FROM INERTIA TO MEGAINFLATION: BRAZIL IN THE 1980s

Eliana Cardoso

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ABSTRACT

This paper discusses the acceleration of inflation in
Brazil. In the early 1980s, the Brazilian inflation rate
increased in good measure because of the balance of payments
crisis and because of large depreciations of the cruzeiro. The
Cruzado Plan failed to stop inflation because of an extremely
loose monetary policy coupled with a lack of fiscal austerity.
Repeated price controls have increased the variability of
inflation. More recently, the decline in tax collections and the
growth of interest payments on a ballooning domestic debt have
built up a massive fiscal problem. Flight from money has further
aggravated Brazilian inflation.

Two steps are used in explaining the Brazilian inflationary
process: the analysis of price freezes in the context of
sustained fiscal imbalance and the research on the consequences
of different fiscal deficit financing forms. The paths of
inflation and real cash balances in response to different shocks
are simulated. The focus is on the effects of controls that
impose a temporary reduction of the inflation rate under
different choices for monetary and fiscal policies. A model of
an open economy where agents can hold money, domestic bonds and
inventories of goods clarifies the linkage between Brazil's
growing inability to finance the public sector deficit externally
after 1982 and the acceleration of inflation.

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BRAZIL IN THE 1980S*

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I. INTRODUCTION

Brazil's inflation rate reached 40 percent per month during the last quarter
of 1989. Once again policy makers discussed the possibility of imposing
price controls despite the failure of the three previous attempts in 1986,
in 1987 and in 1989 at beating inflation by freezes. Figure 1 shows
inflation rates before and after the Cruzado Plan, the Bresser Plan and the
Summer Plan.

This paper discusses the acceleration of inflation in Brazil in
the 1980s. Section II presents an overview (supported by the statistical
appendix) of the Brazilian recent macroeconomic performance. In the early
1980s, the Brazilian inflation rate increased in good measure because of the
balance of payments crisis and because of large depreciations of the
cruzeiro. The Cruzado Plan failed to stop inflation because of an extremely
loose monetary policy coupled with a lack of fiscal austerity. Repeated
price controls have increased the variability of inflation. More recently,
the decline in tax collections and the growth of interest payments on a
ballooning domestic debt have been building up a massive fiscal problem.
Flight from money has further aggravated Brazilian inflation.

[PLACE FIGURE 1 HERE]

Two steps are particularly useful in explaining the Brazilian

inflationary process: the analysis of price freezes in the context of

sustained fiscal imbalance and the research on the consequences of different

fiscal deficit financing forms. These two steps are taken in sections III

and IV.

Section III builds a simple model introducing financial markets

and interest rates in the traditional Cagan style model of inflationary

finance with rational expectations. It assumes inflation inertia. This means

that inflation in the current period reproduces inflation in the previous

period. Inertia occurs through the existence of formal or informal

indexation interacting with a staggered setting of wages, prices and

financial contracts. Inflation fluctuation relative to previous periods

depends on the behavior of interest rates. After characterizing steady

states, we use the model to simulate the paths of inflation and real cash

balances in response to different shocks. The focus is on the effects of

controls that impose a temporary reduction of the inflation rate under

different choices for monetary and fiscal policies.

Section IV examines the central relationship between budget

deficits, external finance and inflation. It extends the model of section

III to an open economy where agents can hold money, domestic bonds and

inventories of goods. Our contribution clarifies the linkage between

Brazil's growing inability to finance the public sector deficit externally

after 1982 and the acceleration of inflation. The suddenly limited access to

external finance and the inadequacy of the government savings effort

profoundly affected the domestic macro-economic structure. Applying the

model developed in section IV to the analysis of inflation in Brazil after

1982, we discuss fiscal imbalances and balance of payments crises as causes

of inflation acceleration. We summarize our conclusions in section V.

II. OVERVIEW

Brazil has traditionally lived with high inflation rates. Between 1960 and

1964, increasingly populist administrations carried inflation from 2 to 6

percent per month. By 1968, inflation was down again to 1.5 percent, a level

that persisted until the first oil shock. Then it doubled to 3 percent per

month and doubled again to 6 percent in 1980-82. By 1983-85, inflation

increased to 10.5 percent per month. With the Cruzado Plan it fell to an

average of 5 percent per month. From then on it increased every year,

reaching more than 50 percent per month in December 1989.[1]

Debt strategy and inflation

The foreign debt strategy of the 1970s and the balance of payments crisis of

the early 1980s play an important role in the history of Brazilian

inflation. After 1968, the government consciously embarked on a program of

tapping private capital markets to underwrite rapid expansion. Brazil relied

extensively on this external capital market, implementing a debt-led model

of development to help finance the mounting capital and intermediate goods

imports associated with the average growth rates of near 10 percent between

1968 and 1973. In 1968, another component of the strategy was explicit

adaptation to inflation through indexation of exchange rates. This was in addition to the indexation of wages, rents and financial assets since 1964.

When the oil shock struck in late 1973, Brazil was the largest oil importer among developing countries. Already faced with the prospect of weakening growth from internal cyclical causes, the government chose not to risk a significant decline in real income from the adverse terms of trade shock. It increased external borrowing, thus postponing the contractionary effects of the petroleum "tax" and permitting domestic expansion to proceed. Brazil opted for adjustment through an ambitious program of generalized import substitution rather than export promotion or domestic recession.

An elastic supply of debt responded to Brazilian requirements. External borrowing and brief episodes of slower domestic activity kept the balance of payments under control until late 1970s. Higher coffee and other commodity prices also contributed by reversing the decline in the terms of trade. Brazilian economic performance after the first oil price shock remained above its trend level of growth of 7 percent per year: petro-dollar recycling transfered considerable resources to Brazil that translated them into high rates of investment and economic growth.

On the eve of the second oil shock, Brazil had the largest external debt in the world. Whereas the first stage of debt accumulation saw a large transfer of real resources, in later stages more and more borrowing went simply to cover interest obligations on earlier loans. The dynamics of debt-led debt had become part of the Brazilian story, a process magnified by rising interest rates.

The debt crisis

In 1980, facing rising oil prices and interest rates, Brazil found
additional finance available. But terms became more expensive as spreads
widened. The country was forced to a more austere set of policies and
domestic adjustment in 1981. For the first time in the post-war period
income declined. Discipline was rewarded with new capital flows.

During the generalized debt crisis in 1982, the government
insisted that the Brazilian situation was distinct and capable of simple
remedy. With a Congressional election in November, politics precluded any
appeal to the IMF until after the votes had been counted. Only then did
Brazil join the rapidly lengthening queue of problem cases. But it did so
with the disadvantage of having its own inadequate stabilization program on
the table beforehand.

Brazil managed best on its external accounts. A greater export
recovery in 1984 made it different from other large Latin American debtors.[2]
The current account was quickly restored to balance and the foreign exchange
constraint became less pressing. While the recession was worse than the
1930s Great Depression, the intervening decline in per capita income was
smaller than for other problem debtors. Output in 1984 was already on the
way up, led by export growth.

External adjustment

To judge from trade performance, adjustment to the debt crisis was nothing
short of phenomenal. The combination of export growth and import
substitution have produced large export surpluses in recent years. The trade

deficits of the 1970s turned into large surpluses after 1983. Merchandise exports increased from 13 billion dollars per year in 1977-79 to 34 billion dollars in 1988. At the same time, Brazil restrained imports by continuing to expand alternative domestic supply sources. Imports in 1983-88 were lower than in 1977-82, despite the increase in output. In 1988, real GDP was 29 percent higher than in 1979, but the volume of imports was 23 percent lower. (Table 2.A).

In part, trade flows responded to the real depreciation of the 1980s: in the 1983-88 period, the real effective exchange rate was 20 percent lower relative to its level in 1977-82. But since the late 1960s Brazil has also been exceptional among the Latin American countries in its successful combination of import substitution and growth as well as diversification of exports. Four factors have played a role: the size and efficiency of the industrial sector, a crawling peg exchange rate policy which has avoided long periods of overvaluation, an active promotion of manufactured exports through incentives and subsidies, and import restriction that has relied not merely on controls but also on the active policy of investment directed toward import substitution in the late 1970s.

