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12 Stopping Three Big Inflations: Argentina, Brazil, and Peru

Miguel A. Kiguel and Nissan Liviatan

12.1 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 cost in terms of growth and unemployment. Sargent (1982) provides convincing empirical evidence for these propositions based on the European hyperinflations in the midtwenties. The more recent hyperinflation and stabilization in Bolivia by and large conforms with this view.[1]

In contrast, in two of the more recent hyperinflations, Argentina and Brazil, the origins are less clear. 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

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

Peruvian hyperinflation, on the other hand, are more similar to the classical episodes.

Another difference is that the origins of the classical hyperinflations were clearly related to external problems: reparation payments after World War I, a significant shift in external transfers in Bolivia. In contrast, in the recent episodes domestic factors played a major role while external ones (the debt crisis of the early eighties) were of secondary importance.

The process of stopping hyperinflation has also been 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 with 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 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% a month, while there were some bouts of high inflation. The programs did not succeed in stabilizing prices in the same way as in the aftermath of the classical hyperinflations.

This paper examines 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 homogeneous group, both regarding the origins (Peru having a classical flavor) and the commitment to stabilize (Brazil being the weakest in this respect). Nevertheless, in broad terms there are distinctive features that 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 undermine the credibility of a new program. In order to convince the public the policymakers need to undertake major structural reforms, such as privatization of large state enterprises, reduction in the size of the public sector, and institutional reforms in the central bank. Short of these reforms, any short-term reduction in the budget deficit would seem fragile and unsustainable.

We 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% 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 12.2 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 12.3 examines the whole process of hyperinflation and stabilization in the classic hyperinflations, with especial attention to the Bolivian case. Section 12.4 concentrates 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 12.5 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 we can consider them as representing a change of regime. We also briefly examine the impact of these programs on inflation, and discuss the differences from the classical hyperinflations. We conclude in section 12.6 with some brief remarks on the costs of the recent hyperinflations.

12.2 Basic Features of Inflation

Table 12.1 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 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, 25). In most cases it is easy to establish the beginning and end of the episodes. Peru is the only gray area in our sample because, although inflation reached 114% in September 1988, the next month it fell below Cagan's 50% benchmark and remained at the lower level for almost two years. Thus, if we use Cagan's definition in a strict sense, Peru experienced two hyperinflations, one in 1988 that lasted just one month, and another

2. The appendix tables at the end of the chapter provide more detailed data of the evolution of inflation.

Table 12.1 **Differences between Classical and New Hyperinflations**

	(1) Approximate Beginning	(2) Approximate Duration (months)	(3) # of Months Inflation above 50%	(4) Hyperinflation Cycles	(5) # of Months Inflation between 20 and 49%
Austria	1921.10	12	6	3	7
Bolivia	1984.04	18	9	4	10
Germany	1923.08	17	14	3	7
Hungary	1923.03	12	5	3	8
Poland	1923.01	13	9	3	7
Argentina[a]	1989.05	11	6	2	5
Brazil[a]	1989.12	4	4	1	15
Peru[a]	1990.07	2	2	1	25

[a] Includes data until the end of 1991.

in 1990 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 on several occasions. In this paper we take the view that Peru's hyperinflation started in September 1988 and analyzed it in this fashion.[3]

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 12.1 indicates the duration of these episodes. Bolivia is the longest within this group, lasting for eighteen months, while the shortest of the classical hyperinflations were Austria and Hungary (twelve months). Argentina comes close, as it lasted for eleven months. The new hyperinflations in Brazil and Peru were much shorter. In Brazil it lasted only four months; in Peru it was short, although Peru was on the verge 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% benchmark for fourteen months in Germany and nine months in Bolivia and Poland. Argentina is similar to Austria and Hungary. At

3. In table 12.3, on the other hand, we follow Cagan's definition strictly, so we show that the hyperinflation was shorter.

the other extreme we find Peru, where inflation exceeded 50% for only two months in 1990 and for one month in 1988.

A second feature is the number of episodes in which inflation started below the 50% per month threshold and later on exceeded it. The reductions in inflation below 50% (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, 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 12.1 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 inflation.

12.3 The Classical Hyperinflations

12.3.1 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. 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 country's 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 it; Hungary underwent dramatic political instability, includ-

ing 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 special 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; Morales 1988). 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% of GDP (see table 12.2). This external transfer (as a share of GDP) was larger than the cash reparation 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 12.3 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 government expenditures, and at the peak of the hyperinflation revenues represented just 12% of expenditures in Germany and 16% in Austria. In Bolivia, government revenues fell from around 85% of revenues in 1980 to around 50% for the period 1983–85. Second, a collapse of government revenues coincided 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% of GDP in 1982 to just 14% in 1985. The collapse in tax revenues was more dramatic; they fell from 8 to 3% of GDP between 1981 and 1983 as inflation increased from 30 to 270%. As we will show in the next section, these features were extreme in the recent hyperinflations.

Seigniorage was extremely large in the classical hyperinflations. Figure 12.1 shows estimates of the revenue from money creation for Germany and Bolivia. What happened in Bolivia is well known. Seigniorage increased fivefold from around 2% of GDP in 1979–81 to over 10% of GDP in 1983–85. In Germany seigniorage[4] increased sixfold at the outbreak of the war and remained high

4. Seigniorage in Bolivia is calculated as the change in the money base 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.

Table 12.2 **Bolivia: Annual Economic Indicators**

Period	Inflation	GDP Growth (%)	Seigniorage (as % GDP)	M1/ GDP	Pub.Exp./ GDP	Pub.Def./ GDP	Curr.Acc./ GDP	Tra.Bal./ GDP	Terms of Trade	Real Exchange Rate	Net Transfers
1970–74	21.68	4.40	2.02	10.92	—	—	1.46	5.75	62.04	113.03	3.17[a]
1975–79	10.14	4.06	1.98	10.50	—	—	−5.78	0.08	82.00	101.39	5.14
1980–82	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	1,281.40	−0.60	15.80	5.15	46.00	25.10	−2.70	4.90	88.30	68.39	−4.84
1985	11,749.60	−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: based in monterey base; ANDREX. M1: M1 average, ANDREX. Public expenditure: current + capital expenditure, consolidated nonfinancial public sector deficit; UDAPE for 1980–84; IMF and World Bank after 1985. Public deficit: overall deficit, consolidated nonfinancial public sector deficit; UDAPE for 1980–84; IMF and World Bank after 1985. External sector: percentage of GDP; ANDREX. Exchange rate: nominal exchange rate, period average; IMF, *International Financial Statistics.* Terms of trade: terms of trade index 1980=100; ANDREX. Real exchange 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.

[a]1971–74.

Table 12.3 **Poland, Austria, Germany, and Bolivia: Classical Hyperinflations**

		Expenditure (as % GDP)	Revenue (as % GDP)	Revenue/ Expenditure	Inflation
Poland	1921	880,852	345,311.0	0.39202	126.9
	1922	879,313	530,428.0	0.60323	212.0
	1923	1,119,800	426,000.0	0.38043	15,636.0
	1924	1,629,000	1,703,000.0	1.04543	N.A.
	1925	1,981,593	1,981,884.0	1.00015	6.8[a]
Austria	1919	1,309	632.3	0.48308	N.A.
	1920	1,089	166.0	0.15248	N.A.
	1921	660	197.0	0.29853	842.0
	1922	733	116.0	0.15830	3,132.2
	1923	367	256.6	0.70000	135.6
Germany	1920	11,266	4,223.7	0.37492	257.4
	1921	11,963	5,336.2	0.44604	28.7
	1922	9,965	3,580.5	0.35931	1,688.3
	1923	13,513	1,676.7	0.12408	6.7E+10

		Expenditure	Revenue	Tax Revenue	Revenue/ Expenditure	Inflation
Bolivia[b]	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	11,750
	1986	22.90	19.40	4.50	0.84716	276
	1987	24.10	16.20	6.20	0.67220	15

Sources: Poland: Sargent (1982); Austria: Dornbush and Fischer (1986); Germany: Young (1925); Bolivia: Country Economic Memorandum.

[a]December rate of change over the preceding three months.

[b]Total expenditures and revenues as percentage of GDP.

until the end of the hyperinflation. In both episodes the level of seigniorage was too large, in the sense that it lay 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 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 in 1984. The picture is less clear in Germany, because the lag was much longer. A protracted period of very high seigniorage eventually led to hyperinflation. Annual data indicate, however,

