The World Economy

Edited by

DAVID GREENAWAY AND JOHN WHALLEY

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Conybeare and Zinkula

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Brazilian Inflation and the *Plano Real*

Jeffrey Sachs and Alvaro A. Zini, Jr.

1. INTRODUCTION

By many standards, Brazilian inflation has been one of the most intractable in world history. The time span of high inflation in Brazil is unparalleled: inflation has exceeded 50 per cent per annum every year since 1979, and has been at double digit rates every year since 1950 (except for 1957) — see Table 1. Even Argentina, the perennial rival of Brazil for the dubious distinction of longest-running high inflation, does not show such a long sequence of high inflation. There have been innumerable major and minor attempts at Brazilian stabilisation, including at least four major plans since 1986. Each has failed. In July 1994, Brazil started a new stabilisation attempt, the *Plano Real* (names after the new Brazilian currency). This paper assesses the difficulties inherent in Brazilian stabilisation programmes, the tenets of the new plan, and lays out an interpretation of Brazil's high inflation in the recent past.

Every successful stabilisation must have three components, besides a strong political will to stop those practices which have led to inflation. These components are: (1) a solution to chronic budgetary problems that are almost always at the origin of the high inflation; (2) a method of eliminating inertial elements of high inflation, mainly wage and price indexation; and (3) the introduction of one or more 'nominal anchors' to the price level at the start of stabilisation. Without nominal anchors, high inflation may easily reappear as the result of self-fulfilling prophecies (e.g. a speculative attack on the currency) or opportunistic behaviour by the monetary authorities, who might seek the short-term benefits of inflationary practices. Previous attempts at Brazilian stabilisation have lacked the requisite combination of these three elements as well as the political will to impose greater control over central bank practices.

In comparison with other high inflation countries, Brazil is special in three ways. First, the high inflation of the 1990s does not seem to be derived from large budget deficits; figures reported in Table 2 indicate that the operational deficit...
### TABLE 1
Seigniorage and Inflation in Brazil (in %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Seigniorage/GDP</th>
<th>Annual Inflation</th>
<th>Money Base/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>2.84</td>
<td>11.6</td>
<td>12.0</td>
</tr>
<tr>
<td>1951</td>
<td>1.30</td>
<td>11.9</td>
<td>11.6</td>
</tr>
<tr>
<td>1952</td>
<td>1.81</td>
<td>12.9</td>
<td>10.9</td>
</tr>
<tr>
<td>1953</td>
<td>1.87</td>
<td>20.8</td>
<td>11.1</td>
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<tr>
<td>1954</td>
<td>1.84</td>
<td>25.6</td>
<td>9.5</td>
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<td>1955</td>
<td>1.64</td>
<td>12.4</td>
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<td>1956</td>
<td>1.39</td>
<td>24.4</td>
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<tr>
<td>1957</td>
<td>2.75</td>
<td>7.0</td>
<td>8.8</td>
</tr>
<tr>
<td>1958</td>
<td>1.46</td>
<td>24.3</td>
<td>9.0</td>
</tr>
<tr>
<td>1959</td>
<td>2.50</td>
<td>39.5</td>
<td>7.8</td>
</tr>
<tr>
<td>1960</td>
<td>2.34</td>
<td>30.5</td>
<td>7.6</td>
</tr>
<tr>
<td>1961</td>
<td>3.13</td>
<td>47.7</td>
<td>7.5</td>
</tr>
<tr>
<td>1962</td>
<td>3.98</td>
<td>51.3</td>
<td>7.3</td>
</tr>
<tr>
<td>1963</td>
<td>4.13</td>
<td>81.3</td>
<td>7.0</td>
</tr>
<tr>
<td>1964</td>
<td>3.50</td>
<td>91.9</td>
<td>6.6</td>
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<tr>
<td>1965</td>
<td>3.52</td>
<td>34.5</td>
<td>6.8</td>
</tr>
<tr>
<td>1966</td>
<td>1.35</td>
<td>38.8</td>
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<td>1967</td>
<td>1.59</td>
<td>24.3</td>
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</tr>
<tr>
<td>1968</td>
<td>2.16</td>
<td>23.4</td>
<td>6.1</td>
</tr>
<tr>
<td>1969</td>
<td>1.21</td>
<td>20.2</td>
<td>5.7</td>
</tr>
<tr>
<td>1970</td>
<td>0.78</td>
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<td>5.3</td>
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<tr>
<td>1971</td>
<td>1.55</td>
<td>19.8</td>
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<td>1972</td>
<td>0.92</td>
<td>15.5</td>
<td>4.8</td>
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<td>1.57</td>
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<td>34.5</td>
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<td>29.3</td>
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<td>1976</td>
<td>1.61</td>
<td>46.3</td>
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<td>1977</td>
<td>1.95</td>
<td>38.8</td>
<td>3.9</td>
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<tr>
<td>1978</td>
<td>1.65</td>
<td>40.8</td>
<td>4.1</td>
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<td>1979</td>
<td>2.61</td>
<td>77.2</td>
<td>4.0</td>
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<td>1980</td>
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<td>1981</td>
<td>1.69</td>
<td>95.2</td>
<td>2.9</td>
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<td>1982</td>
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<td>99.7</td>
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<tr>
<td>1983</td>
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<td>211.0</td>
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<td>1984</td>
<td>1.94</td>
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<td>1985</td>
<td>2.13</td>
<td>235.1</td>
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<td>1986</td>
<td>3.55</td>
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<td>1987</td>
<td>1.72</td>
<td>415.8</td>
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<td>1988</td>
<td>2.28</td>
<td>1037.6</td>
<td>2.1</td>
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<tr>
<td>1989</td>
<td>2.76</td>
<td>1722.9</td>
<td>1.3</td>
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<tr>
<td>1990</td>
<td>4.92</td>
<td>1476.6</td>
<td>1.2</td>
</tr>
<tr>
<td>1991</td>
<td>2.32</td>
<td>480.2</td>
<td>2.1</td>
</tr>
<tr>
<td>1992</td>
<td>2.31</td>
<td>1157.9</td>
<td>1.7</td>
</tr>
<tr>
<td>1993</td>
<td>1.80</td>
<td>2708.6</td>
<td>1.1</td>
</tr>
<tr>
<td>1994</td>
<td>1.78</td>
<td>5153.5</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Note: Inflation is the December to December variation in the IGP index. End of the month monthly figures of the monetary base were used for 1950 to 1979. Average monthly balances were used for 1980 to 1994. Figures for 1994 are for the first semester only and are taken in proportion to GDP in that semester. The IGP-DI index was used to deflate the data. Seigniorage was calculated as: $s = (MB_t - MB_{t-1})/P_{t-1}$.

Source: Authors using monthly data from the Central Bank of Brazil. A revised series for years 1950–79 was taken from Boletim do Banco Central, August 1993. Monthly data for 1980–94 was provided directly by the Research Department of the Central Bank of Brazil.
has been nearly null since 1990.¹ Budget deficits played a role in the onset and prolongation of high inflation (note that the average, inflation-adjusted deficit was 5.2 per cent of GDP during 1986–89), but have not been the main explanatory factor behind the high inflation of the 1990s. Second, Brazil has been plagued with particularly strong inertial inflation, as a result of extensive use of backward-looking wage and price indexation. Third, the money supply has not provided a nominal anchor to the economy because the monetary base (currency plus reserves at the Central Bank) is a very small proportion of GDP and the regulatory framework has allowed the endogenous expansion of inside money, a point which will be explained later on.² Thus, small increases in the monetary base as a per cent of GDP are consistent with very high inflation.