The recent large trade surpluses tend to create an illusory optimism about the ease with which large external transfers of resources can be realized. A broader perspective, incorporating the debt as an integral part of the Brazilian development problem, is necessary. Soaring debt service is an important component of fiscal deterioration in Brazil and it has been financed by growing trade surpluses. Section IV explores the important link between trade surpluses and inflation. In Brazil, trade

surpluses were used to pay interest on government debt while the government financed the purchase of foreign exchange from the private sector by issuing debt and printing money. As a consequence, inflation increased.

The Brazilian experience also led to the understanding that improvement of the balance of payments and domestic equilibrium were not tightly linked. Indeed, as discussed in section IV, trade surpluses might create new problems for macroeconomic policy.

Internal Adjustment

Progress on the external account was not matched internally. The large positive government savings of the first half of the 1970s had shrunk and turned negative in the second half of the 1980s.(Table 3.A). Government savings are not a measure of the budget surplus because they leave public enterprises out of the picture. They do, however, show that public finance in Brazil has been deteriorating. Two factors explain the sharp decline in government savings. One is the growing interest payments on domestic debt. The other is the reduction in revenues from indirect taxes. The latter results from less than perfect fiscal indexation, from evasion and from a growing underground economy. The Instituto Brasileiro de Geografia e Estatistica (IBGE) calculates that the size of the underground economy is at least as large as 15 percent of GDP. The decline in revenue from indirect taxes was in part counterbalanced by an increase in direct taxation in 1986. Yet the overall trend remains one of declining tax revenues.

In 1983, successive letters of intent under IMF programs had no sooner been dispatched than they were made obsolete by accelerating

inflation that crippled attempts to observe the monetary targets. That experience led to the development of a new deficit concept, adjusted for the indexation of government debt, now widely applied in other countries.

Budget Concepts

Table 1 shows alternative measures for the budget. When inflation rises or abruptly falls, different budget concepts are strongly affected. Inflation in Brazil sharply accelerated in the 1980s as did the public sector borrowing requirements. The public sector borrowing requirements (PSBR) move dramatically with inflation because of the inflationary component of interest payments. If inflation were to cease, the PSBR would shrink to the size of the budget deficit corrected for inflation.

[PLACE TABLE 1 HERE]

The operational deficit (column 2 of table 1) captures the behavior of the budget deficit better than the Public Sector Borrowing Requirements (PSBR). It is calculated by subtracting the monetary correction payments from the PSBR. Nonetheless, because the monetary correction index is not always equal to the inflation rate, the operational deficit still is not a proper measure of the budget deficit corrected for inflation. The difference between the two represents capital gains or losses for the public sector. Moreover, like the PSBR, it excludes the deficit of the monetary authorities (which distribute large credit subsidies) and thus possibly

underestimates in a substantial manner the actual borrowing needs of the public sector.

One can try to overcome the shortcomings of the operational deficit by calculating the budget deficit corrected for inflation from the consolidated debt of the public sector. Table 1 shows this measure in its third column, and its calculation is shown in the statistical appendix. This measure underestimates the deficit when prices are rising. In this definition payments and revenues are deflated by the December price index. If inflation is high and the excess of expenditures over revenues occurs throughout the year, deflating the deficit of each month by the December price index grossly underestimates the budget deficit of the year. Thus, while this measure shows the behavior of the consolidated real debt, it does not show the deficit according to the conventional definition. i.e., it does not measure the difference between revenues and expenditures. Moreover, this calculation is very sensitive to real depreciations when the share of external debt in total debt is large. Thus, in a year where there is a large real depreciation, the ratio debt/GDP will show a large increase. After 1985 this measure underestimates the deficit because the rate of depreciation has been smaller than that of inflation.

In 1983, as a percentage of GDP, the budget deficit corrected for inflation was extraordinarily large. There are at least three major causes for this large deficit. First, in contrast with historically large and positive growth rates, output fell during 1983 by 3.4 percent. Second, the domestic cost (corrected for inflation) of servicing the external debt greatly increased during 1983 because of the real devaluation. Third,

interest on government bonds included compensation for the 30 percent devaluation of February, because the return on these bonds had been linked to the rate of exchange depreciation.[3]

In the following year the budget deficit corrected for inflation declined. But in 1985, the budget deficit was still as large as 5 percent of GDP. The Cruzado Plan grossly miscalculated the size of the fiscal deficit, assuming a budget close to equilibrium, when the Cruzado Plan was launched in in February 1986.

The Cruzado Plan

Relations with the IMF deteriorated, and previous plans for a multiyear rescheduling agreement with the banks were scrapped after a new civilian government took office in March 1985. Although interest on the external debt was fully paid, there were no inflows of new capital. Recovery was then based on internal demand, with limited import increase. Despite strong output growth, worrying signs came from increasing government internal debt service, low investment rates and accelerating inflation. New and bold measures were called for.

The Cruzado Plan, implemented in February 1986 as a substitute for a conventional recession-based strategy of stabilization, was centered upon the premise that the high rates of inflation were driven by the inertial, self-replicating force of indexation.[4] Accordingly, the Cruzado Plan enforced a sophisticated short-term standstill that maintained real income positions and abolished future indexation. The key steps of the Cruzado Plan were the following:

• Wages, rents and installment payments were readjusted and frozen, as were
all prices and the exchange rate.

• A _tablita_ was devised to compensate for the expected inflation built into
extant contracts and thus avoid arbitrary redistribution between debtors and
creditors. A new currency was introduced to help facilitate the
readjustment.

• Indexation was virtually eliminated. An _escala movel_, with a 20 percent
threshold, was substituted for wages. In financial markets, indexation was
maintained only for instruments of more than one year maturity.

Inflation was to be zero. For a few months it seemed true, and
there was generalized euphoria. But signs of disequilibrium from excess
demand mounted without inducing adequate compensatory response. Another
election loomed, and in the best Brazilian political tradition, corrective
actions were placed on hold.

This time the new measures were announced immediately after the
election. They proved much too late, and much too little. The ice of
controls had thawed, and there was no opportunity to restore an orderly
process of readjustment of prices and wages. Events rapidly moved out of
control as inflation rates mounted. There seemed to be policy impotence. The
deterioration in the balance of payments became as significant as the
mounting internal problem. Suddenly, Brazil's comfortable cushion of
reserves, that could lend credibility to the maintenance of a fixed exchange
rate, had vanished.

There is no controversy about the reasons why the Cruzado Plan
failed. The most prominent factor was the overheating of the economy through

loose fiscal and monetary policies, as well as through the overly generous wage policy. On the fiscal side, tax revenues disappointingly rose only a little, revenues of state-owned companies were hurt by the price freeze, spending ran higher than anticipated, and subsidies that were cut during 1983-84 staged a comeback in 1986. The public sector wage bill also increased in line with the economy-wide trend. There was a sharp initial monetisation of the economy: in the first three months following stabilization the monetary base doubled. Loose monetary policy produced very low interest rates that permitted firms lacking confidence in the program to build up speculative stocks. Furthermore, the increase in real wages promoted by the Cruzado Plan and the fast-growing economy rapidly expanded wages and sustained a consumers' boom.

New attempts at controlling inflation were made in mid-1987, with the Bresser Plan, and in January 1989 with the Summer Plan. Once again the government froze prices and cut zeros off the face value of the currency. Promises to eliminate the budget deficit were made but not kept. President Jose Sarney lacked the political will to implement measures of fiscal consolidation. He also lacked credibility, determination and allies in the Congress. With the budget deficit left unscathed and the trade surpluses growing, all the three plans amounted to attempts to stop inflation by decree.

Institutional Adaptation

Policy makers, designing the Cruzado Plan, believed that past inflationary shocks were being perpetuated in a vicious circle created by indexation.

Freezing prices, exchange rates, and wages would create a rupture with the past, thus permitting the economy to rid itself of inertial inflation.

The main obstacle to the price and wage freeze was the absence of synchronization in price readjustments. Simply freezing wages and prices on a given day would greatly favor wage earners and entrepreneurs who had readjusted their prices immediately before the freeze. In a likely manner, such a step would drastically punish those who were to have received their new settlements the following day.

Incomes policy, rather than playing the role of a coordinating device, became the major objective of the Cruzado plan. All attention was concentrated in deriving formulas that would permit a "neutral" price freeze. Nonetheless, the objective of "neutrality" in income distribution remains elusive because the choice of a reference point remains arbitrary.