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

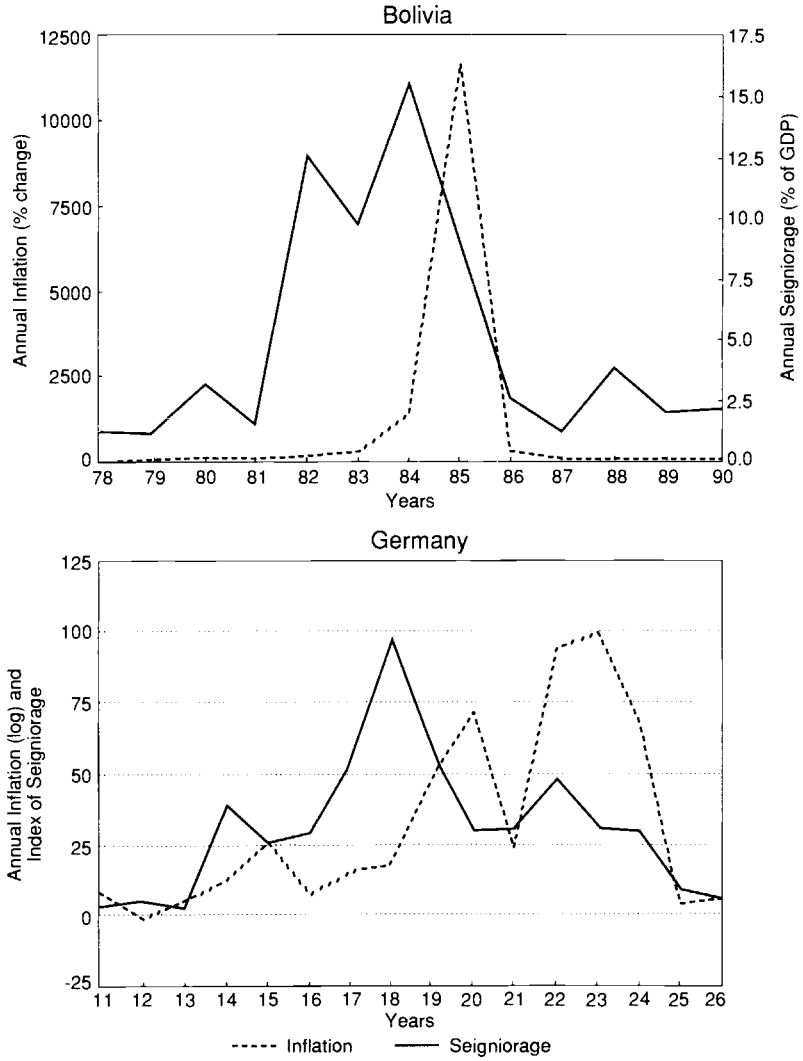

Fig. 12.1 Inflation and seigniorage: Bolivia; Germany (inflation logarithm)

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 classical hyperinflations 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 worst inflationary episodes occurred in the midfifties when the annual inflation rate remained above 100% for a couple of years. Since then inflation remained fairly low; evidence of this was that the country was on a fixed exchange rate regime since 1959 (with only two devaluations until 1982).

12.3.2 Stopping the Classical Hyperinflations

The classical hyperinflations were abruptly stopped always and everywhere through a comprehensive program that stabilized the exchange rate, reduced the budget deficit sharply, and sent a clear signal that the central bank would end domestic credit to the government. In Germany the exchange rate was stabilized on November 20, and prices stabilized the following week.[6] Likewise, the hyperinflation in Bolivia was stopped in its tracks, 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 hyperinflation very quickly came to an end. In this respect the outcomes were similar to the stabilization programs that ended the European hyperinflations in the midtwenties 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 remained relatively large without becoming a destabilizing force. Once the government establishes its determination to sustain price stability, it can run budget deficits that are consistent with the availability of noninflationary finance. In Bolivia the deficits were mainly financed externally without resorting to seigniorage (which, as can be seen from table 12.2, fell to prehyperinflation levels of around 2% 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

6. See data in Webb (1986, 788).

(as shown in table 12.3), 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 in 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 1986 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 signalled 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 just two indicators of the difficulties in reversing long-term expectations. While real interest rates came down from the extremely high levels that prevailed during the first year (of around 100%), they are still very high by international standards (exceeding 20% per year). Also puzzling is the very small increase in real money balances. By 1989 with an inflation of just 15%, 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 to 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.

12.4 Origins of the New Hyperinflations in Argentina, Brazil, and Peru

12.4.1 The Background of High Inflation

The more recent hyperinflations occurred in countries with a long tradition of high inflation (see tables 12.4 to 12.6). Argentina had continuously experienced three-digit annual rates of inflation since the midseventies. In Brazil annual inflation was already at 40% in the midseventies and reached three digits in the early eighties. Peru started to experience high inflation later, in the

Table 12.4 **Argentina: Annual Economic Indicators**

Period	Inflation	GDP Growth (%)	Seigniorage (as % of GDP)	M1/ GDP	Pub.Exp./ GDP[a]	Pub.Rev./ GDP[a]	Pub.Def./ GDP	Curr.Acc./ GDP	Terms of Trade	Real Exchange Rate	Net Transfers (as % of GDP)
1970–74	38.30	1.96	4.60	15.10	40.19	35.26	4.93	−0.35	141.52	135.50	−0.07[b]
1975–79	227.58	−0.10	8.36	8.88	45.53	38.70	6.84	0.44	112.44	187.39	0.38
1980–82	123.34	−4.85	5.37	7.07	50.51	44.97	5.54	−3.47	96.03	140.59	2.42
1983	343.82	1.46	8.61	5.12	55.59	45.09	10.71	−3.77	96.20	228.32	−0.46
1984	626.72	1.06	7.12	4.01	51.86	44.20	7.65	−3.21	97.00	195.86	−4.58
1985	672.15	−5.68	6.51	3.89	52.09	49.91	2.16	−1.46	89.80	220.51	−6.36
1986	90.10	4.20	3.46	5.20	34.80	31.91	2.89	−3.63	85.30	220.91	−6.04
1987	131.33	1.20	4.03	4.43	35.47	30.48	4.99	−5.13	81.80	238.42	−4.99
1988	342.96	−3.73	5.17	3.24	34.01	28.21	5.80	−1.75	86.20	260.55	−2.54
1989	3079.81	−5.65	9.00	3.05	34.95	31.16	3.79	−2.16	89.60	297.57	−5.04
1990	2313.97	−0.79	4.81	2.38	29.93	27.93	2.00	1.80[c]	n.a.	200.32	−3.57
1991	171.67	7.21	2.65	4.41	30.66	29.86	0.80	−1.97[c]	n.a.	147.12	−5.66

Sources: World Bank; International Financial Statistics, IMF; *Indicadores de Coyuntura Economica* (Buenos Aires: FIEL). Seigniorage: based on M1. M1: M1 average; Andrex; 1991 FIEL. Public expenditure: current + capital expenditure, operations of the consolidated public sector; 1970–85 FIEL; 1986–90 Secretaria de Hacienda. Public revenue: current + capital revenues, operations of the consolidated public sector; 1970–85 FIEL; 1986–90 Secretaria de Hacienda. Public deficit: overall deficit, operations of the consolidated public sector; 1970–85 FIEL; 1986–90 Secretaria de Hacienda. External sector: IMF. Terms of trade: terms of trade index 1980 = 100; Andrex. Real exchange 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.

[a]Starting in 1986 it excludes provincial governments' revenue and expenditure.

[b]1971–74.

[c]Preliminary.

Table 12.5 **Brazil: Annual Economic Indicators**

Period	Inflation	GDP Growth (%)	Seigniorage (as % of GDP)	M1/ GDP	Pub.Exp./ GDP[a]	Pub.Rev./ GDP[a]	Pub.Def./ GDP	Curr.Acc./ GDP	Terms of Trade	Real Exchange Rate	Net Transfers (as % of GDP)
1970–74	19.87	7.03	1.53	15.58	35.79	35.40	—	−2.00	167.22	69.99	3.05[b]
1975–79	41.22	3.42	2.38	11.18	47.12	40.36	—	−3.96	135.06	73.90	2.33
1980–82	95.38	−1.37	2.01	6.86	48.26	41.72	5.76	−5.17	94.03	88.39	−0.73
1983	142.14	−5.55	1.30	4.59	45.97	41.91	4.80	−3.30	91.00	134.50	−1.43
1984	196.98	2.99	2.34	3.36	43.83	37.67	2.70	0.02	94.00	134.56	−1.22
1985	226.86	5.64	2.32	4.03	49.11	37.83	4.30	−0.10	89.10	138.64	−2.80
1986	145.24	5.31	3.60	8.69	29.20	27.10	3.60	−2.00	110.00	147.77	−3.46
1987	229.66	1.46	2.73	4.95	31.90	27.00	5.50	−0.50	97.20	147.73	−2.80
1988	682.30	−2.13	3.41	3.07	30.70	28.30	4.80	1.20	116.80	136.90	−2.85
1989	1286.98	1.22	5.02	2.25	34.90	26.20	6.90	0.23	120.10	109.73	−1.72
1990	2937.82	−5.95	4.36	3.75	32.70	31.50	−1.30	−0.80	N.A.	93.52	−0.74
1991	440.84	−0.74	2.76	2.82	N.A.	N.A.	N.A.	N.A.	N.A.	116.49	−3.34
1992[c]	910.41[d]	−1.80[e]	2.16[e]	4.64[e]	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Sources: World Bank; International Financial Statistics, IMF. Seigniorage: based on monetary base. M1: M1 average, Central Bank. Public expenditure: total expenditures of the operations of the central government + operations of public enterprise, 1980–85: Werneck (1991); 1986–1990: IMF. Public revenue: total revenues of the operations of the central government + operations of public Enterprise, 1980–85: Werneck (1991); 1986–1990: IMF. Public deficit: public sector operational deficit; Brazillian Institute of Geography and Statistics. External sector: Andrex. Terms of trade: Terms of trade index 1980 = 100; Andrex. Real exchange rate: Real multilateral exchange rate index with respect to the top twenty partners, 1980 = 100. Net transfers: World Debt Tables, short- and long-term net transfers including IMF.

[a]After 1985; nonfinancial expenditures (revenues) of the public sector, IMF.

[b]1971–74.

[c]January to June.

[d]Annualized based in the first eight month of the year.

[e]Estimates.