These properties of Brazilian inflation have long called into question the purely orthodox approach to stabilisation in Brazil — see Bresser Pereira and Nakano (1987). But even in the recent past, the IMF continued to insist on ever-stronger budgetary actions as a precondition for IMF support (calling for a primary surplus of six per cent of GDP in 1994). Calls such as this have neglected the fact that the budget is not the proximate cause of the continued high inflation.

¹ Numbers in Table 2 are the official estimates of the budget deficit in Brazil, following a methodology agreed with the IMF. The 'operational deficit' measures the inflation-adjusted deficit in net revenues. The 'primary deficit' (or surplus) is revenues minus outlays, leaving aside disbursements with interest on public debts. Even if one allows for a few percentage points of deviation between the estimated and the true value of the deficit — to allow for measurement problems when inflation is high and rising — the numbers in Table 2 are still small in comparative terms. We conduct a test on the consistency of these numbers in the Appendix and find further support for the view that the Brazilian budget deficit has been small in the recent past. For a good discussion of the different measurements of fiscal imbalance in Brazil see Barbosa and Giambiagi (1995).

² See Zini (1992 or 1994) on this topic, and the discussion of the drawbacks of introducing an indexed-currency in parallel with a non-indexed money.
in Brazil. Budget discipline is important, but the nearly exclusive IMF focus on fiscal policy has taken attention from more immediate problems in stabilisation, namely the problems of inertial inflation and the nearly complete demonetisation of the Brazilian economy in the precise sense of a collapse in the demand for high-powered money. The Real plan represents an ingenious attempt to deal with Brazil’s problem of inertial inflation, but it is still incomplete in terms of setting in place monetary rules aimed at price stability in the long run.

In Section 2 we briefly describe the standard seignorage model of high inflation. In Section 3 we show how Brazil differs from the standard model, and therefore requires a separate strategy. In Section 4, we describe the Real plan. In Section 5, we discuss ways which could strengthen monetary discipline in the long run through additional monetary and banking measures.

2. THE SEIGNORAGE MODEL OF HIGH INFLATION

All modern thinking about stabilisation programmes properly starts with a baseline model in which high inflation is the result of large government budget deficits. In discrete time, and assuming that the budget deficit $D_t$ is financed entirely by increases in central bank money (i.e., the monetary base, $MB_t$), we have the basic equations for seignorage $S_t$:

\[
\frac{(MB_{t+1} - MB_t)}{P_t} = S_t \quad \text{(definition of seignorage)}
\]

\[
S_t = D_t \quad \text{(seignorage finance of deficit)}
\]

(1)

where $MB_t$ is the monetary base, $P_t$ is the price level and $D_t$ is the real budget deficit. For the moment, we ignore other ways to finance the deficit, such as bond issues to the public.

We define monetary velocity (conventionally) as:

\[
V_t = P_t Q / MB_t.
\]

(2)

$Q$ is real GDP, assumed constant. Combining (1) and (2), and writing inflation as $\Pi_t = (P_{t+1} - P_t) / P_t$, we have the standard inflation equation linking inflation to the size of the budget deficit, and the level and change in velocity;

\[
\Pi_t = \frac{(V_{t+1} - V_t)}{V_t} + V_{t+1}D_t/Q.
\]

(3)

When the budget deficit (as a per cent of GDP) is constant, and velocity is assumed given, we have

\[
\Pi = V.D/Q,
\]

(4)

which captures the orthodox view that high inflation is the result of a large budget deficit. To cut inflation, it is necessary to eliminate the need for monetary
financing of the deficit. In general, this can be done either by reducing the deficit to a lower level, or by substituting bond financing for money financing.

Suppose that the government can borrow with bonds, with the net flow of bond financing equal to \( F_t \). In that case, seignorage is equal to \( S_t = D_t - F_t \), and the augmented inflation equation becomes:

\[
\Pi = V . (D - F)/Q. \tag{4'}
\]

Thus, the resort to seignorage can be eliminated by a combination of deficit cuts and bond finance.\(^3\)

Equation \((4')\) is still too limited, however. We must take into account that velocity itself is an increasing function of the inflation rate:

\[
V_t = v(\Pi_t). \tag{5}
\]

Since velocity is a function of inflation, the steady-state inflation rate that accompanies a given amount of seignorage financing, \( S/Q \), must solve the more general form:

\[
\Pi = v(\Pi)[S/Q]. \tag{6}
\]

This relationship between \( S/Q \) and inflation is illustrated in Figure 1, known as the 'inflation-Laffer curve.' The figure shows the relationship between inflation and the level of seignorage or budget deficit. This relationship has several well-known properties. First, there is a maximum ratio of the seignorage to GDP that can be raised with a constant rate of inflation. Call \( S_{\text{max}} \) the

\(^3\) In some circumstances, however, the shift to bond financing might not be enough to eliminate contemporaneous inflation, even if it eliminates current seignorage financing. If the bond financing is expected to be followed by even greater seignorage financing in the future, the expectation of future seignorage financing can increase the current velocity and thereby cause current inflation. This is one of the famous lessons of Sargent and Wallace's (1981) 'Unpleasant Monetarists Arithmetic.'
maximum value of $S/Q$ such that (6) has a solution. Second, there are generally at least two inflation rates consistent with any $S/Q$ greater than zero and less than $S^{\max}$. In other words, a given budget deficit as a per cent of GDP is generally consistent with two possible steady-state inflation rates. We illustrate this in the figure by showing the low and high inflation rates consistent with the seignorage level $(S/Q)_0$. From a social welfare point of view, it is obviously preferable for the economy with a given $S/Q$ to be operating at the lower level of II.

The high-inflation or 'bad' equilibrium, at $\Pi^H$, occurs when the 'tax base' of the inflation tax has been eroded by a sharp drop in demand for the monetary base, so that velocity is very high. It is possible to interpret the Brazilian case as one where the economy has become stuck on the wrong side of the Laffer curve, with a low budget deficit and high inflation. Indeed, the situation is even more paradoxical than implied by the figure: Brazil's high inflation in 1993 occurred despite a nearly zero operational budget deficit.

Note also that the economy can find itself in a vicious cycle, in which further reductions in $S/Q$ go hand in hand with the economy moving to the right of $\Pi^H$. As Sachs (1994) argues, when a country has been trapped in destabilising dynamics (due to a combination of political, fiscal, and financial crises), the economy creeps into a 'bad' equilibrium in the sense of moving toward a deeper crisis, collapse, or hyperinflation.

Going back to the seignorage model, velocity is determined both by market forces and the regulatory environment governing the monetary system. The low level of demand for high-powered money in Brazil reflects both considerations. Many years of high inflation have led to ingenious ways to economise on the monetary base. At the same time, the regulatory framework of the banking system has encouraged the flight from the monetary base, by allowing the banks to supply interest-bearing inside money (i.e. money created by banks, rather than by the government) in place of the monetary base. In effect, interest-bearing

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4 Bruno and Fischer (1990) discuss the 'inflation-Laffer curve' and analyze the properties of these two equilibria. Bruno (19930 and Sachs (1994) examine further cases of multiple equilibria in high-inflation economies.

5 Rossi (1994) reports econometric estimates that support this conjecture. The table below also lends support to this idea.

