan onwards, and while there were a few "panics",

Figure 4


INFLATION ARGENTINA
200
180
160
140
120
100
80
60
40
20
0
1985
1986
1987
1988
1989
1990
1991
AUSTRAL
PLAN
PRIMAVERA
BB PLAN
ERMAN II
CONVERT

the Bonex is now quoting at their highest level in recent years. This can be interpreted as greater confidence on the fiscal situation, and on the government's ability to control inflation.

One lesson that comes out of the Argentine experience is that it is more difficult to demonstrate a change of regime in high inflation economies than it was in the CH. In contrast to the CH, the origins of high inflation is unusually not as clear, and the commitment to bring it down can not be shown as easily. In fact, it is likely to take a relatively long time, as was the case in Argentina. During that period inflation is likely to persist, and new hyperinflation outbursts might be unavoidable.

A second lesson that comes out from this experience is that there are strong complementarities between stabilization and structural reforms. The gains in this area twofold: first, they both contribute to a better allocation of resources, and second, and more important, doing them together sends a stronger signal regarding the direction in which the economy is moving.

The Argentine experience on the change of regime has useful lessons for Peru and Brazil, two countries that have not yet got to the point where Argentina is right now. In both countries inflation shows persistence. The trend, however, is different in each of them. The policy stance of the Peruvian authorities and the results achieved so far provide reason to expect that the program could produce good outcomes in the medium term. After the initial reduction, there was an increase in inflation in December and January, but was relatively small and short lived (see figure 1.c). On the other hand inflation fell to around 4 percent per month, but with no clear signs of receding. The policy stance adopted since the Fujimori administration took power has been supportive of a change of regime, but the

authorities have not yet succeeded in consolidating the fiscal position which remains very fragile (revenues are still low relatively to what is need to sustain an adequate level of government expenditure), while key structural reforms (namely privatizations) are just now being implementing.

In Brazil, on the other hand, there is not yet evidence that the explosive cycles of high inflation are moving one way or the other. In addition the policy signals are mixed. While the need for fiscal adjustment is widely acknowledge, and the government has been able to maintain a fiscal surplus, the privatization process has been slow and troubled by setbacks. At the same time, the authorities resorted one more time to price and wage controls in the Collor II stabilization program, an action identified with failed stabilization programs.

## VI. Final Remarks

Much of the existing literature fails to recognize that high inflation (i.e. annual rates in three digits) is a distinct phenomenon from moderate and hyper-inflation.[12] The failure to understand the specific features of the inflation process in the chronic high inflation economies has many times led to a wrong diagnosis of the underlying reasons for changes in inflation in these economies, and the policies that are needed to stabilize prices in these countries. These lack of full understanding extends to the interpretations of the recent hyperinflation in some of these economies.

Argentina, Brazil and Peru in the eighties are certainly part of the high inflation economies. The recent hyperinflations in these countries were not isolated episodes; instead they were the culmination of an unstable