Table 12.6 **Peru: Annual Economic Indicators**

Period	Inflation	GDP Growth (%)	Seigniorage (as % of GDP)	M1/ GDP	Pub. Exp./ GDP	Pub. Rev./ GDP	Pub. Def./ GDP	Curr. Acc./ GDP	Terms of Trade	Real Exch. Rate	Net Transfers (as % of GDP)
1970–74	9.08	3.69	1.53	14.86	28.79	25.95	2.84	−1.21	—	68.93	0.32[a]
1975–79	43.94	−1.08	2.41	13.45	41.24	34.88	6.38	−3.36	—	87.60	2.85
1980–82	66.34	0.76	2.35	8.34	47.78	41.78	6.00	−4.63	126.83	88.78	−1.68
1983	111.13	−14.62	2.87	6.58	53.78	43.96	9.82	−4.39	110.60	85.31	2.86
1984	110.21	3.44	2.45	5.57	45.75	39.57	6.18	−1.07	101.00	85.32	2.34
1985	163.41	−0.18	9.86	6.09	46.05	43.66	2.39	0.75	90.60	104.60	−0.82
1986	77.92	6.69	4.23	8.69	37.95	32.96	5.00	−4.02	66.40	93.11	−1.39
1987	85.85	6.09	5.74	8.58	33.54	26.81	6.74	−3.37	66.90	82.09	0.29
1988	667.03	−10.07	7.89	5.04	30.27	23.55	6.72	−2.97	74.90	90.39	0.41
1989	3398.58	−13.63	6.10	3.43	25.21	18.58	6.62	0.87	72.50	56.64	0.78
1990	7481.66	−6.30	5.42	3.96	22.59	19.58	3.01	−2.60	65.00	44.87	−0.34
1991	409.53	0.49	n.a.	n.a.	n.a.	n.a.	n.a.	−3.88	n.a.	36.24	−3.39

Sources: GDP 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, International Financial Statistics, IMF. Public expenditure: current + capital expenditure, nonfinancial public sector operation; Central Bank. Public deficit: overall deficit, nonfinancial public sector operation; Central Bank. External sector: Central Bank, millions of US$. Terms of trade: terms of trade index 1978 = 100; Central Bank. Real exchange 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.

[a]1971–74.

second half of the seventies, but by the early eighties it was also suffering from inflation rates of 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 12.3, 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. In contrast to the classical episodes, however, 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 12.2 shows annual seigniorage and inflation for these countries. The contrast with Germany and Bolivia is clear; there was no sixfold 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% 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.

The ability of the high-inflation economies 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 12.7). There was no noticeable loss of revenues in Brazil in spite of dramatic increases in inflation since 1986. Likewise, in Argentina, for which we have quarterly data, we find that the hyperinflation had a discernable impact on revenues only 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 third 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.

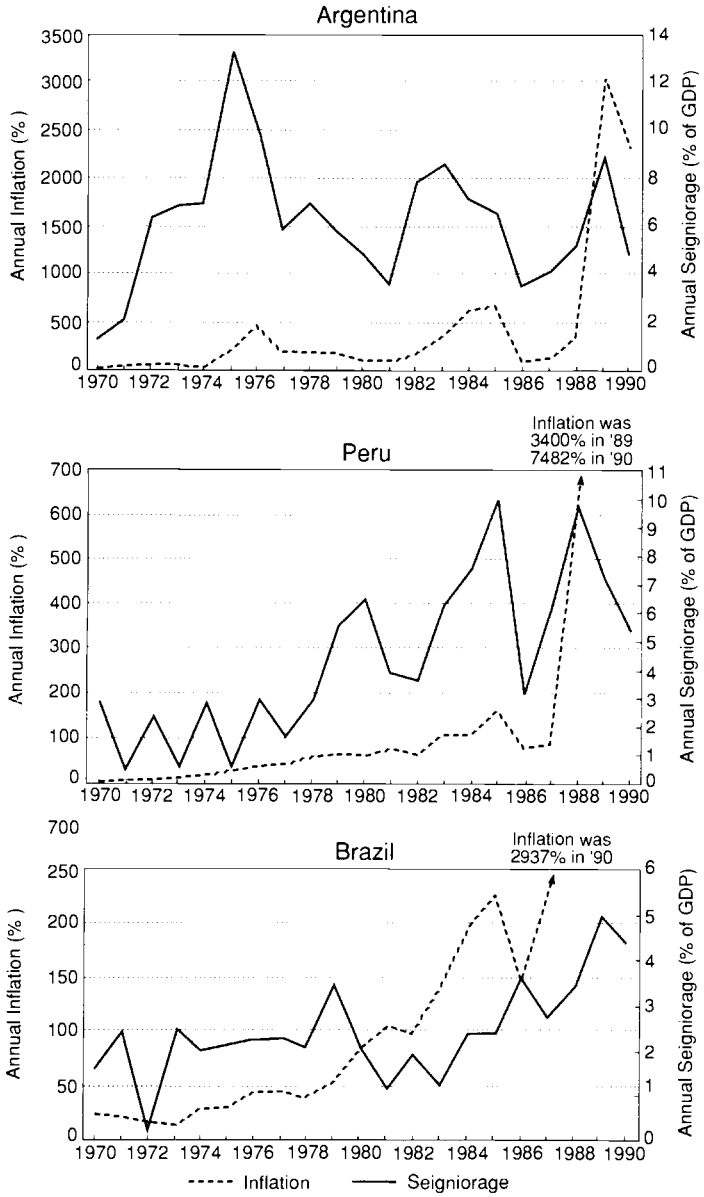

Fig. 12.2 Inflation and seigniorage: Argentina; Peru; Brazil

Table 12.7 **Argentina, Peru, and Brazil Hyperinflations (% GDP)**

			Expenditure	Revenue[a]	Tax Revenue	Revenue/ Expenditure	Inflation[b]
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	35.66	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	0.80038	220.2
	1989		30.85	27.58	16.16	0.89400	3,079.8
		I	37.15	28.86	15.74	0.77685	189.2
		II	38.68	26.76	11.52	0.69183	12,459.0
		III	22.49	24.06	14.71	1.06981	198.171.2
		IV	36.01	30.27	17.80	0.84060	350.9
	1990		26.06	28.07	16.95	1.07713	2,314.0
		I	22.62	21.23	12.35	0.93855	35,399.7
		II	31.28	29.27	17.40	0.93574	1,807.3
		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	14.80	14.30	0.62979	163.4
	1986		21.30	12.60	12.20	0.59155	77.9
	1987		18.20	9.20	9.30	0.50549	85.8
	1988		15.60	9.20	9.10	0.58974	667.0
		I	18.90	10.90	11.20	0.57672	310.4
		Il	14.00	9.10	9.50	0.65000	424.2
		III	17.50	7.70	7.90	0.44000	2,615.3
		IV	14.70	9.70	9.30	0.65986	8,501.3
	1989		13.20	6.00	6.50	0.45455	33,398.6
		I	14.40	9.10	9.40	0.63194	6,830.8
		II	12.70	7.70	7.90	0.60630	4,579.9
		III	12.40	5.50	6.00	0.44355	1,362.4
		IV	13.60	5.70	6.20	0.41912	1,527.8
	1990		14.50	7.80	7.90	0.53793	7,481.7
		I	12.70	4.80	5.00	0.37795	2,403.8
		II	21.30	5.40	5.70	0.25352	3,728.5
		III	13.70	6.60	6.70	0.48175	524,510.2
		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	1,287.0
	1990		32.70	31.50	23.90	0.96330	2,937.8
	1991[c]		28.30	27.60	20.30	0.97527	440.8

Sources: Argentina: Ministry of Economy; Peru: Central Bank of Peru; Brazil: World Bank, *Brazil: Recent Economic Development.*

Note: Consolidated public sector (Brazil and Argentina, central government (Peru).

[a]Total revenue, except only the current revenue for Peru.

[b]The quarterly data are annualized.

[c]Projected.

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% of GDP, this would have amounted to an approximate 20% increase in the monetary base in the early seventies, while in the eighties this would have represented an almost 100% 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% of GDP while M4 is close to 30% 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.

12.4.2 Direct Origins of the Recent Hyperinflations

A distinctive feature of the new hyperinflations is 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 classical hyperinflations, 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 noninflationary domestic financing to the government. But each of these elements by themselves need not have caused a 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 elements with those of Argentina and Brazil. In this respect, it does not look like a classical hyperinflation.