<table>
<thead>
<tr>
<th>Period</th>
<th>Seignorage Over GDP (%)</th>
<th>Average Inflation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-59</td>
<td>1.9%</td>
<td>19%</td>
</tr>
<tr>
<td>1960-69</td>
<td>2.7%</td>
<td>45%</td>
</tr>
<tr>
<td>1970-75</td>
<td>1.2%</td>
<td>22%</td>
</tr>
<tr>
<td>1976-79</td>
<td>2.0%</td>
<td>51%</td>
</tr>
<tr>
<td>1980-84</td>
<td>1.8%</td>
<td>148%</td>
</tr>
<tr>
<td>1985-90</td>
<td>2.9%</td>
<td>835%</td>
</tr>
<tr>
<td>1991-94</td>
<td>2.0%</td>
<td>2.375%</td>
</tr>
</tbody>
</table>

Source: Authors. Data come from Table 1.
### TABLE 3
Money Stock and Liquid Assets in Brazil
(in Per Cent of GDP)

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Currency held by the public</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Demand deposits</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>3. M1 (1+2)</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>4. FAF accounts</td>
<td>2.3</td>
<td>1.4</td>
</tr>
<tr>
<td>5. Special savings deposits (DERs)</td>
<td>1.5</td>
<td>0.6</td>
</tr>
<tr>
<td>6. Federal securities held by the public</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>7. State securities held by the public</td>
<td>2.2</td>
<td>2.7</td>
</tr>
<tr>
<td>8. M2 (3+4+5+6+7)</td>
<td>12.2</td>
<td>10.6</td>
</tr>
<tr>
<td>9. Savings accounts</td>
<td>4.4</td>
<td>4.8</td>
</tr>
<tr>
<td>10. M3 (8+9)</td>
<td>16.6</td>
<td>15.4</td>
</tr>
<tr>
<td>11. Private securities (CDs and bills)</td>
<td>7.8</td>
<td>7.7</td>
</tr>
<tr>
<td>12. M4 (10+11)</td>
<td>24.4</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Memo items:
- Monetary Base
- Issued currency
- Reserves of banking system

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary Base</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Issued currency</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Reserves of banking system</td>
<td>0.5</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Notes: Values refer to end of the year percentages, as estimated by the Central Bank of Brazil. Monthly value of GDP are estimated by the Central Bank using the centred IGP index as a deflator over annual GDP. (See explanation about the centred IGP index in Table 6.) Federal and State securities held by the public (items 6 and 7) exclude FAF's holdings of these securities. Private securities (item 11) includes time deposits, commercial bills and mortgage bills, except those included in FAF accounts. The value of Brazil's GDP at current prices was CR$1,846.81 billion in 1992 and an estimated CR$42,530.00 billion in 1993.

Source: Central Bank of Brazil, Nota para a Imprensa, March 1994.

Accounts in the banking system with the attributes of transactions balances have allowed agents to flee from the cruzeiro base money.

Successful stabilisation can be thought of moving the economy from the high-inflation to the low-inflation equilibrium, while maintaining (and consolidating) a low level of the budget deficit. To achieve this switch to the low-inflation equilibrium, there should be changes in wage and price setting practices as well as changes in monetary procedures.

Next we take a look at the Brazilian banking system to understand how the creation of inside money has helped to lock the economy in a high inflation trap.

**a. The Brazilian Banking System**

The Brazilian monetary base as a per cent of GDP was only 0.8 per cent in 1993, compared with 6.1 per cent in the United States, as shown in the memo items in Tables 3 and 4. (Velocity is simply the inverse of the MB/GDP ratio.)
\begin{table}
\centering
\begin{tabular}{lcc}
\hline
\textbf{} & \textbf{1992} & \textbf{1993} \\
\hline
1. Currency held by the public & 4.9 & 5.1 \\
2. Demand deposits & 5.9 & 6.3 \\
3. Other checkable deposits & 6.4 & 6.6 \\
4. Traveler's checks & 0.1 & 0.1 \\
5. M1 (1+2+3+4) & 17.3 & 18.1 \\
6. Overnight repurchase agreements & 1.3 & 1.4 \\
and overnight Eurodollars & & \\
7. Money market mutual funds & 5.8 & 5.5 \\
\quad (general-purpose) & & \\
8. Savings accounts & 19.6 & 19.0 \\
9. Small-denomination time deposits & 14.4 & 12.2 \\
\quad (Nontransaction component of M2) & 41.1 & 38.1 \\
10. M2 (5+6+7+8+9) & 58.4 & 56.2 \\
11. Large-denomination time deposits & 5.9 & 5.3 \\
12. Term repurchase agreements & 2.1 & 2.2 \\
13. Money market mutual fund (institutions) & 3.1 & 2.8 \\
\quad (Nontransaction component of M3) & 11.1 & 10.3 \\
14. M3 (9+10+11+12) & 69.5 & 66.6 \\
15. Other liquid assets & 14.7 & 14.3 \\
16. L (broadly defined liquidity, 14+15) & 84.3 & 80.9 \\
\hline
\multicolumn{3}{l}{\textbf{Memo items:}} \\
\quad Monetary Base & 5.9 & 6.1 \\
\quad Issued currency & 4.9 & 5.1 \\
\quad Reserves of banking system & 0.9 & 1.0 \\
\hline
\end{tabular}
\caption{Money Stock and Liquid Assets in the USA (in Per Cent of GDP)}
\end{table}

Note: Data is not seasonally adjusted; values refer to end of the year balances. Item 15 (other liquid assets) is the sum of nonbank public holdings of US savings bonds, short-term Treasury securities, commercial papers, and bankers acceptance; net of money market fund holdings of these assets. The value of US GDP at current prices was $6,038.5 billion in 1992 and $6,379.4 billion in 1993.


Thus, the velocity of the monetary base in Brazil is an astounding 125, compared with 16 in the United States). The monetary base has two components, bank reserves and currency. The difference between Brazil and the US is evident in both components, but especially in the demand for currency. In Brazil, currency as a proportion of GDP fell to 0.5 per cent of GDP, compared with 5.1 per cent of GDP in the United States. Bank reserves fell to just 0.2 per cent of GDP in Brazil, compared with 1.0 per cent of GDP in the United States.

Part of the low currency demand in Brazil reflects purely a market response to the high cost of holding currency in the midst of high inflation. Part, however, reflects the evolution of banking regulations to facilitate the flight from the
BRAZILIAN INFLATION AND THE PLANO REAL

TABLE 5
Inflation and Seignorage in Selected Countries
(in Percent)

<table>
<thead>
<tr>
<th>Country</th>
<th>Period of Calculation</th>
<th>Seignorage /GDP</th>
<th>Inflation</th>
<th>Monetary Base /GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>(1993)</td>
<td>1.5</td>
<td>10.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Chile</td>
<td>(1992-93)</td>
<td>4.7</td>
<td>14.1</td>
<td>34.7</td>
</tr>
<tr>
<td>Greece</td>
<td>(1992-93)</td>
<td>1.2</td>
<td>16.4</td>
<td>15.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>(1992-93)</td>
<td>2.2</td>
<td>7.7</td>
<td>24.2</td>
</tr>
<tr>
<td>Spain</td>
<td>(1993)</td>
<td>0.2</td>
<td>4.6</td>
<td>12.8</td>
</tr>
<tr>
<td>USA</td>
<td>(1992-93)</td>
<td>0.5</td>
<td>3.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>(1992-93)</td>
<td>2.3</td>
<td>1547.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Notes: Monetary Base (MB) defined as reserve money issued by the Central Bank (line 14 of IFS). Monthly values for base money deflated by CPI, taking July of each year as basis for prices (July = 1). Seignorage defined as \((MB_t - MB_{t-1})/P_t\). Inflation is calculated from mid year to mid year.

Source: Authors’ calculation using data from the IMF, International Financial Statistics.

monetary base. Brazilian banks have created, with regulatory forbearance, a highly efficient system of interest-bearing transactions balances that allow Brazilian moneyholders to escape from the direct use of currency and the indirect use of bank reserves.