The initial price freeze will not produce excessive windfall profits or losses only if there is little dispersion of relative prices. The dispersion of relative prices in the context of a staggered price setting introduces a serious problem for the use of freezes in the coordination of expectations during a stabilization program. It is sometimes asserted that dispersion of relative prices will be less when inflation is higher because adjustments take place at shorter intervals. The Brazilian experience does not support this view. When inflation rises, adjustments take place at shorter intervals but are also bigger. Rising inflation does not contribute to reducing the dispersion of relative prices, but can make the problem worse. In Brazil, during the last week of December 1989, a Chevette cost the same as 42 standard-size brassieres and a refrigerator the same as a linen

shirt. The same bottle of wine cost 50 cruzados in one supermarket and 15 cruzados in another.

Institutional adaptation to rising inflation has become pervasive as buyers and sellers, borrowers and lenders, the government and the tax payers have engaged in a self-defeating race to shorten the lags on pricing and indexation. Since 1988, the supermarkets in Rio have closed each Monday morning to remark prices and by the end of 1989 firms were discussing weekly adjustments for wage earners. By November 1989, the sales of electronic calculators and the number of credit cards had doubled in relation to their numbers in 1988. To avoid delayed reimbursement, many merchants were offering shoppers 30 percent discount for instant payment in cash or checks. By the end of 1989, most restaurants and hotels stopped accepting credit cards because 20-day billing period eroded the value of payments. Contracts no longer were made in cruzados, but in terms of BTNs (a national treasury bond, daily corrected for inflation and used as unit of account).

[PLACE FIGURE 2 HERE]

Figure 2 shows the daily inflation rate between April 4th, 1988 and August 31st, 1989. One observes that on average, inflation picked up at regular weekly intervals. At the beginning of 1989, there was an extraordinary jump of the daily index as merchants increased prices in response to an expected price freeze that did materialize with the Summer Plan. Soon controls were lifted and once again inflation was on the rise.

III. INFLATIONARY FINANCE

This section builds up a model of inflationary finance and explores the role of price controls on inflation behavior.

Consider an economy where government expenditures, G, are financed by money creation, $H_t - H_{t-1}$:

(1) $$G = H_t - H_{t-1}$$

Dividing both sides of equation (1) by nominal income, assuming zero real growth and using the definition of the inflation rate, we obtain:[5]

(2) $$h_t = g + h_{t-1} \ (1/(1+\pi_t))$$

where: g is the share of the real budget deficit in real income and h is the ratio between real cash balances and real income.

Our next question concerns the dynamics of inflation. The inflation rate accelerates whenever aggregate demand exceeds the full employment output level. For a given fiscal stance and real exchange rate, there is a unique real interest rate at which aggregate demand equals full employment output. Accordingly, equation (3) shows that inflation increases whenever the actual real interest rate, $i - \pi$, is below the full employment real interest rate, ρ:

(3) $$\pi_t - \pi_{t-1} = \phi \ [\rho(g) - (i_t(h_t) - \pi_t)]$$

where ρ is a function of the share of government expenditures in GDP. We also assume that the nominal interest rate moves in order to clear the money market all the time. The demand for real cash balances is inversely related to the nominal interest rate. Thus, we can write the actual interest rate, i_t, as a function of real cash balances in the equation above. Note that equation (3) implies the existence of both inflation inertia and a scope for monetary policy to affect inflation.

Figure 3 illustrates steady state equilibria. In steady state, the inflation rate is constant. We represent the steady state inflation rate in figure 3 as the schedule[6] showing $\pi_t - \pi_{t-1}$:

(4) $$\rho - i(h) - \pi$$

[PLACE FIGURE 3 HERE]

In steady state, the ratio of real cash balances and real income is also constant:

(5) $$h \, \pi - g \, (1+\pi)$$

We represent the steady-state budget constraint in figure 3 by the schedule showing $h_t - h_{t-1}$.

There are two equilibria: E1 and E2. The low inflation equilibrium, E1, can be stable. The nature of the time path around the low inflation equilibrium is one of oscillations as in the cobweb model. The

high inflation equilibrium, E2, is unstable.[7] This model exhibits the
essential property that, in the transition to a sustained increase in money
growth, the inflation rate, <u>on average</u>, exceeds the growth rate of money.

Price Controls

In the context of a budget deficit financed by money printing, price
controls would reduce inflation temporarily. Continuous money growth in the
presence of price controls increases real cash balances reducing interest
rates. As a consequence, once price controls are removed, inflation picks up
again. Through oscillations, inflation would then return to its initial
level, if the initial equilibrium was stable.

We can simulate the path of inflation by assuming specific
functional forms for money demand and values for the parameters in equations
(1)-(3). We make: $i_t - j - vh_t$, with $j - 0.62$ and $v - 4$. We also assume that
$\phi - 0.05$, $\rho - 1$ percent per month and $g - 1.5$ percent. Thus, in the initial
stable steady state: $\pi - 15$ percent per month and $h - 0.115$.

Figure 4 compares two situations. In the first one, the government
freezes prices during one period. In the second, it uses guideposts rather
than a price freeze. Once controls are removed, the price freeze leads to a
bigger overshooting of the inflation rate than in the case of loose
controls. Under both circumstances, the inflation rate finally returns to
the 15 percent steady state level. In this model, price controls can only
lead to an explosive inflation rate under two circumstances. The first
situation corresponds to one with an unstable initial equilibrium. The

second situation corresponds to one where the inflation rate, in response to the price freeze, moves out of the stability region.

[PLACE FIGURE 4 HERE]

Cutting the Budget Deficit

Figure 5 compares equilibria for different fiscal deficits. A cut in government expenditures shifts the steady state budget constraint downwards. It also reduces the full employment real interest rate, thus shifting the schedule $\pi_t = \pi_{t-1}$ to the right.

[PLACE FIGURE 5 HERE]

Assume that, consistent with a 0 real interest rate per month, the reduced budget deficit share in output, g, is 1 percent. In the new stable steady state the inflation rate will be 8 percent per month and the real cash balances share in income will be 0.135.

How does the economy move from the initial 15 percent inflation to the new 8 percent final equilibirium? If policy-makers could precisely determine both the new steady state inflation rate and the size of the desired real cash balances consistent with it, they could cut the deficit and at the same time increase money by the right amount and choose adequate price controls. Under these very special circumstances, they could immediately bring the economy to the new steady state.[8] Unfortunately, perfect information and synchronization do not exist. Thus, we must compare

less perfect but more realistic policies. We compare the inflation path that follows the adoption of:

• a budget deficit cut with and without price controls;

• a budget deficit cut with and without a change in the money stock.

Price Controls in the Presence of a Fiscal Contraction

Figure 6 compares the inflation path in response to a cut in the budget deficit in three different situations:

• no controls

• loose controls during five periods

• a price freeze during five periods.

[PLACE FIGURE 6 HERE]

Figure 6 shows that loose controls produces a deceleration of inflation sooner than would have taken place in its absence and it also reduces the size of the cycles around the new steady state. By contrast, in the case where the inflation rate is not zero in the new steady state, the price freeze exaggerates the size of the cycles.

This exercise helps to understand the success of loose controls in the 1965-68 stabilization in Brazil.

Combining Fiscal and Monetary Austerity

Figure 7 shows that a cut in the budget combined with a monetary squeeze is overkill. The inflation rate declines faster, but the recession and the following cycles are made more acute.

[PLACE FIGURE 7 HERE]

Monetizing Public Debt

Fiscal and monetary austerity were not part of the economic package adopted in Brazil with the Cruzado Plan. On the contrary, fiscal policy was left untouched in the immediate aftermath of the Cruzado Plan and monetary policy was expansionary.

Figure 8 shows the path of real cash balances in response to an increase in the money stock with and without price controls. This figure can be compared with the figure showing the actual behavior of real M1 in Brazil (figure 9). The acceleration of inflation in Brazil, once price controls were removed after the Cruzado Plan, does not need a very elaborate explanation.

[PLACE FIGURE 8 AND FIGURE 9 HERE]

IV. THE CAUSES OF INFLATION

Section III clarified two processes. First, the model in section III showed how price controls, in the presence of a sustained budget deficit, ultimately increases inflation instability. Second, we argued that a monetary expansion combined with a price freeze clearly was one of the factors of inflation acceleration after the Cruzado Plan. Questions concerning the link between domestic and external debts with inflation have to be answered in the context of a model more complex than the one described

in section III. We now develop a model to study the inflationary impact of financing the budget deficit in different ways and of depreciating the exchange rate .