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

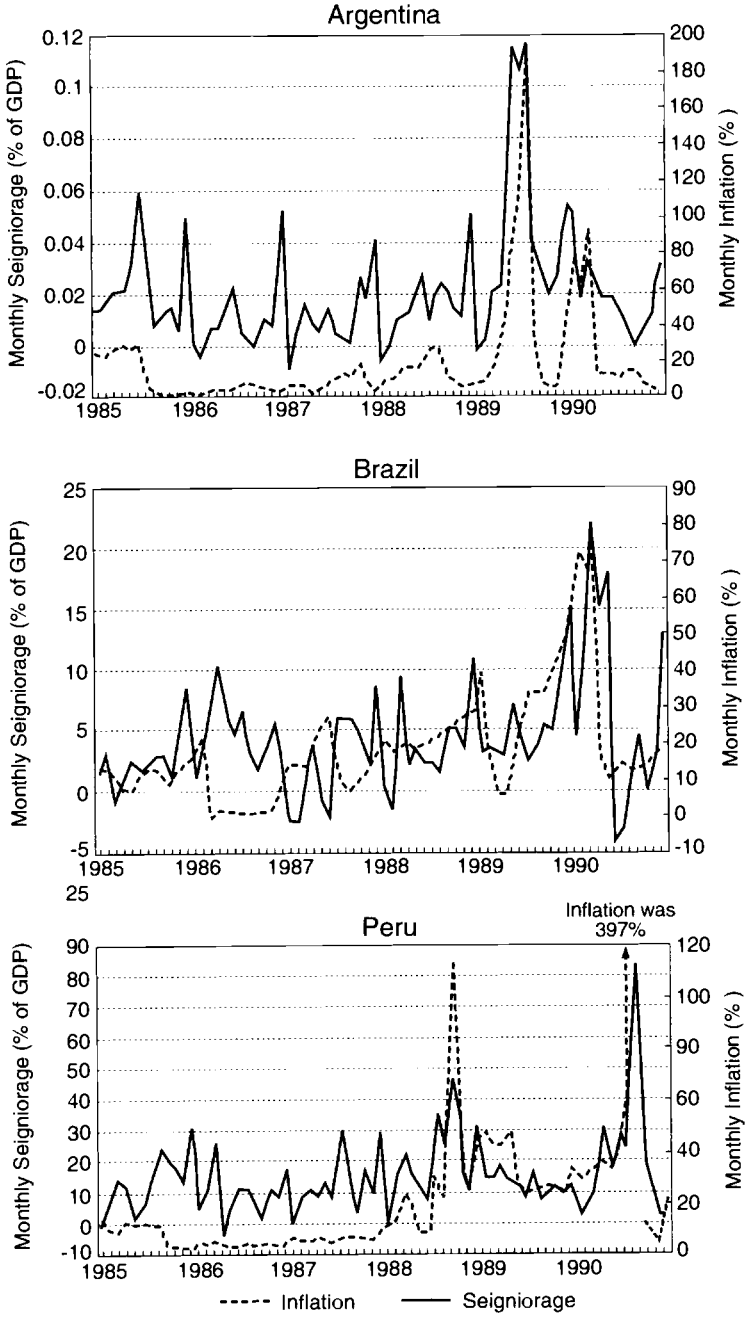

Fig. 12.3 Seigniorage and inflation: Argentina; Brazil; Peru

examining each of these experiences more closely. Figure 12.3 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 classical hyperinflations. 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.

Peru

The hyperinflation in Peru resulted from the overexpansionary domestic policies of Alan Garcia (annual data for Peru are presented in table 12.6). 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%, the success was short-lived, as could easily have been predicted. The government succeeded in preventing a full-blown increase in inflation by keeping public sector 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 is that, by and large, inflation did not accelerate in an explosive manner, except at the very end. This stands in contrast with the classical hyperinflations, where once inflation reached hyperinflation levels it very quickly exploded (see figure 12.3c). There was an extreme increase in inflation in September 1988 (when inflation exceeded 100%), but to a large extent this was equivalent to a one-time increase in the price level in noninflationary economies. Inflation then remained at the 40% per month step for around seven months, and then fell to the 30% per month step for around a year. This ability to maintain relatively stable inflation at rates as high as 30 or 40% per month is unique to Peru, since the available evidence from high-inflation economies indicates that inflations in excess of 20% per month are unstable and lead to hyperinflation (that was the case in

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

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

Figure 12.3c 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), indicating that tight money could be used to avoid an explosion in inflation even in situations where the fiscal position is out of control.

Argentina and Brazil

The origins of the hyperinflations in Argentina and Brazil were 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 toward 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.

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. The combination of high inflation and the induced nominal instability, caused by unsound stabilization strategies, 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 figure 12.3. The 1985 Austral plan in Argentina represented a break with previous stabilization efforts, as it was the first comprehensive stabilization program in many years. A heterodox program, 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 pick 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.

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

A similar pattern is apparent in Brazil, where the cycles started with another so-called heterodox program, the Cruzado Plan. Like 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, and so forth—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 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 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.

12.5 Programs to Stop Three Big Inflations

12.5.1 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 to 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 identi-

fied 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 policymakers 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) indicate that the basic strategy was comparable to the one that succeeded in stopping hyperinflation in Bolivia.

The effectiveness of these programs was mixed. True, they all succeeded in bringing down inflation quickly from the peaks of the hyperinflation to much lower levels. Nevertheless, inflation was stubborn, and it did not fall quickly to low or moderate levels (unlike the case of Bolivia where it fell to around 20% per year). In Argentina the initial attempt was followed by other deeper stabilization programs, and despite mixed results for a long time, inflation appeared to be finally receding; but this took over two years. In Brazil the results were worse; after the failed stabilization attempt inflation rose, it then stabilized at around 20% per month, and the possibility of a new hyperinflation cannot be ruled out. Finally, Peru in 1992 was still fighting to get inflation down in a sustainable manner. While the worst part of the hyperinflation was over, the authorities were still fighting monthly rates of inflation that remained stubborn at around 4%.

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 classical hyperinflations.

12.5.2 Classic Stabilization Programs with Nonclassic Outcomes

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 reve-

nues, 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 classical hyperinflations.

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.), by elimination of tax exemptions, and by drastically increasing public sector prices (e.g., the price of gasoline was increased twentyfold).

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, deregulation 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? We will address this issue in section 12.5.3.

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 the announcement of a comprehensive package of structural reforms, providing a clear indication that the intention was to break with the past. The main objective was to reduce the role of the state in the economy through 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 on 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% of the financial assets for eighteen months. While depositors lost access to their money during the freeze, the funds were supposed to earn indexation plus 6% per annum, with no servicing till September 1991. Until the freeze was enacted, most public 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% to just 9% 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% 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 (at least at the outset) inflation was not eliminated. On the contrary, after an initial fall from 81% in March 1990 to just 9% in May, inflation climbed back to 19% 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 pro-

9. Zini (1992) provides a more detailed description and analysis of the freeze.
10. Monthly data disguise the fact that prices were fully stabilized for around three weeks early on.

gram 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 had proved ineffective in the past), and new attempts to 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 affected expectations in an adverse way, as they were associated with quick increases in inflation.

Argentina

The Argentine stabilization program of July 1989, the Bunge and 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 like 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 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% 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 (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 by imposing strict limits on the amount of central bank financing to the nonfinancial 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 was a slight setback in January 1992, as inflation reached 3%. While at the time of this writing it is still too early to assess the sustainability of this program, it seems clear that the economy is much closer to securing price stability than it has been in the last four decades.

12.5.3 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 that also included many of 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. Nor was stabilizing the exchange rate enough to stabilize prices (as argued in Sachs 1986 for his analysis of Bolivia). Argentina and Peru stabilized the exchange rate temporarily early on, but inflation continued at a higher pace. While in the three countries the initial programs succeeded in bringing inflation down from the heights of hyperinflation, none of them was able to bring about full price stability.

The persistence of inflation in these episodes is linked to the inability of the authorities to convince the public that the programs could sustain low inflation on a long-term basis. In the high-inflation economies stabilization appears to be a long-term process. The numerous failed stabilization attempts of the past—which were the norm in these economies—meant that any new program had to confront adverse expectations from the outset. Policymakers needed to continuously demonstrate their commitment to the stabilization program, and in most cases this task required the adoption of a comprehensive set of policies that went beyond restoring fiscal balance on a short- or medium-term basis. Programs could not be credible unless they frontally attacked the structural features that gave rise to an inflationary economy, namely, addressing the deficits of the public enterprises, reducing the size of the public sector, and introducing institutional reforms to restore control over the money-supply process.

Brazil: Was a Larger Primary Surplus the Answer?

The stubbornness of inflation in Brazil can be explained in different ways. One explanation (e.g., Rodriguez 1992), is that the primary surplus created in the Collor Plan was not large enough to service the domestic debt, and that it eroded very quickly. While the Collor Plan dealt with the domestic debt prob-

11. See Canavese (1992) for a more detailed analysis of the convertibility program.

lem in the short run by freezing domestic assets, this was just a transitory solution. Once these assets were defrozen, the burden of servicing this debt would amount to around 4% of GDP. If the government were to service the external debt as well, the required primary surplus was around 6% of GDP. Since the Collor Plan fell short of this target, proponents of this view would argue that expectations of large future budget deficits was the main reason for the persistence of inflation.[12]

While there is no doubt that those who claim that a primary surplus of at least 4% of GDP was essential to make the package credible have a valid point, we still have serious doubts as to whether generating a surplus of that size would have been enough to stop inflation. In our view the answer is no. Since there is usually a strong deep-rooted mistrust of the government in these economies, policymakers need to do more to demonstrate their commitment to stabilization. Without this commitment, which goes much further than a reduction in the budget deficit, there is little chance of bringing down the basic level of inflationary expectations. Disinflation is typically a long-term process in these economies, mainly because it takes time to put in place the reforms that are necessary to build credibility in the program.

The inability of the Collor Plan to achieve price stability primarily lay in the failure to undertake structural changes that would reverse expectations in a more durable manner. In fact, the Collor Plan did not make much progress in three key areas: in privatizing public sector enterprises, in providing a *permanent* solution to the domestic debt problem, and in limiting the power of state banks to get access to central bank credit.

Argentina: Stabilization Has Been a Process

The recent Argentine experience vividly illustrates that there is slow convergence to low inflation after stopping a hyperinflation in a chronic-inflation economy. In Argentina this reduction was possible because the authorities undertook wide and far-reaching structural reforms in key areas. While the economy maintained a small primary surplus since 1990, the size of the fiscal adjustment was not large enough to convey convincing signals about the long-term commitment to stabilization. The reduction in inflation was achieved gradually, as the policymakers undertook and deepened structural reforms.

Figure 12.4 shows that the reversal in the inflation pattern, the period of exploding cycles that preceded the BB Plan, has been followed by another of

12. It should be noted that this criticism of the plan is based on the assumption that the real interest rate on the domestic debt would remain at around 20% per annum, which reflects the high risk premium on holding government securities. Under this approach the closing of the deficit is a difficult, though not impossible, task; an internal debt of about 30% of GDP, which is about its current size, would require revenues of 6% of GDP to service the interest payments. The problem, however, would be less severe if the government were able to reduce real interest rates closer to international levels. In any case, there is no doubt that those who claim that a primary surplus of around 4% of GDP is essential for a credible fiscal policy have a valid point. In this sense the criticism of the Collor Plan is well taken.