The relevant interest-bearing accounts are shown as items (4)–(7) in Table 3. These accounts, labelled in Brazil as M2 (a different definition from US M2), are interest-bearing, checkable deposits (i.e., checks may be written against these accounts). Moreover, up to June 1994, the banks were not required to hold central bank reserves (monetary base) against these accounts. Instead, the commercial banks held short-term securities (mostly government bills) as 100 per cent backing against these accounts, rather than monetary reserves at the Central Bank. In effect, these accounts in Brazil are like checkable money-market funds in the United States.\(^6\)

The main household account of this sort are the FAF accounts (item 4). Enterprises with large money balances hold accounts under items 6 and 7. As a shorthand, we will label all of these accounts by the generic name of ‘FAF accounts,’ even though in practice FAF accounts are just one type of interest-bearing checkable deposits.\(^7\)

Under the weight of high inflation, and with the very high liquidity of FAF accounts, Brazilian households and firms have shifted almost entirely out of currency and checking accounts, and into FAF (and related) accounts. Indeed, deposits in checking accounts in Brazil are mainly a kind of float, as money is

---

\(^6\) With the difference that in the US corporations are not allowed to hold interest-bearing demand deposits (such as NOW accounts).

\(^7\) Nominal interest rates on these accounts are forward-looking, in anticipation of the on-going rate of inflation, and are credited daily in the accounts. Since 1991, withdrawals in the first 15 days after a deposit in a FAF account pay a tax on the nominal yield accrued in the period based on a decreasing scale.

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TABLE 6
Brazil: Factors Causing Changes in the Monetary Base
(Participation Over Change in Base — in Per Cen)

<table>
<thead>
<tr>
<th></th>
<th>Domestic Credit (Public)</th>
<th>Domestic Credit (Non-public)</th>
<th>External Sector</th>
<th>Changes in Monetary Base (1+2+3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991 year</td>
<td>72.6</td>
<td>-16.1</td>
<td>43.5</td>
<td>100.0</td>
</tr>
<tr>
<td>1992 year</td>
<td>-63.9</td>
<td>9.9</td>
<td>174.1</td>
<td>100.0</td>
</tr>
<tr>
<td>1993 year</td>
<td>-7.1</td>
<td>-9.7</td>
<td>116.8</td>
<td>100.0</td>
</tr>
<tr>
<td>1994 qtr.</td>
<td>-158.6</td>
<td>18.6</td>
<td>240.1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Notes: End of the month data were used. Monthly figures were first expressed in constant prices using the centred IGP index. Then, quarterly values were calculated as percentages of quarterly flows. A positive sign indicates an expansionary factor, a negative sign, a contractionary one. Credit to the public sector is the sum of operations with the Federal Treasury and with public securities — dealings with the Federal Treasury accounted for — 0.5 per cent of the expansion in base money in 1991. — 26.6 per cent in 1992 and —13.2 per cent in 1993. Domestic credit is the sum of interest earning deposits of FAF and DER accounts, reserve deposits of the banking system, financial assistance and rediscounts, monetary reserve investments, judicial deposits and other accounts. The nominal expansion of the monetary base was 291.2 per cent in 1991, 991.3 per cent in 1992 and 1953.2 per cent in 1993. The real rate of growth (deflated by the centred IGP-DI index) was — 32.6 per cent in 1991, — 13.2 per cent in 1992 and — 26.9 per cent in 1993. The centred IGP index is the general price index centred at the end of the month. This is done by the operation:

\[ IGP - C_t = IGP_t^{15} - IGP_t^{14} \]

Source: Authors with nominal data from Central Bank of Brazil, Boletim do Banco Central.

temporarily transferred in and out of FAF accounts. Consider the remarkable difference, therefore, in the demand for demand deposits in Brazilian and US banks. Brazilian demand deposits were just 0.8 per cent of GDP in 1993, compared with 6.3 per cent of GDP in the United States.

If we compare all checkable deposits, however, the difference between the two countries narrows considerably: 10.0 per cent of GDP in Brazil (items 2, 4, 5, 6, 7 in Table 3), compared with 12.9 per cent of GDP in the US. If we compare all transactions balances (checkable accounts plus currency), the difference is wider, with Brazilian transactions balances standing at 10.5 per cent of GDP, compared with 18.0 per cent of GDP in the US, still a rather modest difference in view of the difference in inflation. The most striking difference, therefore, is the composition of transactions balances, not their overall level relative to GDP. In Brazil, transactions balances are almost entirely inside money, substantially de-linked from the monetary base. The monetary base is only 7.5 per cent of Brazilian transactions balances. In the US, by contrast, the monetary base makes up for 33.7 per cent of that aggregate.

As a result of the remarkably low level of demand for high-powered money, Brazilian inflation has been high despite a very low level of seignorage as a per cent of GDP. This is shown in Table 5, where we see that many countries have roughly the same level of seignorage as a per cent of GDP as Brazil, but with inflation rates in the normal range.
The escape from the monetary base has been gradual. Seignorage in Brazil has been fairly steady in the 1980s and 1990s, at around 2–3 per cent of GDP — see Table 1. However, the monetary base has been shrinking as a per cent of GDP (i.e. velocity has been increasing), from 3–4 per cent of GDP in the late 1970s, to less than 1 per cent of GDP in 1993. Thus, an ever-rising rate of inflation has been necessary to collect the same amount of seignorage. This is one of the costs of chronic high inflation: a continuing flight from the currency (i.e. erosion of the inflation tax base), so that the economy becomes ever-more distorted just to remain in the ‘same’ place.

Equally remarkable, even the low level of seignorage does not reflect budget deficit financing in recent years. In 1993, for example, there was no net credit from the Central Bank to the budget — see Table 6. To understand how seignorage has been used, we must examine the role of the external sector in the Brazilian money supply.

To do so, we must first amend the basic seignorage equation, to allow for international factors in money creation. Rather than writing \((MB_{t+1} - MB_t)/P_t = D_t - F_t\), we now recognise that the monetary base can expand for three reasons: credit to the budget \((D - F)\), credit to the non-budget \((NB)\) domestic economy (e.g. rediscouts to the commercial banks), and central bank intervention in the foreign exchange market (in which purchases of foreign exchange lead to an increase of \(MB\) matched by an increase of foreign reserve holdings \(R_t\) at the central bank). The central bank’s balance sheet identity ensures:

\[
MB_{t+1} - MB_t = (D_t - F_t) + NB_t + e_t(R_{t+1} - R_t)
\]

where \(e_t\) is the nominal exchange rate, in cruzeiros per dollar.\(^8\)

In Table 6, we divide the sources of seignorage in terms of domestic credit for the public sector, domestic credit for the non-public sector, and changes in foreign reserves, as in equation (7). As we see in the table, the seignorage in 1993 and 1994 reflected purchases of foreign exchange, rather than domestic credits to the government and the private sector.\(^9\) The money supply grew in that period because of the accumulation of foreign exchange reserves, rather than budget-deficit financing.