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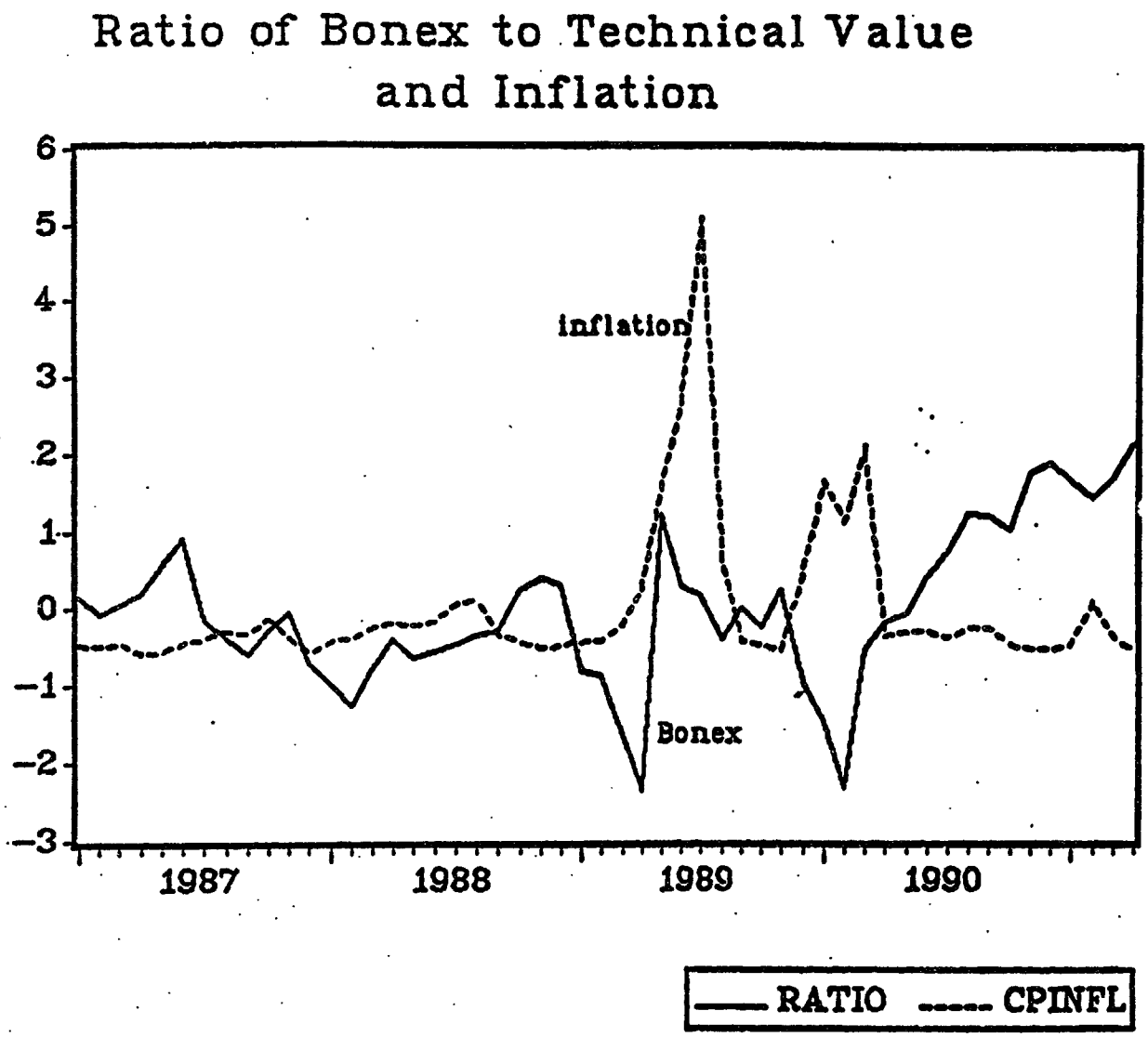
[12] Kiguel and Liviatan (1988) discuss some of the especial features of these economies.

Figure 5


Ratio of Bonex to Technical Value
and Inflation
6
5
4
3
2
1
0
−1
−2
−3
inflation
Bonex
1987
1988
1989
1990
RATIO
CPINFL

process, in which inflation crept up gradually for many years before accelerating into an explosive path. These episodes were important because they helped to dispel the myth that it is possible to maintain a stable high rate of inflation on a long term basis, without harmful effects on growth.[13]

The causes of the new hyperinflations were not as clear as in the classical episodes, as they originated from a combination of fiscal and non-fiscal factors. The chronic fiscal imbalances eventually became an unsurmountable obstacle, and inflation moved away from the fragile high inflation equilibrium into hyperinflation. The interesting feature of the new episodes (especially in Argentina and Brazil) is that they were not triggered by a large increase in the budget deficit; instead, because the initial equilibrium was so fragile, inflation was in the end destabilized by financial shocks.

An important lesson of the new hyperinflations is that the process of restoring price stability has been longer and more costly than in the classical cases. The main reason for this outcome is that it is not clear in the publics' minds where will inflation settle once hyperinflation is stopped. In the CH expectations were that inflation would return to the low levels that prevailed before. In contrast, in the new episodes there is no compelling reason for agents to expect that the economy would go back to low inflation. Experienced showed that inflationary expectations initially settled near to the level where inflation was prior to the hyperinflation. As a result, the disinflation process must continue once hyperinflation is stopped.

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[13] This view was especially strong among Brazilian economists, who used the experience of the late seventies to argue that high inflation is not an obstacle to growth. These arguments proved wrong in the eighties, when inflation went out of control and growth collapsed.