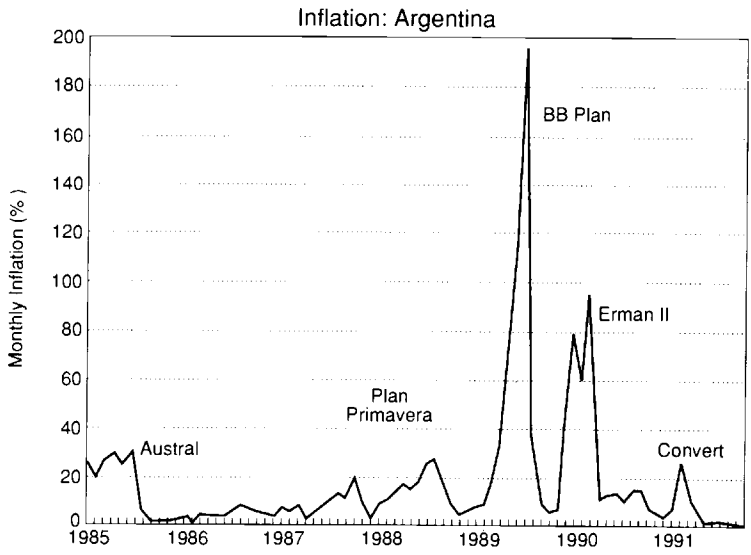

Fig. 12.4 Inflation: Argentina

converging cycles. The BB Plan was successful in stopping hyperinflation, though inflation continued at around 5% 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 toward 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% per month) for almost a year, and then it experienced a new increase that was even shorter and milder. Since then inflation has been receding, and recently has been hovering around 1.5% per month for eighteen months, a major achievement.

The new pattern of converging cycles has been induced by a continuous stabilization effort, where each setback (or rekindling of inflation) was fought with a new, more drastic program. The basic reforms started already in the early stages of the Menem administration in 1989 with the launching of the BB Plan. The new government passed legislation authorizing the sale of public enterprises, suspension of most subsidies, limitations on central bank credit to the public sector, and a major tax reform that broadened the base of the value-added tax. The Plan Bonex, of December 1989, tried to provide a permanent solution to the domestic debt problem that had undermined so many stabilization efforts in the past, by enacting a forced conversion of time deposits and short-term debt into long-term dollar-indexed bonds. In the course of 1990 the

government made great progress with the actual implementation of its privatization program. The Decree 435 stabilization attempt went much further on the fiscal side than any previous program. The government was finally confronting the industrial promotion law, which provided generous subsidies and numerous tax loopholes without clearly motivating industrial activities, and also announced important changes in tax administration and public sector reform. Finally, the convertibility program went further than the others in imposing fiscal discipline, while undertaking numerous measures to improve enforcement in tax payments.

During these three 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 simplification and rationalization of the tax system). Not once during these years has there 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.

Although the Menem administration acted relentlessly on all the relevant fronts, the basic level of inflation in 1990 was still around 13–15% per month. There are three basic reasons for the sluggish response of inflation. First, the design and implementation of reforms takes time, especially when they involve privatization. Since the reforms must reach a critical mass before they can bring about a basic change in expectations, the effect on inflation is necessarily delayed. Second, the policymakers themselves do not know at the outset what precisely is required in order to generate the required critical mass. Argentina's experience shows clearly that the evolution of the reforms involved a process of trial and error—whenever there was a resurgence of inflation, the government added another dose of reforms. This learning process is inevitably time-consuming. The process is further complicated by the parallel program of structural reforms, which are intended to move the country quickly toward a market economy.

The third reason for the slow convergence of inflation relates to nominal aspects. In the classical hyperinflations the price level was stabilized by a simultaneous change in the fiscal regime and the exchange rate regime; specifically, all the classical cases were stopped by fixing the exchange rate. This simultaneity cannot be achieved in the new hyperinflations, because the commitments on the fiscal and monetary fronts have to be backed by implementation of fundamental reforms that involve a time-consuming process; an early use of a fixed exchange rate policy, before reforms reach a critical mass, will not be effective. In the meantime money is used as a nominal anchor. However, experience in the high-inflation economies in Latin America shows that, while

tight money was effective in blocking hyperinflationary outbursts, it has not been effective in bringing down inflation to single-digit levels.

Peru: Balancing the Budget Was Not Enough

The very slow convergence of inflation in Peru may appear puzzling because of the impressive structural reforms that have been carried out in that country, and especially because of its persistent adherence to a balanced budget on a cash basis. Yet the fiscal position in Peru remains in a fragile state. This is especially the case with regard to taxation, which has not regained the levels of the pre-Garcia years. The restoration of the tax base to levels that are consistent with a long-term fiscal balance requires not only reforms but also the allocation of appropriate manpower for their implementation.

It has been noted that the stabilization program in Peru involved periods in which the nominal exchange rate was stable (even appreciating slightly), as for example in July–September 1991 and December 1991–March 1992, yet inflation did not respond to this development. This is because the path of the exchange rate was variable, with the periods of stability being short. Thus on average the monthly rate of devaluation in 1991 was 6%, with inflation being 7.5%.

A special factor that hinders disinflation in Peru is the high degree of dollarization, which developed over the long inflationary period and which surprisingly has not displayed any signs of reversal during the stabilization period. This led to the paradoxical phenomenon that stopping hyperinflation did not result in an expansion in the real monetary base or M1; in fact, both of them declined as more dollars were introduced into the formal financial sector. The fact that money demand does not recover during the stabilization phase leaves the system vulnerable to a resumption of inflation, and thus slows down the convergence of inflationary expectations.

Why Was It Not Possible to Fix the Exchange Rate after the New Hyperinflations?

In contrast to the programs that stopped the classical hyperinflations, Brazil and Peru did not fix the exchange rate at the outset. Argentina fixed it in the BB Plan but had to abandon it quickly when the program proved unable to bring inflation to a halt.

The ineffectiveness of using a fixed exchange rate early on can be illustrated by the BB Plan. Table 12.8 shows that when the exchange rate was fixed in September 1989 inflation fell from the previous high rates but continued to stay at around 6% per month, with lending rates being in the range of 9–13% per month and real wages rising. While lack of credibility can explain the persistence of inflation, Dornbusch (1987) describes how fixing the exchange rate in the midst of the German hyperinflation (in February 1923) stabilized inflation immediately; there was in fact an actual deflation in March. Later devalua-

Table 12.8 **Argentina: Selected Economic Indicators**

	Monthly Percentage Rates			
	Inflation	Devaluation	Lending Rate	Real Wages (1985 = 100)
BB Plan				
1989.08	38.9	15.4	17.9	69
1989.09	9.4	0.0	11.3	67
1989.10	5.6	0.0	9.0	69
1989.11	6.5	0.0	12.8	89
1989.12	40.1	70.4	32.9	94
Convertability Plan				
1991.01	7.7	28.8	18.5	79
1991.02	27.0	44.6	23.0	71
1991.03	11.0	1.0	19.4	76
1991.04	5.5	3.4	5.1	74
1991.05	2.8	0.8	4.6	73
1991.06	3.1	0.7	5.0	72
1991.07	2.6	0.0	5.0	71
1991.08	1.3	0.0	4.6	70

tion was resumed as a result of large reserve losses. There is no reason to believe that the German program of February 1923 was more credible than the BB Plan, yet inflation stopped temporarily in one case but not in the other.

While fixing the exchange rate in the BB Plan did not work, it was effective when used in the convertibility plan of March 1991. In the latter case, monthly inflation came down to 3% and loan rates to 4.5% within three months, without a rise in real wages (table 12.8). All this took place after an inflation of 8% in January and 27% in February.

While it is true that the convertibility plan was accompanied by further fiscal reforms and a new law that effectively converts the central bank into a currency board, yet it is unthinkable that any announced reform could cause inflation to fall so dramatically without fixing the exchange rate. In fact, success was achieved by combining a critical mass of reforms effected during the stabilization and by fixing the exchange rate.

The success of the Argentine strategy poses a key question for Peru, a country that has been stabilizing and reforming for over two years. Are the conditions now ripe for fixing the exchange rate as a way to bring about full price stability in that country? There is some consensus that the stabilization program in Peru has primarily relied on tight money. Under this strategy inflation fell but displayed significant persistence, recently at around 4% per month.

While an exchange rate–based stabilization program is very likely to succeed in bringing inflation further down in the short term, the longer-term success of such effort is still questionable. The main difficulty is that Peru has not been able to demonstrate that the fiscal situation is sustainable. Tax revenues

are still very low, conflicting with demands for basic expenditure in infrastructure and in the social sectors. In addition, the external situation continues to be blurred, without a clear way out of the debt crisis. It seems that fixing the exchange rate continues to be a very risky proposition.

12.6 Hyperinflation, Stabilization, and Growth

12.6.1 The Costs of Hyperinflation

Hyperinflation is a phase in the inflation process where even the most indexed economies cannot avoid output losses. The recessionary effects come from the disruptive effects of hyperinflation itself as well as from the desperate stabilization measures undertaken under conditions of extreme stress. Brazil embraced for many years the philosophy that indexation can enable sustained growth even under conditions of high inflation. Indeed, this strategy worked quite well in the miracle years of the sixties and seventies. Brazil's recovery of growth after the debt crisis of the early eighties was also remarkable. However, as inflation moved from the 200% plateau of 1984–87 to 700% in 1988 and 3,000% in 1990 (in annual terms), the growth of GDP came to a halt (table 12.5). Industrial production in 1991 was lower than in 1987, implying a decline in per capita terms. Since the economy was not facing severe foreign exchange constraints, which could be associated with import compression, it is reasonable to attribute the decline in output growth to the hyperinflation. Thus the classical indexed economy was no longer able to isolate the real economy from inflation. On many occasions in recent years Brazil attempted to get rid of indexation, but these efforts were frustrated by the resurgence of inflation. In a broad historical perspective Brazil traded short-term gains of growth for a possible long-term stagnation.