Montiel (1989) divides recent analyses of inflation into a "fiscal" view and a "balance of payments" view. Followers of the "fiscal" persuasion point to movements in the budget deficit as the fundamental source of monetary emission that moves the economy to higher inflation rates. Supporters of the "balance of payments" theory link inflation to exchange rate depreciation triggered by balance of payments crises. Computing historical decompositions of the Brazilian inflation rate based on vector autoregressions, Montiel concluded that movements in base money and the nominal exchange rate have played an important role in determining the time path of the rate of inflation in Brazil between 1983:1 and 1985:4. Brazilian inflation for most of that period resulted in good part from inertia and increased because of new shocks deriving from exchange rate depreciation. Monetary shocks had an important role only in the last two quarters of 1985.

Rodriguez (1978) offered a starting point for the discussion of the devaluation-inflation spiral in a model where the government finances the budget deficit through central bank credit creation.[9] He showed that under these circumstances, while casual observation would indicate that inflation is preceded by devaluation and monetization of the resulting balance of payments surpluses, the conclusion that the external sector is the cause of inflation would be inappropriate:

> "Although it is correct that over a short period following the
> devaluation external sector developments lead the movement in domestic

prices, over the entire typical cycle the price level follows the path of the money supply, which is determined entirely by domestic credit creation to finance the fiscal deficit.(...) Both the price level and the exchange rate (are) led by developments in the monetary sector, which are in turn determined by the monetization of the internal fiscal deficit."

The situation described by Rodriguez can be complicated if external credit rationing follows a period of external borrowing by the government. Consider, for example, a situation where a government has a large external debt. Suddenly, deprived of foreign capital inflows needed to finance interest payments and non-interest deficits, it will have to foster trade surpluses to produce the needed exchange resources to service the external debt. In order to produce these trade surpluses, the exchange rate is greatly depreciated in real terms. The government now has to finance domestically the purchase of foreign exchange it needs to service the external debt. In the absence of a cut in the budget, there will be more government credit creation. Moreover, depreciation has an important impact on the domestic cost of servicing the external debt. Debt service measured in domestic currency increases and thus the budget deficit measured in that currency also increases. This, in turn, increases money creation and hence, inflation.

Observe that the inflationary impact of the trade surpluses does not necessarily come from an increase in foreign reserves, as in Rodriguez (1978). If the trade surplus is used to pay interest on government debt and is not counterbalanced by an increase in taxes, it will increase money creation, even if reserves remain unchanged.

Under these circumstances, what "caused" inflation to rise? The disappearance of the external source of finance? The exchange rate

depreciation? The deterioration of the budget that resulted from the
depreciation? The monetization of budget deficits that were previously
financed by external borrowing and counterbalanced by trade deficits?

The answer, of course, is all of the factors mentioned above. In
the absence of a budget deficit neither external credit rationing nor
exchange depreciation would cause a persistently higher inflation rate. On
the other hand, without credit rationning and depreciation, the inflation
rate would not increase.

We now explore this situation formally. Our first question
concerns the fiscal budget and its financing. The government finances the
budget deficit by borrowing abroad, by issuing domestic debt and by creating
money. We assume that the current account is financed either by commercial
loans or by changes in foreign reserves. All external borrowing is done by
the public sector. The appendix shows how we can combine the equations for
the budget constraint and the balance of payments to obtain:[10]

(6) $$g + \psi + ib = h \mu + b \nu$$

where: g = share in output of the primary budget deficit

ψ = share in output of net exports

i = nominal interest rate

b = ratio between domestic debt and income

h = ratio between the monetary base and income

μ = growth rate of the monetary base

ν = growth rate of domestic debt.

Net exports are equal to the interest payments on the public external debt in the special case where, after a decade of external borrowing by the government, there is external credit rationing and no change in foreign reserves.[11]

Domestic agents hold money, domestic bonds and inventories of goods. Demand for real cash balances is inversely related to the interest rate, i, and inversely related to the inflation rate, π:

$$(7) \qquad h = \gamma_0 - \gamma_1 i - \gamma_2 \pi$$

The demand for domestic bonds depends positively on the interest rate and inversely on the inflation rate:

$$(8) \qquad b = \beta_0 + \beta_1 i - \beta_2 \pi$$

The government follows a "passive" monetary rule, letting money growth match the inflation rate when inflation is stable, but reducing the money growth rate when the inflation rate increases:

$$(9) \qquad \mu = \pi - \alpha \dot{\pi}$$

The growth rate of domestic debt is endogenous. Substituting (7)-(9) in (6) we obtain the equation that describes the behavior of the real domestic debt through time:

(10) $\qquad \nu - \pi = i - \pi + (1/b)\{(g+\psi) - (\gamma_o - \gamma_1 i - \gamma_2 \pi)(\pi - \alpha \pi)\}$

where: $i = (b - \beta_o + \beta_2 \pi)/\beta_1$

Our next step is to re-interpret equation (3) from section II that describes the dynamics of inflation. As before, the equilibrium nominal interest rate is part of the real interest rate which influences inflation dynamics. In the goods market, inflation increases whenever the actual real interest rate, $i - \pi$, is below the full employment real interest rate, ρ, which is now a function of both the share of government expenditures and of net exports in income:

(11) $\qquad \dot\pi = \phi \, [\rho(g, \psi) - (i - \pi)]$

where: $i = (b - \beta_o + \beta_2 \pi)/\beta_1$

We can represent the model as done in figure 10. The schedule $\nu - \pi$ shows the budget constraint in steady state:[12]

(12) $\qquad \nu - \pi = 0 =$

$(1/\beta_1)[b^2 - \beta_o b - (\beta_1 - \beta_2)b\pi] + (g+\psi) - \{\gamma_o - \gamma_1[(b - \beta_o + \beta_2 \pi)/\beta_1] - \gamma_2 \pi\}\{\pi - \alpha\phi[\rho + \pi - (b - \beta_o + \beta_2 \pi)/\beta_1]\}$

The schedule $\dot\pi = 0$ shows the steady state inflation rate, under the assumption that $\beta_1 = \beta_2$:[13]

(13) $\qquad \rho + \pi = (b - \beta_0 + \beta_2 \pi)/\beta_1$

[PLACE FIGURE 10 HERE]

There are two steady state equilibria.[14] The high inflation equilibrium, point B in figure 10, is unstable. At the high inflation equilibrium, any disturbance will move inflation onto an explosive path. The low inflation equilibrium in figure 10, point A, can be stable. The nature of the time path around the low inflation equilibrium is one of oscillations as in the cobweb model.

Comparative Dynamics: External Credit Rationing Changes the Source of
Finance of the Budget Deficit

If external finance dries up and the government responds by depreciating the exchange rate, there is an increase in the trade surplus, ψ. The increase in the trade surplus shifts the schedule representing the steady state budget constraint downwards as shown in figure 11. On the other hand, the increased trade surplus requires a higher full employment real interest rate, i.e., a higher domestic debt/income ratio. Thus, the schedule that represents steady state inflation shifts upwards.

[PLACE FIGURE 11 HERE]

The economy moves from the initial equilibrium, A, to a new one, A', where the domestic debt and the inflation rate are higher than before. With the increase in the trade surplus, the economy moves, with oscillations, to the higher inflation equilibrium. Initially, the inflation rate increases ahead of the nominal interest rate and the real interest rate falls, stimulating activity and pushing up the inflation rate. Gradually, the interest rates exceed inflation rates, increasing the real interest rate and the domestic debt.

An increase in the budget deficit generates exactly the same results as those described above. A reduction of the external finance of the budget, requiring a devaluation and an increase in the trade surplus, is thus equivalent to an increase in the budget deficit.

Because there is a limit to the budget deficit that can be financed by seigniorage, or to the trade surplus that can be monetized, further increases in the budget deficit or in the trade surplus might rule out any crossings of the two schedules, denying the existence of an equilibrium solution to the model.

We also observe that in response to an increase in the budget deficit, or in response to a reduction in the external finance of the budget deficit, both the inflation rate and the ratio of domestic debt to income increase. The debt crisis in Brazil manifests itself not only in rising inflation but also in the rapid growth of domestic debt. (Table 7.A). The rapid domestic debt growth results in part from the financing of both the primary deficit and of debt service. In 1989, problems were made more acute by the high real interest rates, shown in figure 12.