In our interpretation, the increase in the monetary base via the balance of payments was the result of domestic inflation, rather than the cause. Suppose that Brazilian inflation is determined by inertia, so that this period’s inflation is

---

\(^8\) The notation might be slightly confusing because of the mix of stocks and flows. \(D, F,\) and \(NB\) are flows of credit. \(R\) is a stock of foreign exchange, and \(MB\) is the stock of monetary base. Therefore, the change in the money stock is equal to the net flow of \(D, F,\) and \(NB\) plus the change in the stock of \(R.\)

\(^9\) As we explain in the Appendix, the revenues yielded by seignorage in the recent period have been used to reduce the overall net public debt rather than to finance deficits.
roughly equal to last period’s inflation. Therefore, \( \Pi_t \) is determined by ‘past history.’ Similarly, velocity \( V_t = \frac{v(\Pi_t)}{\Pi_t} \) is determined by past history (and banking regulation). Then, we can use (1) and (4) to derive the growth of the monetary base as a function of inflation and velocity:

\[
(MB_{t+1} - MB_t) = (\Pi/V)P_tQ. \tag{8}
\]

How does this money supply come about? If there is no domestic credit expansion, then \( MB \) must increase via the balance of payments. Money market equilibrium is achieved when the accumulation of reserves \( \epsilon_t (R_{t+1} - R_t) \) is equal to the desired change in the monetary base. Since \( V \) is very high, the requisite increase in the monetary base, measured as a per cent of GDP, is relatively low even when inflation is high.

The basic economics of the balance of payments adjustment is as follows. The Central Bank manages the exchange rate so that it depreciates at the rate of inertial inflation (thereby maintaining a given real exchange rate). Domestic inertial inflation leads to an increase in the demand for the monetary base, so the real value of the monetary base remains unchanged. If there is no domestic credit expansion, and an initial balance of payments equilibrium there will be an incipient excess demand for money in the Brazilian economy, since the growth of the monetary base will lag behind inflation. This will tend to push up interest rates in Brazil, and thereby to induce a capital inflow from abroad and an incipient currency appreciation. The Central Bank must intervene in the foreign exchange market to maintain the real exchange rate.\(^{10}\) As reserves rush in to the Central Bank, the monetary base in Brazil grows according to the relation in (8). Monetary equilibrium is thereby re-established via the balance of payments, with the monetary base growing at the rate of inflation, and seigniorage equal to the level in (8). The result of this mechanism has been a rapid rise of foreign exchange reserves since 1991, with Central Bank reserves rising from \$8.0 billion in October 1991 to \$41.4 billion in May 1994 (using the IMF concept of ‘international liquidity’ as measurement of reserve holdings).

Since the requisite increase in the monetary base is a relatively small proportion of GDP (just 1.8 per cent in 1993), it has been possible to satisfy the entire desired increase in the money supply through capital inflows. Were the money base larger relative to GDP, capital inflows would probably be insufficient to generate the entire increase in the monetary base implied by (8). Instead, interest rates would tend to rise, leading to a rise in velocity, and a reduction of money demand. The rise in interest rates, in turn, would reduce aggregate demand and, to some extent, inflation. In that way, the tight domestic credit would act as an automatic brake on inflation. With very low levels of monetary base and open

\(^{10}\) Following the liberalisation measures of 1991–93, the capital account can be taken to be rather open in Brazil.
capital account, however, the automatic brake on inflation through this mechanism is far weaker.

An alternative possible explanation of (part of) the seignorage financing of reserve accumulation by the Central Bank in 1993–94 views the Central Bank actions as deliberate, even though it knew that its actions pushed up inflation. The accumulation of foreign reserves, in this view, was rationalised as a preparatory step of a coming stabilisation attempt. Moreover, the government may have wanted higher rates of inflation because the more intolerable inflation is, the stronger the demand for stabilisation. Such a view stresses the political battle going on in preparation of the Presidential election set for October 1994. At the very least, the political calendar was a factor in the timetable of the plan.

b. Wage and Price Dynamics and Stabilisation

The powerful inertia in Brazil’s inflation is a consequence of several features, including: (1) years of living with high inflation, resulting in extensive use of (backward-looking) wage and price indexation; (2) Brazil’s relatively closed real economy, an inherent result of its continental scale, as well as a byproduct of decades of import restrictions, both of which have reduced the role of the exchange rate as a direct factor in wage and price setting; and (3) the relatively oligopolistic nature of Brazil’s labour and product markets, which is also partly the result of protectionist policies.

To see the implications of this inertia, we return to the basic seignorage model. In an economy with fully flexible wages and prices, the end of seignorage financing can bring an instantaneous end to high inflation, assuming full credibility of the budgetary actions and ruling out a spontaneous flight from the currency.\(^\text{11}\)

With a constant money supply and velocity, inflation would be zero and velocity would be determined by the equation \(V = v(0)\). Prices would be stable at the level consistent with monetary equilibrium: \(P = MB_0 v(0)/Q\). Notice, in fact, that the advent of stabilisation would immediately result in a fall in the price level. Suppose that at time \(t\) the money supply is given by \(MB_t\). The moment before stabilisation, inflation is equal to \(\Pi\), and the price level is given by \(P = MB_t v(\Pi)/Q\).

How reliable is instantaneous disinflation? It has actually been observed several times in history, as Sargent (1982) stressed in his influential essay. However, the mechanism for the sudden deceleration of prices involves more than simply the end of monetary financing of deficits and a reduction in velocity.

\(^{11}\) Even with a constant or zero level of \(D/Q\), it is possible that there might be a spontaneous flight from the currency, with steadily rising velocity. From equation (3) we see that a spontaneous inflationary bubble would be governed by the dynamic equation \(\Pi_t = [v(\Pi_{t+1}) - v(\Pi_t)]/v(\Pi_t) + v(\Pi_{t+1}) D/Q\).
Under conditions of high inflation, wage and price setters adopt strategies for operating under highly inflationary conditions. Some of these strategies are conducive to rapid disinflation, while others are not.

The main pricing mechanism observed in practice is the use of a foreign currency as the unit of account in highly inflationary conditions. For example, in the hyperinflations in Argentina, Bolivia, Israel, and Poland, many price setters set their prices in dollar terms, and then used the spot market exchange rate to calculate the equivalent prices in domestic currency units. In such cases, prices are set by the relation:

$$P_t = e_t P^*_t,$$

(9)

where $e_t$ is the exchange rate, in units of domestic currency per unit of foreign exchange (a rise in 'e' signifies a domestic currency depreciation), and $P^*_t$ is the (constant) foreign price level in the foreign currency. In this case, price stabilisation can be achieved instantaneously by successfully stabilising the nominal exchange rate.

The fundamental conditions for a sustained exchange-rate stabilisation are similar to the fundamental conditions for stabilising the price level in the basic seignorage theory. That is, if the budget deficit is eliminated or is bond-financed in a sustainable way, it will prove to be possible to stabilise the nominal exchange rate, and thereby to end the high inflation rapidly. Even if the budget deficit is not reduced, it may prove possible to end the high inflation temporarily by pegging the nominal exchange rate through market intervention of the Central Bank in the foreign exchange market, using a supply of available foreign exchange reserves. However, continued Central Bank financing of the deficit combined with a pegged exchange rate supported by Central Bank intervention in the foreign exchange market, leads to the depletion of the Central Bank's foreign exchange reserves and to the eventual collapse of the fixed exchange rate.

In Brazil in the 1990s, as in Chile in the 1970s and Mexico in the 1980s, prices have been neither instantaneously flexible nor set according to the exchange rate. Instead, wage and price setters have used various forms of indexation to reduce the transactions costs associated with high inflation. As the most extreme and simple illustration, suppose that prices are a fixed mark-up over wages, while wages are changed according to inflation of the previous month. Thus,

$$\Pi_t = \Pi_{t-1},$$

$$\Pi_t = \Pi_{t-1}.$$  

(10)

This, of course, produces strict inflationary inertia, with

$$\Pi_t = \Pi_{t-1}$$  

(10')

In more general terms, domestic prices might depend on the exchange rate as well.
as wages; wages might depend on unemployment as well as on lagged inflation; and indexation to lagged inflation might be less than 100 per cent. Even in these more realistic settings, current inflation will tend to be a function of lagged inflation.