The fact that the hyperinflation in Brazil did not bring about a collapse of the economy can explain why the required reforms are still postponed. Thus the economy became a captive of its own inflation-mitigation technology.

In the case of Peru the outbreak of hyperinflation led to a much sharper drop in output as well as to a concomitant collapse of public sector revenues, in the classical fashion. This is the main explanation for the extreme form of regime change that took place under the Fujimori administration.

There is little doubt that the significant drop in GDP growth in Argentina with the sharp acceleration of inflation in the 1988–90 period, including the collapse of public sector finances in the second quarter of 1989, contributed to the readiness to implement the radical reforms of the Menem administration and to its success in bringing down inflation. However, the success of dealing with inflation is only one component of the resumption of growth; no less depends on the progress achieved with the structural reforms toward a market economy.

It is tempting to regard the big jump in Argentina's growth in 1991 (7% in

per capita terms) as being due entirely to the effect of reforms and liberalization that took place in the past two to three years. Usually the genuine effect of reforms appears gradually over the longer term. However, one has to distinguish in this episode between the cyclical and the sustainable aspects of a stabilization cum reforms package. For example, in the case of Chile the main effects of the massive reforms of the seventies bore fruit only in the second half of the eighties. The growth that Chile experienced in the seventies was largely cyclical, being associated with the exchange rate–based stabilization of that time. It may be recalled that toward the end of the seventies Argentina implemented a similar (Tablita) policy, which was associated with a GDP growth of 7% in 1979, only to be followed by a sharp recession later on. It should be stressed, however, that the fiscal reforms, and especially the trimming of the public sector, under the Menem administration are unprecedented in Argentine history, which may make a difference between the experiences of the seventies and the nineties.

12.6.2 Real Appreciation and the Costs of Stabilization

Experience with disinflation programs shows that they involve not only the cost of a slowdown of GDP growth, which is discussed in section 12.6.1, but also a worsening of conditions in the tradables sector as a result of a tendency for the real exchange rate to appreciate. This is also a standard result in models of flexible exchange rate systems with capital mobility, where disinflation involves tight monetary policies. Similar tendencies are likely to appear in disinflation programs that adopt the fixed exchange rate system as part of the policy package, but in this case the program may generate a temporary boom of the type described in the previous section. In any case, it is hard to avoid the unfavorable effect of disinflation on the tradables sector, and consequently on the resumption of export-led growth.

Since the underlying cause of the real appreciation in any of these regimes results from rigidities in domestic wages or prices, one might expect that the elimination of inflation inertia through hyperinflation will minimize the real appreciation. However, in the new hyperinflations the major cause of wage and price rigidity is expectational rather than inertial. Consequently, the issue of real appreciation may appear in even stronger force than in ordinary tight-money policies.

Figure 12.5 shows the tendency for real appreciation that accompanied the periods of tight-money disinflation in the three countries. Usually this is also reflected in an increase in our measure of real interest rates. In Argentina the tendency for real appreciation was smoothed, but not eliminated, by the transition to the convertibility plan. In Peru the process goes on from the beginning of the stabilization. Since the real appreciation is driven by capital inflows (part of which is repatriation of flight capital), it does not represent currently a balance-of-payments problem, but it creates a "Dutch disease" problem for the sector of tradables. Brazil, which relaxed its tight-money policy after a short

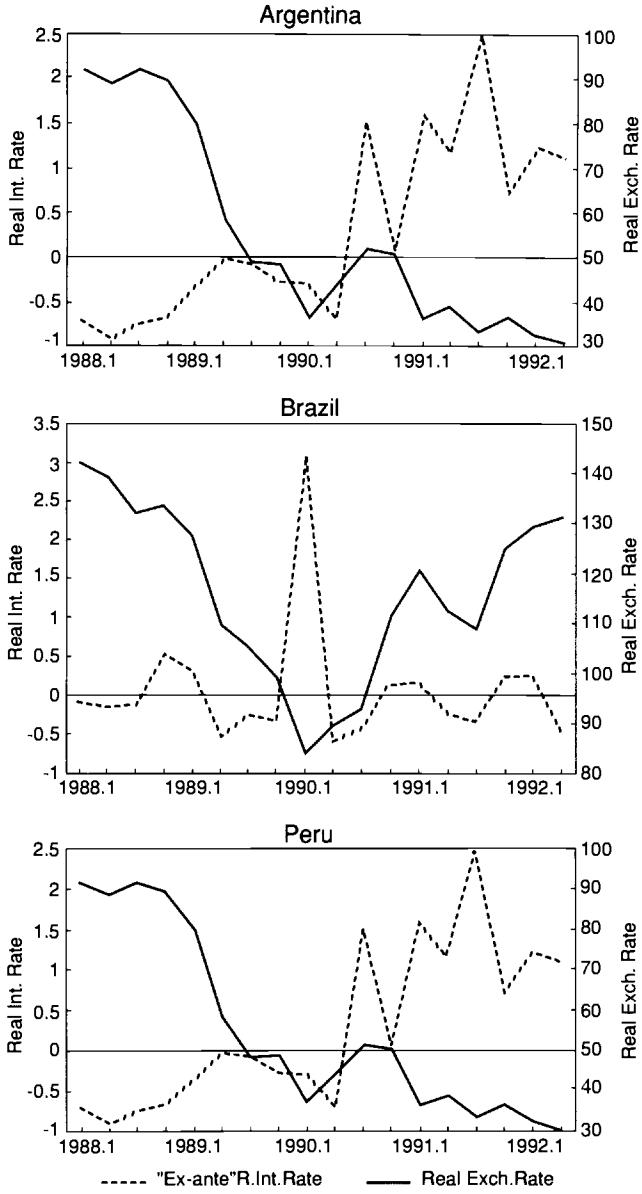

Fig. 12.5 "Ex ante" rate interest versus real exchange rate: Argentina; Brazil; Peru

Note: Nominal interest rates were deflated using next quarter's inflation.

while, enabled its real exchange rate to regain its values of ten years ago but at the cost of resumption of inflation. This shows that countries struggling with the pressures of possible renewal of hyperinflation must confront the trade-off between this danger and the damage caused to the tradables sector as a result of real appreciation.

12.7 Summary

Are all hyperinflations alike? Most of the existing wisdom regarding the origins and the ends of hyperinflations is based on Sargent's (1982) influential paper. In his view the origins of hyperinflations are clear, extremely large budget deficits financed by money creation (seigniorage), and so are the policies that are required to stop them, a commitment to a new regime in which the budget is balanced and the central bank is restrained from financing the treasury. Once a decisive stabilization was in place, hyperinflation was stopped in its tracks. Sargent's paper is based on a consistent pattern observed in the European hyperinflations of the 1920s. This pattern was repeated in the Bolivian hyperinflation of the mideighties.

This paper examines the recent hyperinflations in Argentina, Brazil, and Peru. It is argued that, in contrast to the European hyperinflations, the more recent ones were not caused by a sudden, large increase in the budget deficit and seigniorage. Instead, they were the final stage of a long process of high and increasing rates of inflation that lasted for around two decades. For a while it looked as if high inflation could be a stable process. In the end, however, it became clear that hyperinflation was all but unavoidable.

It is also argued that the process of restoring price stability in the new episodes appears to be longer and more costly than suggested by Sargent. Despite decisive stabilization programs, none of these countries was able to stop hyperinflation in its tracks. Instead inflation pulled back to high levels (monthly rates oscillated between 4 and 8%). The reason for the difference is that it is more difficult and costly to demonstrate a regime change in countries that have a tradition of high inflation. Balancing the budget for a year or two is not enough to convince the public that the economy is departing from a long history of high inflation.

An implication of our analysis is that the costs of high inflation might become apparent only at a very late stage of the process. These episodes helped to dispel the myth that it is possible to maintain a high and stable rate of inflation on a long-term basis, without harmful effects on growth.