[PLACE FIGURE 12 HERE]

During the last two quarters of 1989, the goal was to maintain a
restrictive monetary policy and, in practice, this was translated into very
high real interest rates. Nonetheless, the public could effectively write
checks on their overnight deposits which were backed by the government debt.
That implied that open market operations traded non-paying-interest- money
for money paying interest and thus they did not affect liquidity. The high
interest rate avoided the flight into dollars and real assets and the
government continued to enjoy financing for the deficit. But without debt
relief, fighting current inflation with tight monetary policy must
eventually lead to higher future inflation or debt repudiation of some kind.
In the case of Brazil the situation is made more serious because of the
extremely short maturity of the debt.

V. CONCLUSIONS

Several factors explain inflation in Brazil. Between 1979 and 1983 its
acceleration resulted from supply shocks and large real depreciations in the
context of an indexed economy.[15] Because of a large external debt, the
fiscal imbalance also increased in this period with real depreciations and
the increase in foreign real interest rates. After 1984, when the government
could not finance the deficits externally anymore, monetization of deficits
and acceleration of money growth became important inflationary factors.
Despite the decline of inflation-corrected budget deficits, the

disappearance of external sources of finance made the fiscal deficits more inflationary because they had to be financed domestically.[16] Moreover, the perception of unsustainable fiscal imbalances led to financial adaptation and flight from money, further aggravating the inflation problem.[17]

Table 2 summarizes the stylized facts that our model has tried to replicate. In the two years that followed the Cruzado Plan, the average monthly inflation rate was about the same as it had been in the two years that preceded the Cruzado Plan. Instability nonetheless increased, as measured by the coefficient of variation of inflation, by the premium in the black market for dollars and by the coefficient of variation of the index of the Sao Paulo stock market.

The very fast acceleration of inflation after 1988, as well as the recent sharp increase in real interest rates, cannot be directly attributed to the failure of the Cruzado Plan alone. The culprits are several attempts to control inflation through price freezes and, more recently, by tight monetary policy alone, all the while avoiding the necessary fiscal adjustment.

There are four important lessons to be learned from the Brazilian experience.

• The first lesson derives from the inadequacy of the public sector savings effort. What occurred in the 1980s can be characterized as an "accomodation" to the disappearance of external sources of finance rather than a structural adjustment. External debt reduction through different types of swaps coupled with large budget deficits, financed by expensive domestic debt have evolved into a massive fiscal problem.

Inflation stabilization now requires a major fiscal effort. In the Brazilian case it requires action on three fronts. Foremost the position of the public sector in Brazil continues to be badly compromised by the need to extract resources from the private sector for the service of the external debt. To obtain fiscal consolidation without a major recession, Brazil need to reduce the transfer of resources abroad. Today that means debt reduction and postponement of debt service.

Domestic debt has also grown to finance the budget deficit as well as to pay for large subsidies granted to public enterprises and the private sector itself. The maturity of this debt is explosively short. Budget equilibrium requires the consolidation of the domestic debt. This could be achieved by privatization with the proceeds used to retire debt and by a forced lengthening of the maturity of the remaining instruments.

Moreover, solving the two debt problems will not be enough to restore stability. Fiscal consolidation requires major cuts in subsidies and better tax administration.

• The second lesson concerns the use of price controls. In the absence of fiscal consolidation, price controls increase inflation instability. They stimulate demonetization and increase the financial vulnerability of the economy. These effects are not easily reversed after stabilization.

Here one should also notice the difficulty of managing neutral disinflation. In 1986 real wages were increasing at the expense of profit margins, helping to provoke shortages, black markets and disorderly growth.

• Third, even if fiscal and monetary policies are just right
for stabilization, the problem of the transition from a situation with
high inflation to one with a low inflation rate still has to be dealt
with. In that case, price guideposts will help to smooth transition.

• Finally, it is too easily asserted that getting rid of
indexation is essential to achieve inflation stabilization. This is
wrong, as demonstrated by the excessive boldness of the Cruzado Plan in
aiming for zero inflation and abolishing indexation. While indexation
contributes to the propagation of inflation, it also protects against the
kind of volatile inflationary acceleration that occurred at the end of
1986 and beginning of 1987. Indexation establishes inertia at a lower
inflation rate, locking in disinflation gains. A good example are the
years of low and stable inflation rates in Brazil between 1968-74.
Indexation also facilitates political acceptance of a stabilization
program, an attribute that cannot be overestimated.

APPENDIX I: MACROECONOMIC STATISTICS

Table 1.A: Inflation Rates[a]

Year	Average Inflation During the Year (percent per month)	Coefficient of Variation (percent)	Price Freeze
1976	3	22	
1977	3	34	
1978	3	18	
1979	5	32	
1980	6	17	
1981	6	52	
1982	6	19	
1983	10	24	
1984	10	11	
1985	11	24	
1986	5	162	March 1986
1987	15	45	August 1987
1988	23	17	
1989[p]	27*	54*	March 1989

[a] Indice Geral de Precos from Fundacao Getulio Vargas.
Source: Conjuntura Economica

Table 2.A: Trade Balance and Real Exchange Rates

	(Billions of US $)			Index of the Real Effective Exchange Rate[b]	Terms of Trade
	Exports	Imports	Trade Balance		
1977-79[a]	13.3	14.6	-1.3	104.0	100
1980-82[a]	21.2	21.5	-0.3	100.0	66
1983	21.9	15.4	6.5	86.4	61
1984	27.0	13.9	13.1	85.7	63
1985	25.6	13.2	12.5	85.2	62
1986	22.3	14.0	8.3	74.4	67
1987	26.2	15.0	11.2	73.6	60
1988	33.8	14.7	19.1	80.9	63[p]

[a] yearly average; [b] appreciation up; [p] preliminary
Sources: Conjuntura Economica, Morgan Guaranty, Banco Central and IDB.

Table 3.A: Financial Indicators

	Velocity[a]	External Debt/ GDP[b]	Consolidated Debt of the Public Sector/GDP[c]	Real Effective Exchange Rate[d]
1970-73	6.6	13.3		130.5
1974-77	7.8	17.3		116.9
1978-80	10.0	31.1		93.9
1981	13.7	25.6		103.2
1982	15.4	28.0	29.6	112.9
1983	19.4	42.6	48.9	86.4
1984	26.4	45.5	54.5	85.7
1985	26.8	45.4	55.8	85.2
1986	12.2	39.8	44.9	74.4
1987	21.6	38.3	55.0	73.6
1988[P]	36.9	33.0	68.0	80.9
1989[P]	42.0			

[a] GDP/M1
[b] External debt calculated as the average between the debt outstanding in December of current and of previous year times the average exchange rate during the year.
[c] Consolidated debt calculated as the average between the debt outstanding in December of current and of previous year.
[d] Morgan Guaranty
Source: Banco Central and Morgan Guaranty

Table 4.A: Government Revenues, Expenditures and Savings as Shares of GDP
        All Levels of Government
        (Percent)

	Direct Taxes	Indirect Taxes	Revenues (1)+(2)+ others[b]	Interest on Internal Debt[c]	Transfers and Consumption Expenditures (including (4))	Savings (3)-(5)
	(1)	(2)	(3)	(4)	(5)	(6)
1970-77[a]	10.6	14.8	25.0	0.5	19.4	5.6
1978-80[a]	12.0	13.0	24.0	0.8	21.2	2.8
1981	11.7	12.9	23.5	1.1	21.2	2.3
1982	12.6	12.5	23.8	1.1	22.0	1.8
1983	12.1	12.6	23.2	1.6	22.0	1.2
1984	11.2	10.2	20.7	2.4	19.7	1.0
1985	11.7	10.3	21.2	3.3	21.6	-0.4
1986	13.0	11.6	22.2	3.5	23.7	-1.5
1987[P]	10.2	11.3	19.3	2.4	23.4	-4.1
1988[P]	9.7	10.2	17.2	2.7	24.0	-6.8

[a] yearly average
[b] others include other revenues minus external debt service
[c] excludes monetary correction
[P] preliminary
Source: Fernando Resende et al., "A Questao Fiscal," in Perspectivas da Economia Brasileira, Rio de Janeiro: INPES/IPEA.

Table 5.A: Budget Deficit Corrected for Inflation
          (Percent)

	Change in in Real Debt[a]/ GDP (1)	Inflation Tax[b]/ GDP (2)	Deficit Corrected for Inflation/ GDP (3) = (1) + (2)
1982	7.1	2.0	9.1
1983	20.0	2.1	22.1
1984	7.5	1.5	9.0
1985	3.7	1.3	5.0
1986	1.4	0.7	2.1
1987	-0.5	3.8	3.3

----
[a] see table 6.A.
[b] $(H_{t-1}/P_{t-1})(\pi/(1+\pi))/GDP$
Source: Banco Central, Brazil Economic Program, various issues.