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# MONTHLY INFLATION

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | AUSTRIA | GERMANY | [illegible] | [illegible] | | BOLIVIA | |
| 1920 | 0.01 | n.a | 56.91 | n.a | n.a | 1983 | 0.01 | -0.67 |
| | 0.02 | n.a | 34.13 | n.a | n.a | | 0.02 | 10.53 |
| | 0.03 | n.a | 1.16 | n.a | n.a | | 0.03 | 11.90 |
| | 0.04 | n.a | -8.19 | n.a | n.a | | 0.04 | 8.51 |
| | 0.05 | n.a | -3.62 | n.a | n.a | | 0.05 | 9.80 |
| | 0.06 | n.a | -8.61 | n.a | n.a | | 0.06 | 3.57 |
| | 0.07 | n.a | -0.72 | n.a | n.a | | 0.07 | 10.34 |
| | 0.08 | n.a | 5.84 | n.a | n.a | | 0.08 | 25.00 |
| | 0.09 | n.a | 3.45 | n.a | n.a | | 0.09 | 17.50 |
| | 0.10 | n.a | -2.00 | n.a | n.a | | 0.10 | 11.70 |
| | 0.11 | n.a | 2.72 | n.a | n.a | | 0.11 | 24.76 |
| | 0.12 | n.a | -4.64 | n.a | n.a | | 0.12 | 25.19 |
| 1921 | 0.01 | n.a | 0.00 | n.a | n.a | 1984 | 0.01 | 9.76 |
| | 0.02 | 41.00 | -4.17 | n.a | 28.60 | | 0.02 | 22.76 |
| | 0.03 | -13.48 | -2.90 | n.a | 3.31 | | 0.03 | 21.27 |
| | 0.04 | -4.92 | -0.75 | n.a | -3.56 | | 0.04 | [illegible] |
| | 0.05 | 4.31 | -1.50 | n.a | 2.93 | | 0.05 | 47.02 |
| | 0.06 | 23.97 | 4.58 | n.a | 8.43 | | 0.06 | 4.06 |
| | 0.07 | -4.67 | 4.36 | n.a | 29.00 | | 0.07 | 5.25 |
| | 0.08 | 16.78 | 34.27 | 28.57 | 16.31 | | 0.08 | 14.96 |
| | 0.09 | 28.74 | 7.81 | 15.74 | 13.38 | | 0.09 | 37.30 |
| | 0.10 | [illegible] | 16.84 | 8.00 | 8.66 | | 0.10 | [illegible] |
| | 0.11 | [illegible] | 39.02 | 22.96 | -10.61 | | 0.11 | 31.52 |
| | 0.12 | [illegible] | 2.05 | -0.60 | -2.62 | | 0.12 | [illegible] |
| 1922 | 0.01 | 21.23 | 5.16 | -1.82 | 3.63 | 1985 | 0.01 | [illegible] |
| | 0.02 | 25.04 | 11.72 | 4.94 | 7.11 | | 0.02 | [illegible] |
| | 0.03 | 2.03 | 32.44 | 16.47 | 15.79 | | 0.03 | 24.94 |
| | 0.04 | 11.12 | 17.13 | 8.59 | 2.23 | | 0.04 | 11.78 |
| | 0.05 | 25.26 | 1.57 | 2.33 | 4.70 | | 0.05 | 35.67 |
| | 0.06 | [illegible] | 8.82 | 17.27 | 11.52 | | 0.06 | [illegible] |
| | 0.07 | 41.19 | 44.52 | 34.88 | 16.84 | | 0.07 | [illegible] |
| | 0.08 | [illegible] | [illegible] | 22.99 | 33.66 | | 0.08 | [illegible] |
| | 0.09 | [illegible] | [illegible] | 24.30 | 12.21 | | 0.09 | [illegible] |
| | 0.10 | -7.58 | [illegible] | 23.68 | 32.16 | | 0.10 | -1.86 |
| | 0.11 | -4.77 | [illegible] | -0.91 | 38.89 | | 0.11 | 3.20 |
| | 0.12 | -1.54 | 29.13 | 2.45 | 25.65 | | 0.12 | 16.80 |
| 1923 | 0.01 | 0.67 | [illegible] | 15.27 | [illegible] | 1986 | 0.01 | 32.96 |
| | 0.02 | 1.85 | [illegible] | 8.57 | [illegible] | | 0.02 | 7.95 |
| | 0.03 | 1.98 | -16.94 | [illegible] | 15.08 | | 0.03 | 0.07 |
| | 0.04 | 6.72 | 6.63 | 28.52 | 7.12 | | 0.04 | 3.59 |
| | 0.05 | 5.28 | [illegible] | 12.57 | 6.27 | | 0.05 | 0.97 |
| | 0.06 | 0.16 | [illegible] | [illegible] | [illegible] | | 0.06 | 4.28 |
| | 0.07 | -5.44 | [illegible] | [illegible] | [illegible] | | 0.07 | 1.78 |
| | 0.08 | -4.42 | [illegible] | [illegible] | [illegible] | | 0.08 | 0.64 |
| | 0.09 | 13.20 | [illegible] | 19.76 | 37.92 | | 0.09 | 2.26 |
| | 0.10 | 1.01 | [illegible] | 5.99 | [illegible] | | 0.10 | 0.59 |
| | 0.11 | 1.46 | [illegible] | 8.18 | [illegible] | | 0.11 | -0.11 |
| | 0.12 | 1.72 | [illegible] | 12.44 | [illegible] | | 0.12 | 0.65 |
| 1924 | 0.01 | 5.00 | -7.14 | 43.70 | [illegible] | 1987 | 0.01 | 2.45 |
| | 0.02 | 1.72 | -0.85 | [illegible] | 2.59 | | 0.02 | 1.23 |
| | 0.03 | 0.00 | 3.45 | 12.93 | -1.27 | | 0.03 | 0.70 |
| | 0.04 | 0.11 | 3.33 | 2.79 | -1.21 | | 0.04 | 1.59 |
| | 0.05 | 1.87 | -1.61 | 6.52 | n.a | | 0.05 | 0.34 |
| | 0.06 | 1.96 | -4.92 | -2.72 | n.a | | 0.06 | -0.22 |
| | 0.07 | n.a | -0.86 | 3.93 | n.a | | 0.07 | -0.05 |
| | 0.08 | n.a | 4.35 | -2.29 | n.a | | 0.08 | 0.99 |
| | 0.09 | n.a | 5.83 | -0.24 | n.a | | 0.09 | 0.58 |
| | 0.10 | n.a | 3.15 | 2.17 | n.a | | 0.10 | 2.09 |
| | 0.11 | n.a | -1.53 | 1.06 | n.a | | 0.11 | -0.28 |
| | 0.12 | n.a | 1.55 | 1.61 | n.a | | 0.12 | 0.60 |