Appendix

Table 12A.1 Monthly Inflation

Month		Austria	Germany	Hungary	Poland	Month		Bolivia
1920	01	N.A.	56.91	N.A.	N.A.	1983	01	−0.87
	02	N.A.	34.13	N.A.	N.A.		02	10.53
	03	N.A.	1.18	N.A.	N.A.		03	11.90
	04	N.A.	−8.19	N.A.	N.A.		04	8.51
	05	N.A.	−3.82	N.A.	N.A.		05	9.80
	06	N.A.	−8.61	N.A.	N.A.		06	3.57
	07	N.A.	−0.72	N.A.	N.A.		07	10.34
	08	N.A.	5.84	N.A.	N.A.		08	25.00
	09	N.A.	3.45	N.A.	N.A.		09	17.50
	10	N.A.	−2.00	N.A.	N.A.		10	11.70
	11	N.A.	2.72	N.A.	N.A.		11	24.76
	12	N.A.	−4.64	N.A.	N.A.		12	25.19
1921	01	N.A.	0.00	N.A.	N.A.	1984	01	9.76
	02	41.00	−4.17	N.A.	26.60		02	22.78
	03	−13.48	−2.90	N.A.	3.31		03	21.27
	04	−4.92	−0.75	N.A.	−3.56		04	**62.69**
	05	4.31	−1.50	N.A.	2.93		05	47.02
	06	23.97	4.58	N.A.	8.43		06	4.06
	07	−4.67	4.38	N.A.	29.00		07	5.25
	08	16.78	34.27	28.57	16.31		08	14.96
	09	28.74	7.81	15.74	13.38		09	37.30
	10	**54.88**	18.84	8.00	8.86		10	**59.21**
	11	**69.97**	39.02	22.96	−10.61		11	31.52
	12	**66.43**	2.05	−0.60	−2.62		12	**60.90**
1922	01	21.23	5.16	−1.82	3.83	1985	01	**68.77**
	02	25.04	11.72	4.94	7.11		02	**182.76**
	03	2.03	32.44	16.47	15.79		03	24.94
	04	11.12	17.13	8.59	2.23		04	11.78
	05	25.26	1.57	2.33	4.70		05	35.67
	06	**68.69**	8.82	17.27	11.52		06	**78.46**
	07	41.19	44.52	34.88	15.84		07	**66.30**
	08	**128.70**	**88.98**	22.99	33.66		08	**66.46**
	09	**81.88**	**49.48**	24.30	12.21		09	**56.51**
	10	−7.58	**97.21**	23.68	32.16		10	−1.86
	11	−4.77	**103.36**	−0.91	36.89		11	3.20
	12	−1.54	28.13	2.45	25.65		12	16.80
1923	01	0.67	**88.84**	15.27	**57.26**	1986	01	32.96
	02	1.85	**111.31**	8.57	**57.72**		02	7.95
	03	1.98	−16.94	**57.89**	15.06		03	0.07
	04	6.72	6.63	26.52	7.12		04	3.59
	05	5.26	**56.75**	12.57	6.27		05	0.97
	06	0.16	**137.27**	**53.72**	**67.18**		06	4.26
	07	−5.44	**285.80**	**97.92**	**63.17**		07	1.78
	08	−4.42	**1,162.31**	**61.71**	**72.47**		08	0.64
	09	13.20	**2,431.67**	19.78	37.92		09	2.28
	10	1.01	**29,565.27**	5.96	**274.96**		10	0.59

(continued)

Table 12A.1 (continued)

Month		Austria	Germany	Hungary	Poland	Month		Bolivia
	11	1.48	**10,139.77**	8.18	**148.14**		11	−0.11
	12	1.72	**73.55**	12.44	**109.44**		12	0.65
1924	01	5.00	−7.14	43.70	**70.18**	1987	01	2.45
	02	1.72	−0.85	**79.24**	2.59		02	1.23
	03	0.00	3.45	12.93	−1.27		03	0.70
	04	0.11	3.33	2.79	−1.21		04	1.59
	05	1.87	−1.61	6.32	N.A.		05	0.34
	06	1.98	−4.92	−2.72	N.A.		06	−0.22
	07	N.A.	−0.86	3.93	N.A.		07	−0.05
	08	N.A.	4.35	−2.29	N.A.		08	0.99
	09	N.A.	5.83	−0.24	N.A.		09	0.58
	10	N.A.	3.15	2.17	N.A.		10	2.09
	11	N.A.	−1.53	1.06	N.A.		11	−0.28
	12	N.A.	1.55	1.61	N.A.		12	0.80

Table 12.A.2 **Monthly Inflation**

Month		Argentina	Brazil	Peru
1988	01	9.18	21.16	12.76
	02	10.34	17.89	11.84
	03	14.73	18.88	22.59
	04	17.31	19.69	17.90
	05	15.59	18.58	8.51
	06	18.08	20.33	8.86
	07	25.64	20.87	30.88
	08	27.56	21.74	21.71
	09	11.68	25.16	**114.09**
	10	9.03	26.53	40.60
	11	5.73	27.70	24.40
	12	6.83	28.23	41.87
1989	01	8.93	39.07	47.34
	02	9.56	13.10	42.49
	03	17.00	5.79	41.99
	04	33.40	5.36	48.63
	05	**78.48**	13.26	28.61
	06	**114.47**	28.00	23.05
	07	**196.63**	33.87	24.58
	08	37.86	33.39	25.06
	09	9.36	34.08	26.86
	10	5.60	38.65	23.25
	11	6.52	45.48	25.84
	12	40.07	**51.47**	33.75
1990	01	**79.20**	**72.84**	29.73
	02	**61.57**	**67.52**	30.59
	03	**95.53**	**80.75**	32.63
	04	11.37	17.24	37.39

Table 12.A.2 (continued)

Month		Argentina	Brazil	Peru
	05	13.61	9.63	32.80
	06	13.90	12.75	42.52
	07	10.83	14.71	**63.28**
	08	15.34	12.86	**396.96**
	09	15.68	13.12	13.77
	10	7.69	14.04	9.61
	11	6.18	16.74	5.93
	12	4.68	18.87	23.73
1991	01	7.70	19.91	17.83
	02	26.99	21.53	9.42
	03	11.04	6.60	7.70
	04	5.51	8.61	5.84
	05	2.80	7.05	7.64
	06	3.12	11.72	9.26
	07	2.59	13.31	9.06
	08	1.30	15.49	7.24
	09	1.77	16.87	5.56
	10	1.35	23.98	3.95
	11	N.A.	25.36	3.96
	12	N.A.	23.79	3.74

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Comment on Chapters 11 and 12

William R. Cline

These two papers concern the case of persistent intermediate inflation (Turkey) and the transition from chronically high inflation to hyperinflation (Argentina, Brazil, Peru, and Bolivia). My comments will focus on the latter, but there are important common themes that warrant an initial statement based on the Turkish case.

I had thought that only the Philippines qualified as an honorary Latin American country, but Anne Krueger's paper shows that Turkey must also be included in this club. All of the familiar Latin American distortions are present: inefficient import-substituting industrialization, fiscal drain from state enterprises, chronic fiscal problems more generally, the eventual frustration of the public with a failed economic model, and economic crisis as the forcing event of model change. Indeed, Turkey turns out to have preceded Latin America in structural adjustment, as it adopted trade liberalization and a slimming of the state sector in 1980, whereas Latin America did so some years later following the debt crisis.

Perhaps the principal differences are that Turkey seems to have been able to achieve faster growth (4 to 7%), avoid inertial inflation despite large devaluations and exchange rate crawl, and keep inflation below three digits despite fiscal deficits averaging some 4% of GDP. Maybe the good neighborhood helped. Overall, the political economy Krueger describes is reassuring with

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respect to the response of trade and growth to exchange rate and trade policy reform, but discouraging with respect to the political sustainability of fiscal adjustment. Her question of whether the "sectoral" (structural) reforms can persist in the face of macroeconomic instability is of great relevance to Latin America today.

Kiguel and Liviatan postulate that the phenomenon of hyperinflation in countries with chronically high inflation (H-CHI) differs from classical hyperinflation of Germany and certain other European countries in the 1920s. Hyperinflation tends to come as a further destabilization from already high inflation rather than as an abrupt break from past stability. Because high inflation reduces the demand to hold money and thus the money base as a share of GDP, the economy becomes subject to larger proportionate monetary destabilization from shocks of identical size relative to GDP. Once ignited, H-CHI is more difficult to stop than in a classical hyperinflation. The thesis has intuitive appeal; after all, it is easier to reform the youth who goes on a single binge than the chronic alcoholic. As I agree with the thesis, I will focus on qualifications and differences of interpretation.

My principal critique of the paper is that it tends to say the classical remedies have failed in situations where the real problem was that the classical remedies have not really been adequately applied. Thus, the authors argue that in Argentina the Bunge-Born program would have worked if the episode had been one of classical hyperinflation, so its failure under H-CHI was attributable to the qualitative differences between these two prototypes. I would disagree. The Bunge-Born Plan never consolidated fiscal adjustment. After an initial megaincrease in public sector prices, there was talk about a value-added tax (VAT), but the tax was not enacted for several months. The real attack on tax evasion did not come until the Cavallo Plan.

Or consider Brazil. The Kiguel-Liviatan data show a reversal of the fiscal deficit from about 5.5% of GDP (operational) in 1987–89 to a surplus of 1.3% of GDP in 1990. They conclude that there was a paradox: classical fiscal correction did not achieve the classical end to hyperinflation. But the 1990 fiscal outcome was misleading. It was attributable to temporary factors, such as a 25% tax on stock market holdings and the sharp reduction in the government's domestic interest burden resulting from the freeze of financial deposits. The public knew the freeze would be reversed in eighteen months and probably sooner, and that structural phenomena such as a utopian constitution meant the fiscal adjustment was not permanently in hand. Moreover, the data in question do not include large quasi-fiscal deficits of the financial system, namely, the expected losses on official sector lending. Thus, Kiguel and Liviatan are on questionable grounds when they call the Collor I Plan "very orthodox." Indeed, at the heart of the plan was an unorthodox asset freeze, what has been called Chicago school economics but of the Al Capone rather than the Milton Friedman variety.

What should be added is that, in the Brazilian case especially, even a con-

vincing fiscal adjustment probably would not have been enough without the definitive end of indexation. Yes, the Collor Plan temporarily eliminated indexation, but it was back within a few months. The combination of only transitory fiscal adjustment, early release of frozen accounts in a context where the freeze itself had caused a downward shock in the demand for money, and the reappearance of indexation meant disaster for the Collor Plan. More generally, the essence of the argument about greater difficulty of stopping inflation after a hyperinflation in a chronic-inflation country must be that expectations and defense mechanisms that perpetuate inflation are much more severe in the chronically high-inflation countries. Thus dealing with indexation and other such mechanisms must be part of the solution. Moreover, as the Collor II Plan showed, the heterodox remedy of a price freeze does not serve this purpose where this instrument has been discredited by previous attempts that did not incorporate fundamental fiscal adjustment. Indeed, the very hint of a new freeze just encouraged the firms to increase prices preemptively.