Table 6.A: Consolidated Debt of the Public Sector and
           Share in GDP of the Real Debt Change

	Debt Stock December Millions NCZ (1)	Price Index December (2)	Change in Real Debt Δ[(1)/(2)] (3)	Nominal GDP Millions NCZ (4)	GDP Deflator (5)	Change in Real Debt/ Real GDP (percent) (6)=(3)/((4)/(5))
1981	8.524	1.01		24.6	0.8	
1982	21.743	2.05	222	51.0	1.6	7.1
1983	94.745	5.68	604	118.9	3.9	20.0
1984	334.120	17.54	237	393.7	12.4	7.5
1985	1,242.335	61.16	127	1,413.8	41.0	3.7
1986	2,084.175	100.00	53	3,708.2	100.0	1.4
1987	10,988.000	532.52	-20	11,884.7	309.3	-0.5

Source: Banco Central, Brazil Economic Program, various issues.

Table 7.A: Domestic Debt held by the Private Investors
          Billions of US $

1987   December   33.8
1988   March   32.4
       June   42.2
       September   43.3
       December   44.7
1989   January   40.9
       February   51.1
       March   62.0
       April   68.0
       May   63.0
       June   58.0

Source: Banco Central

APPENDIX II: How to obtain equation (6)

The government budget constraint is:

$$(A.1) \qquad (G-T) + i^*ED + iB = E\dot{D} + \dot{B} + \dot{C}$$

where:
G-T = the primary budget deficit.
i*ED = interest payments on the external debt; E is the exchange rate.
iB = interest payments on the domestic debt.
$\dot{D}$ = external borrowing.
$\dot{B}$ = domestic borrowing
$\dot{C}$ = domestic credit creation, equal to the change in the monetary base, H , minus the change in foreign reserves, F:

$$(A.2) \qquad \dot{C} = \dot{H} - E\dot{F}$$

Consider now the balance of payments in dollars under the assumption that only the government borrows abroad:

$$(A.3) \qquad \dot{F} = NX - i^*D + \dot{D}$$

where: NX = net exports.
We substitute (A.2) and (A.3) in (A.1), to obtain (A.4):

$$(A.4) \qquad (G-T) + E(NX) + iB = \dot{H} + \dot{B}$$

Dividing both sides of (A.4) by income, Y, and defining:
$(G-T)/Y = g,$ $E\ NX/Y = \psi,$ $H/Y = h,$ $B/Y = b,$

$\dot{H}/H = \mu ,$ $\dot{B}/B = \nu$

we obtain:

$$(A.5) \qquad g + \psi + ib = h\,\mu + b\,\nu$$

FOOTNOTES

I thank Rudi Dornbusch, Eustaquio Reis, Elhanan Helpman and one anonymous referee for comments and suggestions. I also thank Daniel Dantas who kindly made the data available.

[1] See Table 1.A in the Statistical Appendix.

[2] See Table 2.A in the Statistical Appendix.

[3] Surprisingly, the deficit corrected for inflation in 1983 is practically the same as the PSBR. Here the reason might well be large subsidies given through the monetary authorities and excluded from PSBR but not from the deficit corrected for inflation.

[4] For detailed analyses of the Cruzado Plan see, for instance, Arida and Resende (1985), Barbosa and Simonsen (1989), Cardoso and Dornbusch (1987), Cardoso and Fishlow (1990), Modiano (1988) and Simonsen (1988).

[5] We divide (1) by P_tY to obtain: $(G/P_tY)-(H_t/P_tY)-(H_{t-1}/P_{t-1}Y)(P_{t-1}/P_t)$, where we substitute: $\pi_t = (P_t/P_{t-1}) - 1$. We assume that government can choose g. And, of course, ΔH is endogenous.

[6] The slope of the schedule representing steady state inflation is given by $d\pi/dh = \delta i/\delta h < 0$. In drawing figure 2 we assumed a linear relationship between i and h, i.e., we assumed: $i_t = j - vh_t$, with $j=.62$ and $v=4$.

[7] For stability, it is necessary that the schedule $h_t = h_{t-1}$ cuts the schedule $\pi_t = \pi_{t-1}$ from below, i.e.: $-(\delta i/\delta h) > \pi/(h-g)$.

[8] This policy mix entails a credibility problem. Increasing money by the right amount may be interpreted by the public as a phase of expansionary monetary policy despite the cut in the budget deficit.

[9] See also Dornbusch (1987) and Ize and Ortiz (1987).

[10] For simplicity, we use continuous time.

[11] We assume that policy makers set expenditures and taxes, and thus choose g. We also assume that they set the nominal exchange rate and its devaluation rate. Given that there is inflation inertia, they actually set the rate of real devalution, and thus can choose ψ.

[12] The slope of $\nu = \pi$ is $db/d\pi = \{(\beta_1\gamma_0+\beta_0\gamma_1)+b(\beta_1-\beta_2 - \gamma_1)-2\pi(\beta_2\gamma_1+\beta_1\gamma_2)\}/(\beta_0 +\beta_1 i+\beta_1\rho+\gamma_1\pi)$.

Observe that $db/d\pi > 0$ for small π and $db/d\pi < 0$ for large π.

[13] The slope of $\overset{\bullet}{\pi}=0$ is $db/d\pi = -(\beta_2 - \beta_1)$.

[14] The necessary condition for stability, as shown by the arrows in figure 10 is that the schedule representing the steady state budget constraint cuts the schedule representing the steady state inflation rate from below.

[15] Table 2.A in the Statistical Appendix shows a sharp real depreciation at the end of the 1970s and another one in 1983.

[16] Between 1982 and 1988, the ratio of the consolidated debt of the public sector/GDP more than doubled. The ratio of the external debt/GDP increased sharply in mid-1980s and declined in recent years. See Table A.3 in the Statistical Appendix.

[17] Velocity shows a growing demonetization of the economy between 1970 and 1985, a remonetization in 1986, and a fast demonetization since 1987.

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Table 1: Different Measures of the Budget Deficit as Shares of GDP and
         Real Depreciation Rates
         (Percent)

Year	PSBR[a]	Operational deficit[b]	Deficit Corrected for Inflation[c]	Real Depreciation Rate[d]
1981	12.5	5.9		
1982	15.8	6.6	9.1	-3
1983	19.9	3.0	22.1	43
1984	23.3	2.7	9.0	0
1985	27.5	4.3	5.0	-2
1986	11.2	3.6	2.1	-8
1987	31.4	5.5	3.3	-6

[a] Public Sector Borrowing Requirements, as defined by the IMF.
[b] Subtracts monetary correction from PSBR.
[c] Calculation shown in tables 5.A and 6.A.
[d] [(1+depreciation rate)/(1+inflation rate)] - 1; December/December.
Source: Banco Central.

Table 2: Before and after the Cruzado Plan
(percent)

	2 preceding years Jan. 84 - Feb. 86	2 following years Mar. - Apr. 88	May 88 - May 89
Average Inflation Rate per Month	11	10	20
Coefficient of Variation of the Inflation Rate	3	8	4
Real Interest Rate per year[a]	2	3	20
Black Dollar Premium[b]	21	45	68
Coefficient of Variation of Real Ibovespa[c]	48	75	40

[a] $(\Pi(1+r_{1-i}))-1$, $i=1,\ldots,12$ and $(1+r) = (1+i)/(1+\pi)$.

[b] (Black Market Rate/Official Rate) - 1

[c] S.Paulo Stock Market Index.

Source: Conjuntura Economica and Banco Icatu.