# MONTHLY INFLATION

| | | ARGENTINA | BRAZIL | PERU |
|---|---|---|---|---|
| 1988 | M01 | 9.18 | 21.16 | 12.76 |
| | M02 | 10.34 | 17.89 | 11.84 |
| | M03 | 14.73 | 18.88 | 22.59 |
| | M04 | 17.31 | 19.69 | 17.90 |
| | M05 | 15.59 | 18.58 | 8.51 |
| | M06 | 18.08 | 20.33 | 8.86 |
| | M07 | 25.64 | 20.87 | 30.88 |
| | M08 | 27.56 | 21.74 | 21.71 |
| | M09 | 11.68 | 25.16 | [illegible] |
| | M10 | 9.03 | 26.53 | 40.60 |
| | M11 | 5.73 | 27.70 | 24.40 |
| | M12 | 6.83 | 28.23 | 41.87 |
| 1989 | M01 | 8.93 | 39.07 | 47.34 |
| | M02 | 9.56 | 13.10 | 42.49 |
| | M03 | 17.00 | 5.79 | 41.99 |
| | M04 | 33.40 | 5.36 | 48.63 |
| | M05 | [illegible] | 13.26 | 28.61 |
| | M06 | [illegible] | 28.00 | 23.05 |
| | M07 | [illegible] | 33.87 | 24.58 |
| | M08 | 37.86 | 33.39 | 25.06 |
| | M09 | 9.36 | 34.08 | 26.86 |
| | M10 | 5.60 | 38.65 | 23.25 |
| | M11 | 6.52 | 45.48 | 25.84 |
| | M12 | 40.07 | [illegible] | 33.75 |
| 1990 | M01 | [illegible] | [illegible] | 29.73 |
| | M02 | [illegible] | [illegible] | 30.59 |
| | M03 | [illegible] | [illegible] | 32.63 |
| | M04 | 11.37 | 17.24 | 37.39 |
| | M05 | 13.61 | 9.63 | 32.80 |
| | M06 | 13.90 | 12.75 | 42.52 |
| | M07 | 10.83 | 14.71 | [illegible] |
| | M08 | 15.34 | 12.86 | [illegible] |
| | M09 | 15.68 | 13.12 | 13.77 |
| | M10 | 7.69 | 14.04 | 9.61 |
| | M11 | 6.18 | 16.74 | 5.93 |
| | M12 | 4.68 | 18.87 | 23.73 |
| 1991 | M01 | 7.70 | 19.91 | 17.83 |
| | M02 | 26.99 | 21.53 | 9.42 |
| | M03 | 11.04 | 6.60 | 7.70 |
| | M04 | 5.51 | 8.61 | 5.84 |
| | M05 | 2.80 | 7.05 | 7.64 |
| | M06 | 3.12 | 11.72 | 9.26 |
| | M07 | 2.59 | 13.31 | 9.06 |
| | M08 | 1.30 | 15.49 | 7.24 |
| | M09 | 1.77 | 16.87 | 5.56 |
| | M10 | 1.35 | 23.98 | 3.95 |
| | M11 | n.a | 25.36 | 3.96 |
| | M12 | n.a | 23.79 | 3.74 |

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