In contrast to the two Collor Plans and the Bunge-Born Plan, the Cavallo Plan represents a case of successful end to hyperinflation even for a chronically high-inflation country. The reason it was successful was that its fiscal adjustment was much more substantial and permanent. This time fiscal correction was based on the VAT, which rose from about 2% of GDP to about 7%, rather than on such temporary mechanisms as forced saving and an export tax under the Austral Plan. From a high of 10% of GDP in 1983, the primary deficit turned into a surplus of 2% of GDP by 1991. Moreover, Cavallo's law of convertibility achieved the abrupt regime change that is also a required element of the classical remedy. The paper gives short shrift to the plan, perhaps because it has been too successful to fit with the theory of prolonged difficulty of stopping inflation under H-CHI, or perhaps because the authors are afraid the plan is now entering a phase that could lead to collapse.

The Kiguel-Liviatan paper also curiously omits an examination of the key issue of whether use of the exchange rate as a monetary anchor is a good idea or a bad idea in attempts to stop hyperinflation in a chronically high-inflation country. I would submit that the Argentine hyperinflation of early 1989 was exchange rate led. The authors rightly note that seigniorage increase was contemporaneous with rather than prior to hyperinflation. The leading influence was the collapse of the exchange rate under a temporary float in the face of the public's fear about the honoring of domestic government debt. With that experience, it is not surprising that the Cavallo Plan chose to lock in the exchange rate, to minimize the fear of a repetition of exchange rate–led hyperinflation. It would be nice to hear more about the optimal time to use the exchange rate anchor and the optimal time to shift back toward use of the exchange rate to preserve external balance.

The authors propose several lucid suggestions about H-CHI versus classical hyperinflation. As just one example, they note that in the classical case the driving force is a sharp increase in seigniorage, which then causes inflation to

feed on itself because of the Olivera-Tanzi effect and its decimation of real tax revenue. In contrast, in H-CHI high seigniorage is at most contemporaneous rather than leading; moreover, the Olivera-Tanzi effect is much smaller. The reason, presumably, is the development of indexed tax revenue mechanisms in a climate of chronic inflation.

Other propositions about the difference between H-CHI and classical hyperinflation are less persuasive. In particular, there was little supporting evidence that hyperinflation has a lower real cost in chronically high-inflation countries. Real GDP fell by 4.5% in Argentina in 1989; what was the comparable figure in the typical European cases?

Other differences warrant further discussion. For example, is seigniorage accelerationist? Does it require a rising rate of inflation to secure a constant amount of seigniorage as a percentage of GDP, as I suspect? If so, then this is one reason why we should expect chronically high inflation eventually to transit to hyperinflation, unless the country takes action. In this regard, it is worth mentioning a growing danger in Brazil: the public simply becomes innured to high inflation, and accepts 20% monthly rates of inflation as "normal." That is surely a recipe for disaster.

I was considerably uneasy about the implication that Bolivia was a classical case of hyperinflation ended by decisive action. In particular, it seems to me that the size of the current account deficit after the correction—10% of GDP in 1986–87 according to table 12.2—was unsustainable and makes the Bolivian case essentially irrelevant for larger countries where such a deficit could not be financed. Similarly, a nominal fiscal deficit of 6.5% of GDP as Bolivia had after adjustment would be explosive in Argentina or Brazil, where an appropriate target for the nominal deficit is on the order of 0 or maybe 1% of GDP.

The Bolivian case also raises a theoretical issue. The authors indicate that hyperinflation started in Bolivia when external finance was cut off. In this regard, incidentally, there seem to be some inconsistencies. The paper says that resource transfers turned to −5.6% of GDP, but table 12.2 states that the current account was not in surplus but was in deficit by about 4% of GDP in 1982–84. The two are inconsistent unless factor payments abroad reached 10% of GDP, which seems highly implausible.

The theoretical issue that warrants a further look, however, is the difference between hyperinflation caused by events that shock the exchange rate and that which could occur even in a closed economy. In particular, if massive seigniorage is used by the government to make domestic purchases, then Keynesian excess demand inflation is no puzzle. However, if the large seigniorage is used to purchase dollars from exporters for the purpose of servicing external debt, then the inflation that results does not stem from increased demand for domestic production, but instead from an expectational price shock in an environment where the public watches the exchange rate as an indication of future inflation.

It would be nice to hear more about the problem of high real interest rates

in the posthyperinflation phase for the chronically high-inflation countries. It seems to me that one should be concerned about dynamic instability when real interest rates are 20% or more, because these rates inevitably mean that the domestic debt will balloon as a fraction of GDP, in turn widening the risk premium because of the rational expectation that the government must default on domestic obligations. This is another reason to doubt that Bolivia has consolidated its posthyperinflation adjustment.

Finally, it would have been nice if the authors could have mentioned more about the new problem of large capital inflows, and especially the inflationary consequences in an environment where hyperinflation has reduced the country's monetary base to a small fraction of GDP. It would also have been useful to address the related problem of bimetallism, whereby holdings of dollars should probably be added to the money base to get a clearer picture of monetization.

Overall, nonetheless, the authors are to be commended for an incisive paper.

Comment on Chapters 11 and 12

Holger C. Wolf

Comment on Chapter 11

Anne Krueger's paper provides an excellent overview of the evolution of the Turkish economy during the last decade. Not being an expert on Turkey, let me limit my comments to reemphasizing two political arguments submerged in the paper that not only apply to traditional stabilization episodes but are also highly relevant to the east European transitions.

First, liberalization, like stabilization, is facilitated by major economic crisis placing the competing options in sharp contrast. Indeed, as Aaron Tornell pointed out (chap. 2 in this volume), such upheavals may in some cases be necessary to bring about the political consensus for decisive action.

Second, even if liberalization is ex ante opposed by significant parts of the population, it may very well be ex post politically stable. Part of the explanation might be found in games played between various rent-seeking groups. Krueger suggests a second, less calculating channel: moving from the apparent stability of interventionism to the apparent anarchy of markets requires a leap of faith. Again, economic crisis reducing the appeal of the status quo may facilitate the leap.

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Comment on Chapter 12

In their intriguing paper, Miguel Kiguel and Nissan Liviatan argue against the notion of a general model of hyperinflation. Rather, they contend, the recent hyperinflations in Argentina and Brazil significantly differ from the classic interwar episodes in Europe. The difference lies in the origin of the inflation (a one-time increase in the deficit during the 1920s versus a long, drawn-out process in Latin America), in the process itself (extreme instability in Europe, a semblance of government control in Argentina and Brazil), and in the stabilization (instantaneous stability in Europe, lingering inflation in Latin America).

While the dynamics of the two groups of hyperinflations certainly differed, an alternative continuous classification scheme encompassing both groups of inflations as extreme cases may yield insights not captured by the authors' dichotomization. The measuring rod, as identified by Kiguel and Liviatan, is the degree of institutional adjustment to high inflation at the onset of inflation. Four adjustments are of particular relevance here: first, the degree of indexation of prices, determining the pass-through speed of shocks; second, the extent to which wages are automatically indexed to prices, determining the virulence of the wage-price spiral; third, the extent to which financial markets provide hedges against inflation, determining the scope for seigniorage extraction; fourth, the degree to which taxes are indexed to prices, determining the sensitivity of the deficit to inflation.

Looking in this light at the classical episodes, institutions (formed under the gold standard) were ill-equipped to deal with the emergence of inflation. German courts prohibited price increases on inventory goods as "price-gouging" until the early 1920s. Cost of living indices were only slowly developed as a response to the inflation. Financial institutions offered no more than rudimentary inflation hedges. Taxes remained nonindexed until the summer of 1923, rendering the deficit highly responsive to the inflation process.

In contrast, the latest editions of the Latin American hyperinflations originated in economies already characterized by widespread indexation of prices and wages and—in the case of Brazil—a highly sophisticated financial system. The authors contend that the different starting point suffices to classify the Latin cases as qualitatively different from the European ones. Alternatively, one might endogenize the difference as a function of the inflation history. Altering institutions entails significant costs. As inflation accelerates, these costs are eventually outweighed by the benefits of inflation-proof institutions, prompting wrenching changes in the financial system, in wages, and in price setting. By the end of the German hyperinflation, exchange rate indexing, complete wage indexation, dollarization and tax indexation—features well known from the Latin American inflations—were pervasive. In like vein, the very existence of these institutions in Argentina and Brazil reflects past inflationary excesses.

This dynamic view suggests that equal shocks will have very different consequences depending on the past inflationary history of the country. A second hyperinflation in Germany would have followed a quite different path, a path probably not dissimilar to the recent Latin hyperinflations. The point, incidentally, is not new: in the aftermath of the interwar inflations Ludwig von Mises stressed that any attempt of the government to once more extract seigniorage revenue was doomed to failure, as inflation-proof institutions would immediately spring back into action. This institutional view also suggests that the common focus on the size of the fiscal shock is a misleading indicator of the likely evolution of the inflation. The time integral of monetized deficits, proxying the degree of institutional adjustment, may provide a more reliable measure.

Let me conclude with a factual quibble. The authors present a fashionable yet arguably somewhat streamlined version of the origin and emergence of the classical hyperinflation episodes. In the case of Germany, under an alternative view the period of monetary instability commenced with the abandonment of gold convertibility in 1914, gathered strength throughout the war years during which the inflationary consequences of monetized deficits were held in check by extensive price controls, and exploded as these controls were lifted between 1918 and 1920 and as institutions began to adjust. Viewed in this vein as a drawn-out nine-year process rather than a straight-line explosion caused by a single factor (reparations), the German episode no longer looks that different from the Latin cases. It also bears pointing out that, while the German inflation indeed came to a sudden stop in 1923, several previous stabilization efforts failed after initial signs of success, not unlike the repeated failed stabilizations in Argentina and Brazil.