The implications of this kind of inertia for inflation stabilisation were made strikingly manifest in the case of Chilean stabilisation in the late 1970s and early 1980s. In that period, the Chilean government eliminated the budget deficit (and actually achieved a budget surplus) and successfully stabilised the nominal exchange rate. Nonetheless, domestic prices continued to rise at a significant rate. It became apparent that inflation was like a dog chasing its own tail: wages were indexed to lagged inflation by law; in turn, current inflation was heavily influenced by current nominal wages. In effect, current inflation was a function of lagged inflation. Even budget discipline and successful exchange rate stabilisation did not end inflation. Eventually, the exchange rate became enormously overvalued in real terms (that is, $e_t/P_t$ fell sharply), so that the government was forced to devalue the currency. Brazil has long adopted a similar pattern of backward-looking wage indexation, as opposed to the Argentine pattern of substantial price and wage setting in dollars.

For these reasons, an end to seigniorage financing and a stabilisation of the nominal exchange rate are not enough, by themselves, to end inflation in Brazil. Inflationary inertia has rendered strictly orthodox monetary and fiscal policy insuficient to achieve price stability.

3. BRAZILIAN INFLATION AND THE PLANO REAL

To summarise our arguments so far, Brazilian inflation in the 1990s has been
driven by three basic factors: (1) inertia in wage-price dynamics; (2) a very low level of demand for the monetary base, as a result of Brazilian banking practices, Central Bank accommodation, and past economising on currency holdings; and (3) endogenous increases in the monetary base via the balance of payments. The Real plan attempts to address the inertial aspects of Brazilian inflation. It has also aimed to strengthen the fiscal accounts, through budgetary austerity — see data on tax collection and on government spending in Table 7. However, the plan remains an incomplete long run stabilisation strategy, mainly because it has not yet fully addressed the institutional problems of monetary control in the banking system nor has it set in place more solid controls on the budget.

Since the 1980s, Brazil has attempted two kinds of approach to stabilisation. At various points it has introduced wage-and-price controls in order to try to break inertial inflation. The most famous attempts were the Cruzado Plan (1986) and the Collor Plan (1990) — see Zini (1992). These plans collapsed for several reasons. The price controls were not sustainable, politically or economically. On the political side, they engendered significant pressures from affected business interests that undermined public support and credibility in the controls. Economically, controls led to shortages, black markets and growing economic distortions with each month in which the controls were in force. Since Brazil was relatively cut off from world markets, both because of structure and policy, imports did not generally relieve the shortages. Also very important, the controls tended to turn the terms-of-trade against the government sector. Private prices kept creeping up while state-enterprise prices were held in place for political reasons (in an attempt to bolster credibility in the controls). In this way, the price controls themselves enlarged the public-sector budget deficits, and thereby further undermined the controls. As a more general matter, the ex-post budget deficit was also relatively large at the time of the Cruzado Plan, so that the fundamentals were further out of balance than in 1993–94.

The other kind of ‘stabilisation’ effort has been the orthodoxy of budget cutting, especially since 1990. Of course, this orthodoxy is a prerequisite to effective stabilisation, but it is obviously insufficient to bring about full price stability, for the three main reasons that we have discussed: inertia in wage and price setting, the very low levels of the monetary base plus the existence of inside money created by the banking system, and the endogeneity of the money supply via the balance of payments. Nonetheless, the orthodox budgetary management left a positive and important legacy as of 1994. As we saw in Table 2, the operational deficit has been near zero in 1991–94, compared with deficits of around five per cent of GDP during the second-half of the 1980s. 12 Deficit figures

12 We want to be clear on the need for fiscal discipline as a requisite for a successful stabilisation. The low deficit figures in 1990–93 have been achieved, in part, by ad hoc practices. High and rising inflation has also played a role in reducing the real value of government outlays. However, that is
TABLE 8
Inflation and Exchange Rate Devaluation — 1994–95
(Monthly Rates of Change in Per Cent)

<table>
<thead>
<tr>
<th></th>
<th>Inflation</th>
<th>Exchange</th>
<th>Real</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General</td>
<td>Index</td>
<td>Rate</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>in</td>
<td>Devaluation</td>
</tr>
<tr>
<td></td>
<td>Index</td>
<td>Real</td>
<td>Per Cent</td>
</tr>
<tr>
<td></td>
<td>(IGP)</td>
<td>(S. Paulo)</td>
<td>CR$/S</td>
</tr>
<tr>
<td>Jan. 1994</td>
<td>42.2</td>
<td>—</td>
<td>40.3</td>
</tr>
<tr>
<td>Feb.</td>
<td>42.4</td>
<td>—</td>
<td>38.2</td>
</tr>
<tr>
<td>Mar.</td>
<td>44.8</td>
<td>—</td>
<td>41.9</td>
</tr>
<tr>
<td>Apr.</td>
<td>42.5</td>
<td>—</td>
<td>46.2</td>
</tr>
<tr>
<td>May</td>
<td>41.0</td>
<td>—</td>
<td>45.1</td>
</tr>
<tr>
<td>Jun.</td>
<td>46.6</td>
<td>1.0</td>
<td>50.8</td>
</tr>
<tr>
<td>Jul.</td>
<td>24.7</td>
<td>6.1</td>
<td>30.7</td>
</tr>
<tr>
<td>Aug.</td>
<td>3.3</td>
<td>5.5</td>
<td>1.9</td>
</tr>
<tr>
<td>Sep.</td>
<td>1.5</td>
<td>1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Oct.</td>
<td>2.6</td>
<td>1.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Nov.</td>
<td>2.5</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Dec.</td>
<td>0.6</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Jan. 1995</td>
<td>1.4</td>
<td>1.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Feb.</td>
<td>1.2</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Mar.</td>
<td>1.8</td>
<td>1.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Apr.</td>
<td>2.3</td>
<td>1.9</td>
<td>2.6</td>
</tr>
<tr>
<td>May</td>
<td>2.4</td>
<td>2.4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: Central Bank of Brazil — Boletim do Banco Central, March 1995; recent data on inflation from Folha de São Paulo. The general price index is calculated by Getúlio Vargas Foundation in Rio; the Real price index (IPC-r) is calculated by the IBGE Foundation in Rio; consumer prices in São Paulo are from FIEP Foundation; exchange rate devaluation is the nominal change in the price of the dollar in Brazil; real interest rate is the preset (nominal) yield on a 30-day time deposit, minus the IGP monthly inflation rate.

For 1994 have also been low.

The Real plan is an ingenious attempt to break the inflation inertia without the use of wage and price controls, and despite a politically weak government in power at the time that the programme was introduced. The basic idea was a phased introduction of a new currency pegged to the US dollar.\(^\text{13}\) The plan rightly recognised that any immediate exchange rate stabilisation of the Cruzado would not, by itself, lead to price stabilisation, since one of the channels of price inertia in Brazil had been through backward-looking wage indexation, rather than dollarisation (as in the Argentine and Bolivian hyperinflations, for example).

To overcome this problem, the plan was set in place in three phases. In the not novel or unique to Brazil. The ‘classic’ hyperinflations of the 1920s all eroded the real value of pensions, of public servant’s wages and the servicing of public debts. Stabilisation undoubtedly requires setting in place sound budgetary practices. But some of this can be tackled in the period after the initial reduction of high inflation.

\(^\text{13}\) For an official exposition of the underpinnings of the Real plan, see Brazil, Ministry of Finance (1993). The peg to the dollar, which was a basic tenet in phases one and two of the plan, has been made more flexible in phase three.