BRAZILIAN INFLATION RATE
3-MONTH MOVING AVERAGE

NOTE: IGP from FGV
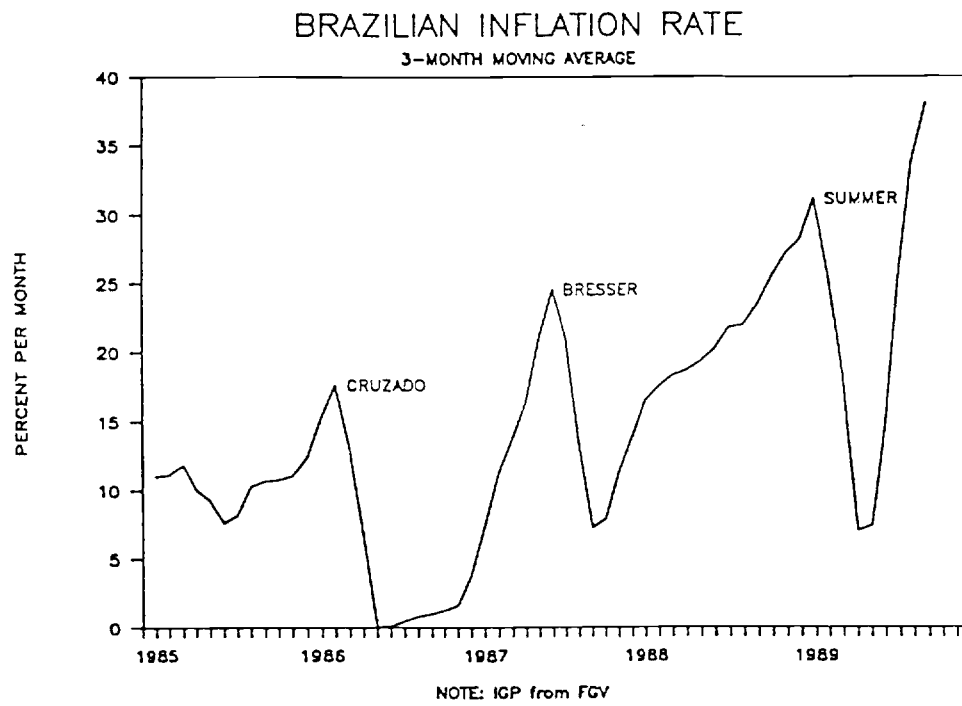
FIGURE 1

DAILY INFLATION RATE
BRAZIL: APRIL 4,1988 — AUG.31,1989
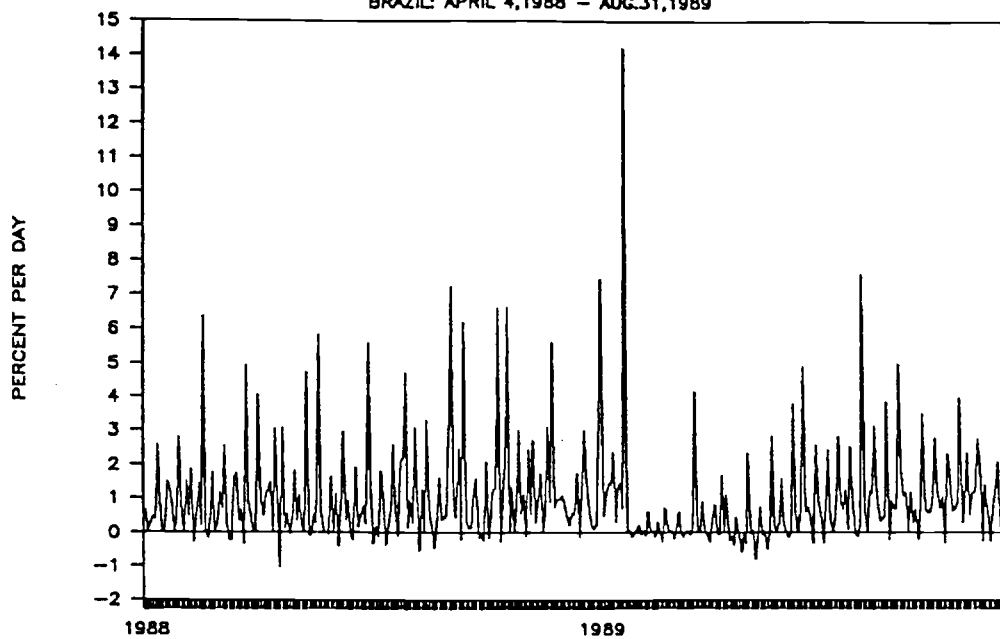
SOURCE: Banco Icatu

FIGURE 2

FIGURE 3

INFLATION PATH
AFTER PRICE CONTROLS

FIGURE   4

INFLATION RATE

$h_t = h_{t-1}$

$\pi_t = \pi_{t-1}$

E1

E

0

0
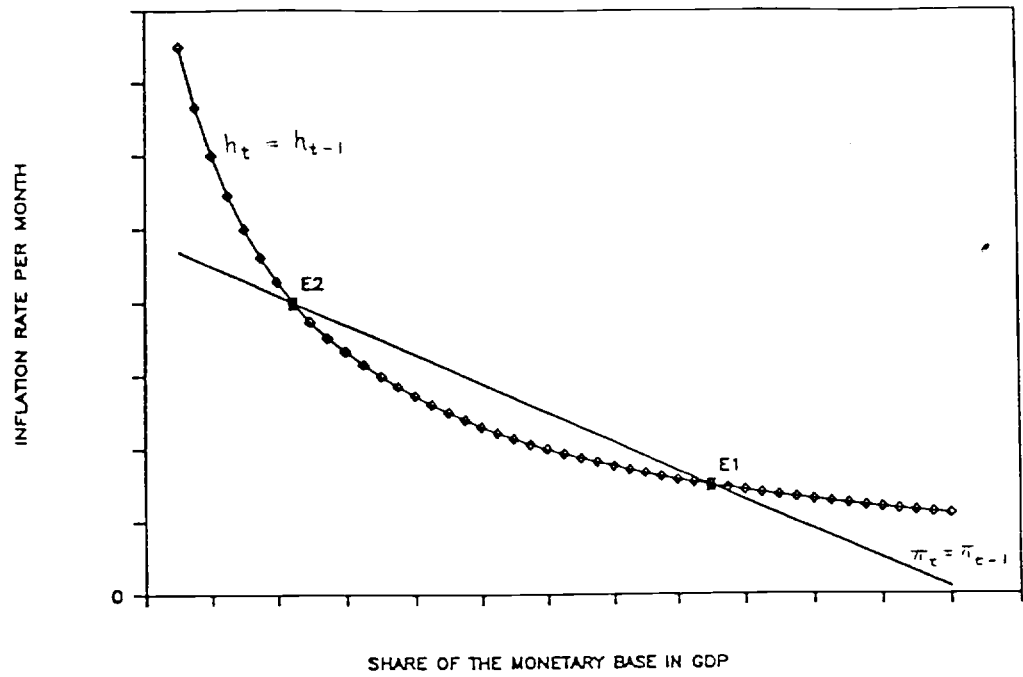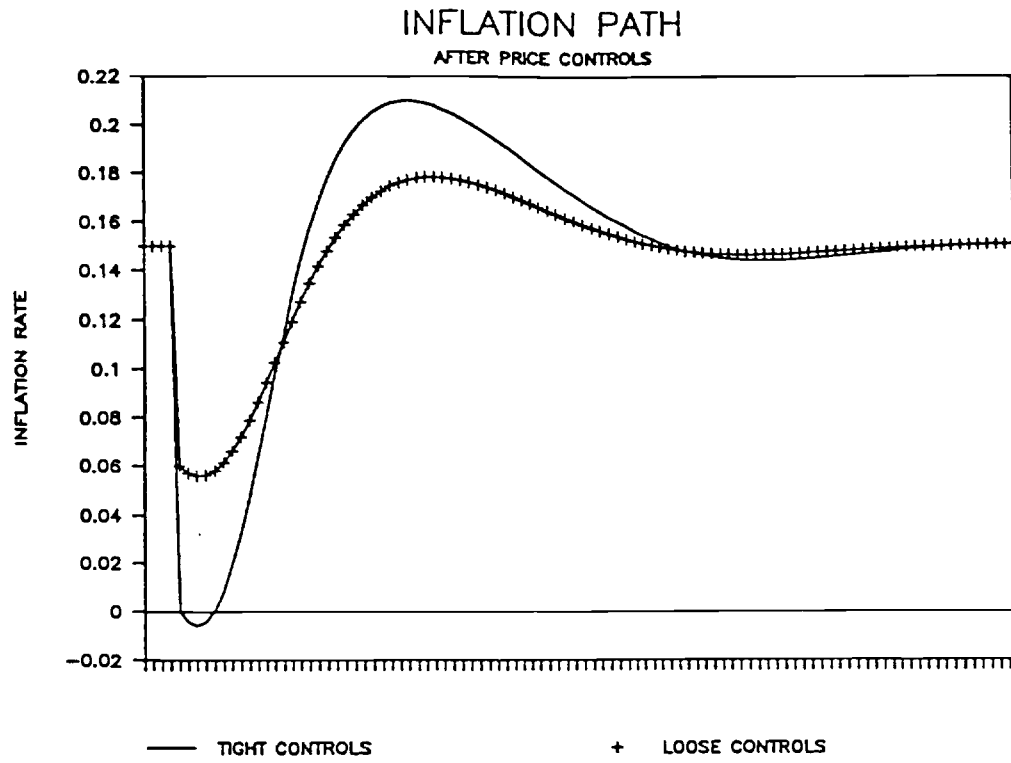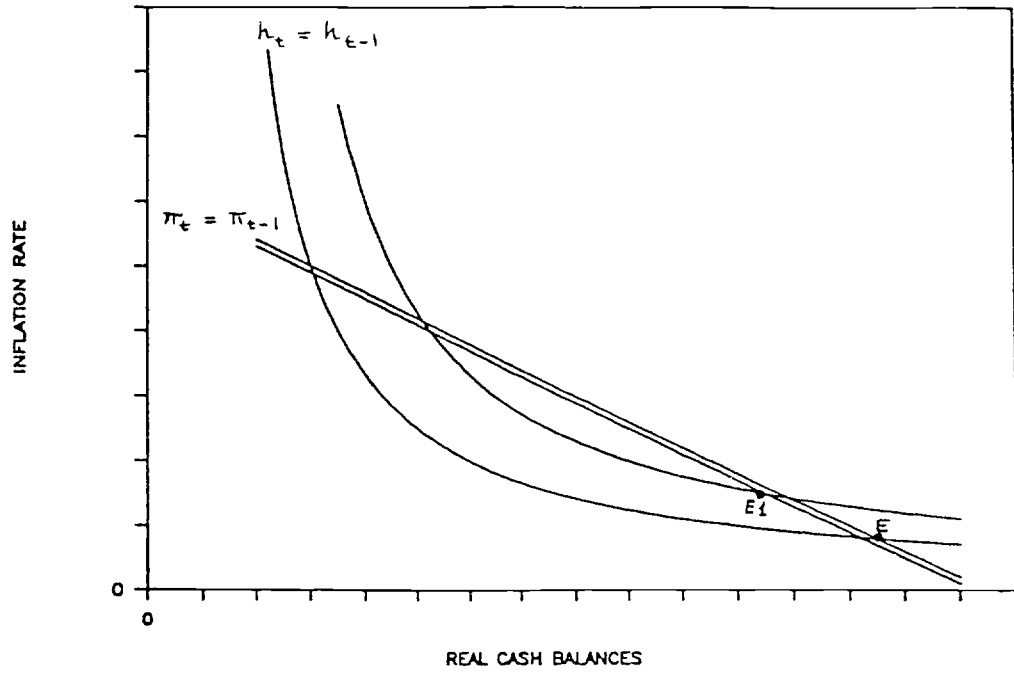
REAL CASH BALANCES