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first, during January–February 1994, budgetary controls were enhanced through congressional approval of certain emergency deficit-cutting measures. In the second and novel stage, which began in March 1994, wages, prices, and taxes were re-dominated in a new unit of account, the ‘URV’ (unit of real value). At the same time, the use of indexation in URV wage contracts was prohibited for the following 12 months. In effect, the programme reset the wage indexation to the contemporaneous exchange rate, rather than to backward-looking inflation.

From March 1994 to 1 July 1994, the URV was, in effect, the US dollar unit of account, as the URV was fixed nearly one-to-one with the dollar. The Cruzeiro Real/URV ‘exchange rate’ was basically the Cruzeiro Real/dollar exchange rate. All wages and most prices were reset in URVs in March 1994 (prices in URVs could change both before and after the plan), but actual transactions continued to be made in Cruzeiros Reais, based on the market exchange rate. Inflation in URVs (i.e. in dollars) could then be calculated and was around two per cent per month in March–May.

In the third stage (1 July 1994), a new money, the Real, has been introduced, also pegged to the dollar at the start. All URV prices were to be converted (one-for-one) into Real prices, although some price hikes took place in the days right before the plan. Inflation dropped at once from the Cruzeiro rate of around 50 per cent per month (June) to the URV rate of around two per cent per month after September, and has persisted roughly at that rate in the following half year. Table 8 reports monthly rates of inflation in Brazil in 1994–95.

4. THE INITIAL MONETARY CONSEQUENCES OF THE STABILISATION PROGRAMME

There are two main areas in which the policies adopted after 1 July 1994 differed from what had been previously expected. First, the exchange rate between the Real and the dollar was not rigidly fixed one-to-one after the introduction of the new currency, and, second, monetary targeting was attempted, at least half heartedly.

The exchange rate policy set in place differed from what had been expected during phase two of the plan. The Central Bank announced in July 1994 that it would stand ready to sell dollars for one Real but that the buying rate would be left free to float. In other words, the Central Bank adopted a one-sided peg, in which it prevented currency depreciation above one Real per dollar, but permitting currency appreciation. The Central Bank feared that a strict (two-sided) exchange rate peg would require the Central Bank to purchase a very large amount of dollars, as Brazilians repatriated their offshore dollars in order to rebuild their nominal money balances. The Central Bank feared that a surge in the domestic money supply, even one caused by a re-building of money balances, would accommodate continuing inflationary inertia in the economy. Therefore,
the Central Bank opted for a slower re-monetisation of the economy, coupled with a nominal (and hence real) exchange rate appreciation of the currency.

In the event, the Real exchange rate appreciated immediately, to R$0.91 in July and then further to R$0.85 from September to March 1995. The result was a substantial nominal appreciation of the Real, and an even greater real appreciation, in the light of Brazil’s continuing inflation of around two per cent per month. A trade deficit appeared as early as November 1994 and continued in the first semester of 1995, in part the result of the currency appreciation.

In addition, in an attempt to limit consumption spending, the Central Bank targeted very high interest rates — see data on real interest rates in Table 8. The Central Bank deemed that high domestic interest rates were necessary to limit a consumption boom among groups that benefited from the end of the inflation tax. As a result of Central Bank policy, a substantial interest rate differential opened between Brazil and the rest of the world, adding to the capital inflows that were resulting in any case from the rise in money demand. To reduce these capital inflows, the Government imposed a five per cent tax on currency dealings in July 1994, and foreign borrowing by public agencies was suspended. Despite the tax, the capital inflows were not totally staunched.

After the Mexican currency crisis in December 1994, capital flows temporarily reversed and Brazil lost part of its reserves. International reserves fell by around US$8 billion from January to March 1995, partly surrounding a clumsy small devaluation of the Real in March. Nonetheless, capital inflows rose again after April 1995 because of improving confidence in international markets, the high interest rate differential in place, and the announcement of more rapid privatisations for the coming months.

In the monetary area, the government declared that it would follow a strict monetary programming in July 1994 and established nominal ceilings for the value of M1 valid for September, December of 1994 and March of 1995 (such ceilings could be surpassed up to 20 per cent, if a justified need arose). The target for September was set at R$7.5 billion, double the value of the monetary base in June. Moreover, the Central Bank imposed a 100 per cent reserve requirement on the expansion of demand deposits and a 20 per cent reserve requirement on savings accounts, FAF accounts and on time deposits.

Such measures were meant to provide a form of monetary anchor to the plan. But to be more convincing the target should have been on M2 given the fact that M1 was only a small part of M2. Moreover, back-of-the-envelope calculations on the growth of M1 showed that the announced targets could not be credibly sustained. In fact, those targets were not pursued vigorously and were abandoned in December 1994.
a. Will the Plano Real Prove to be Long Lasting?

The main question is whether the introduction of the Real will lead to a lasting stabilisation, or merely to one year or so of low inflation? There certainly are chances for lasting stabilisation. The inertia of high inflation has been truncated (at least temporarily) by the re-denomination of contracts in URVs, the introduction of the new currency, and the prohibition on wage indexation. Crucially, the budget deficit is small, certainly within the range of low-inflation OECD economies. Without doubt, continued fiscal discipline is a sine qua non for continued stabilisation.

Nonetheless, there are continuing risks that must be noted, even beyond the obvious risk that fiscal discipline might still be abandoned. Despite the initial re-monetisation of the economy, Brazil continues to operate with a very low level of M1 relative to GDP, so that small increases in the monetary base as a per cent of GDP can still support very large increases in inflation. Without further changes in monetary regulations, we believe that Brazil will remain vulnerable to the risk that even small budget deficits can ignite a resurgence of high inflation. Moreover, since wage and price setters know that the money supply is not an effective anchor (in part because of the possibility of endogenous money supply increases), they may also attempt to boost prices in anticipation of renewed inflation.

Moreover, without a change in the monetary system, the Brazilian Government may well have insufficient self-restraint in avoiding inflationary policies, since major wealth-holders still believe themselves to be relatively well insulated from the inflationary consequences of such a process. This is an example of the general point in Fischer and Summers (1989) that extensive indexation can lead to higher inflation by weakening the political resistance to inflationary policies. Suppose, for example, that the government is considering a devaluation of the currency in order to achieve a given target of international competitiveness. In an economy with a low degree of financial indexation, the government would face strong political pressures from asset holders against a devaluation. In Brazil, the asset holders (though not necessarily the wage earners) are still mostly insulated from devaluation, and so there is much less pressure against devaluation on this account.

Also, under the current system, the nominal value of FAF-type accounts tends to increase as a result of high interest rates (since FAF accounts pay the daily market interest rate). Suppose inflation is successfully reduced but that interest rates on publicly traded bonds remain high, either because of deliberate central bank policy, or because of continuing expectations of future inflation.14 The

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14 Calvo (1988 and 1994) presents theoretical models that show how high nominal interest rates can lead to inflation when liquid substitutes of money (such as Treasury bills) are present.
nominal, and therefore real, balances in FAF accounts would grow sharply. This increase in real balances, in turn, would support increases in consumer spending as well as pressures on domestic prices.

To strengthen control over the money supply, we would recommend that the very liquid Brazilian-type M2 accounts (items 4–7 in Table 3) should be eliminated, allowing deposits to be redirected voluntarily into non-interest-bearing checking accounts (M1), into fixed-term savings accounts (M3) — with maturities of three months or more, into CDs, or into public debt holding by final investors (without repurchase agreements). Individuals could hold liquid assets in the money markets, but these money market funds would not be checkable deposits, and therefore would not substitute for transactions balances in the banking system. A substantial proportion of the existing M2 accounts would likely move into checking deposits, raising the ratio of demand deposits to GDP from the pre-plan level of around 0.8 per cent to a ratio of perhaps 3–4 per cent of GDP. Moreover, the elimination of the M2 deposits would increase the demand for currency, since the FAF accounts have been substitutes for currency as well as checking accounts. This step, combined with the continued application of reserve requirements to most types of bank deposits (as introduced by the Central Bank in July 1994), would strengthen the demand for base money and thereby provide a more reliable monetary anchor to price stability.

Some other actions to bolster the confidence in the new currency are also advisable. First, the continued suspension of wage indexation — beyond the one-year limit established in the programme — is appropriate to consolidate the stabilisation plan. To keep symmetry, the suspension of other kinds of price indexation in the coming months should also be required. With respect to indexation of financial securities, we believe that indexation on all traded securities with a maturity of less than three months should be considered. Assuming that the stabilisation is successful, the prescription on various kinds of indexation could be made permanent, as in the German Basic Law of 1949.

Third, it would be desirable to introduce a new Central Bank Act giving substantive independence to the Central Bank. A new Act would specify the principal goal of the Central Bank to be monetary stability and would establish that the operations of the Central Bank are to be carried out independently of the Government, though in consultation with the Government.

Fourth, to bolster confidence and to avoid future crises, we would urge the Government to announce its commitment to some sort of crawling peg or crawling band, with the band depreciating rapidly enough to avoid a severe overvaluation of the currency. It would be a mistake to adhere for too long to any nominal exchange rate level as a nominal anchor, since the costs of currency overvaluation could become very high, as the Mexican debacle in late 1994 showed (See Sachs, Tornell, and Velasco, 1995, for a detailed account of the Mexican Peso crisis).
TABLE 9
Finance for Reserve Accumulation
Estimates in US Dollars ($ Billion)

<table>
<thead>
<tr>
<th>Sources</th>
<th>Uses</th>
<th>Change in International Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seignorage</td>
<td>Operational Deficit</td>
<td>Redaction in Domestic Debt</td>
</tr>
<tr>
<td>1992</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>1993</td>
<td>12</td>
<td>-1</td>
</tr>
</tbody>
</table>

Source: Zini (1994) using the definitions given below:

Seignorage: estimate in dollars calculated using monthly average balances of the money base, deflated by the IGP index and expressed in dollars of December 1993;
Change in reserves: variation of international liquidity as reported in Table 10;
Change in domestic debt: variation of public bonds outstanding plus values on the order of the Central Bank from December to December of each year, expressed in constant prices. A negative sign indicates an increase in debt.
Operational Deficit: fraction of GDP reported in Table 2 times GDP expressed in dollars (negative sign indicates a surplus). GDP was projected at $430 billion in 1993.

5. CONCLUDING REMARKS

The policy suggestions delineated in the last section were not meant to be exhaustive given the limitations of an academic paper. Our main goal here was to lay out an alternative interpretation of Brazil’s high inflation in the 1990s, to provide a concise assessment of the Real plan, and indicate areas in which monetary practices might still be changed.

The specific measures we suggested are politically possible and many could be achieved by administrative action. Such changes, combined with the introduction of the new currency, would set the foundation for a prolonged period of low inflation. The real test, however, is in the political arena. The earliest test of the programme was to avoid a fiscal expansion in the run-up to elections in 1994 — and that test was successfully passed. The broader test lies in 1995, as various structural reforms are examined by the Congress in Brazil. Given the long reign of inflation, much of the political system has been convinced that reforms in areas like deregulation, privatisation and reducing the size of the government are required. A relatively strong, centrist, political coalition backs the government and seems ready to approve most of the changes in the Constitution that the Government has proposed.

Reforms such as deregulation of public monopolies and privatisation of many state enterprises are very likely to be approved by Congress, even when they require changes in the Constitution. However, reform in other areas such as the fiscal system, the social security system, and the banking system, are much less certain. The Real plan is the most serious attempt to establish the foundations for
long-term price stability in recent years, but Brazil's overall struggles for stabilisation and economic reform still face many political hurdles in the years ahead.

APPENDIX

The notion that Brazil's budget deficit has been small in recent years raises scepticism among some observers, partly because inflation has been high. A basic cross-checking on the consistency of the numbers shown in Table 2 is possible by examining the seignorage collected by the Central Bank and the changes in public debts.

Financing of the public sector obeys the following budget constraint, expressed in nominal terms:

\[(G - T) + iB + e_i'B^* = MB' + B' + eB^* - A'\]  \hspace{1cm} (11)

where an apostrophe following a variable indicates the instantaneous time derivative \((B' = \delta B/\delta t)\). In the equation, \(G\) is the sum of non-financial expenditures including quasi-fiscal outlays; \(T\) are taxes and levies collected; \(B\) is the stock of government's net internal debt; \(B^*\), the stock of public net external debt in dollars; \(i\) is the domestic nominal interest rate; \(i^*\) is the foreign interest rate; \(e\) the nominal exchange rate; \(A\) is the stock of public assets for sale in privatisations; and \(MB\) is the monetary base. To simplify matters, \(A\) can be taken as netted out with \(B\) (revenues yielded by privatisation in Brazil up to 1994 have been small). The net external debt \(B^*\) can be decomposed into the gross external debt \(B_C^*\) less the stock of international reserves \(R\). That is, \(B^* = B_C^* - R\).

Dividing both sides of identity (11) by the price index, representing the real value of each variable by lower-case letters \((x = X/P)\), letting \((i_r)\) indicate the real interest rate \((i_r = i - P'/P)\), and noting that \([x' = X'/P - (P'/P)x]\), we get:

\[(g - t) = i_r b + e_i'b^* = S + b' + eb'^*\]  \hspace{1cm} (12)

where \(S\) stands for seignorage, i.e. command over resources captured by the government by virtue of its authority to print money \((S = MB'/P\). The left side of (12) represents the public sector's operational deficit. Using \(d\) to represent this real deficit, \(R\) to designate the stock of international reserves held by the Central Bank \((r = R/P)\), and \(f\) to indicate the overall public debt in deal terms, we can write:

\[d = S + f'\]  \hspace{1cm} (13)

where \(f' = b' + eb_C'^* - er'\). Thus in a given year the operational deficit can be
financed either by seignorage \( S \) or by changes in net indebtedness.

Now suppose that the government holds its gross external debt constant \( (b_G^* = 0) \), then the revenue yielded by seignorage can be used to finance a budget deficit, to reduce the net domestic debt or to accumulate reserves:

\[
S = d - b' + er' \tag{14}
\]

Table 9 shows estimates for these variables, assuming that the government gross external debt has remained constant (this is the information available). The numbers show that seignorage yielded a revenue of $12 billion in 1992. That amount plus an $8 billion increase in domestic debt was used to finance a budget deficit of $7 billion and an accumulation of $14 billion in international reserves. In 1993, seignorage worth $12 billion plus $1 billion in budget surplus were used to add $8 billion to reserves and to reduce the domestic debt in $5 billion.

Although these numbers are only indicative, due to the indirect nature of their calculation, they imply that the figures in Table 2 are plausible and consistent. A basic test consists in verifying if the sum of columns 2, 3 and 4 is equal to column 1 in Table 9. Although the four columns come from separate sources, they do approximately add up to zero. That is, if the operational deficit had been much larger it would have to be financed but that does not show up in the available financing variables.

Table 9, however, points to a perverse pattern. In 1992–93 (continued in 1994), the government used a highly inefficient type of taxation to finance reserve accumulation and to reduce net foreign debt. More generally, seignorage has been used to reduce the overall net public debt rather than to finance the budget-deficit. This is an unexpected result: Brazil’s high inflation in the 1990s has served partly to repay old debts, in contrast, say, to the erosion of government bonds in the ‘classic’ German hyperinflation of 1923.

REFERENCES