FIGURE 5

INFLATION PATH AFTER FISCAL CONTRACTION

WITH AND WITHOUT PRICE CONTROLS

— NO CONTROLS   ◇ LOOSE CONTROLS   × VERY TIGHT CONTROLS

FIGURE   6

INFLATION PATH

AFTER A CUT IN THE BUDGET DEFICIT

INFLATION RATE

— ONLY FISCAL   ×   W/ CUT IN MONEY
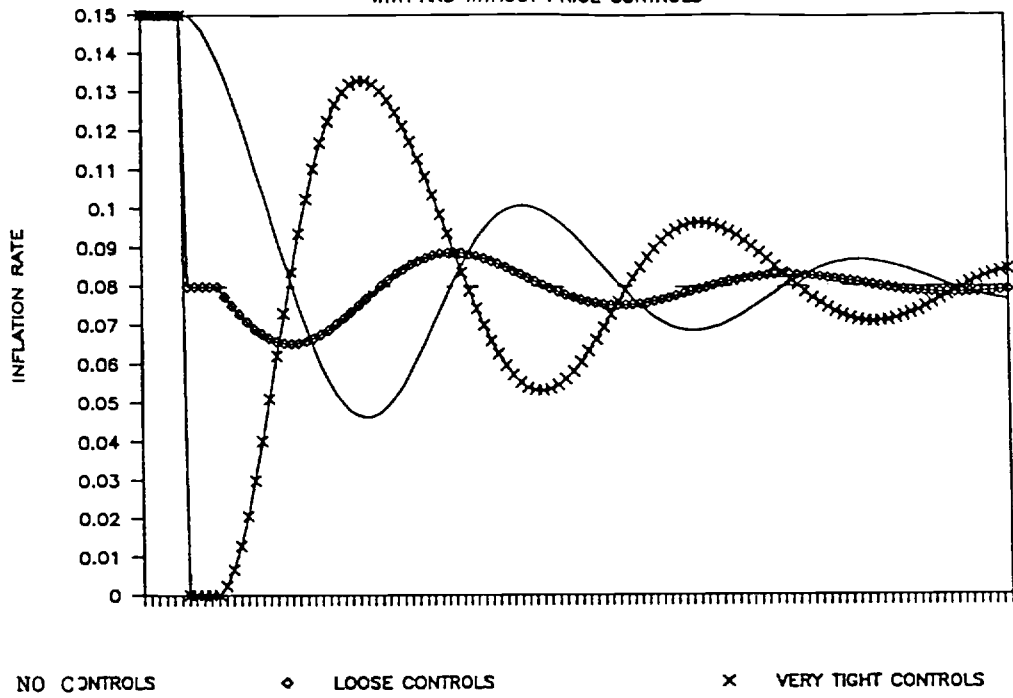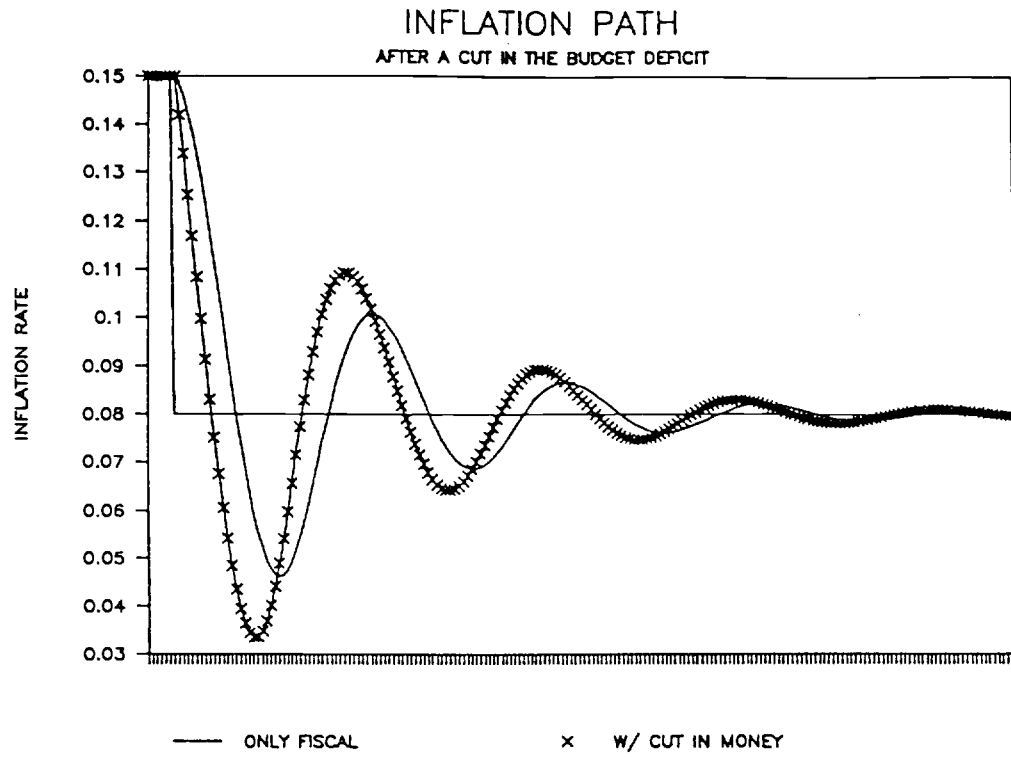
FIGURE   7

PATH OF REAL CASH BALANCES

AFTER AN INCREASE IN THE MONEY STOCK

—— NO PRICE CONTROLS   ◇   WITH CONTROLS
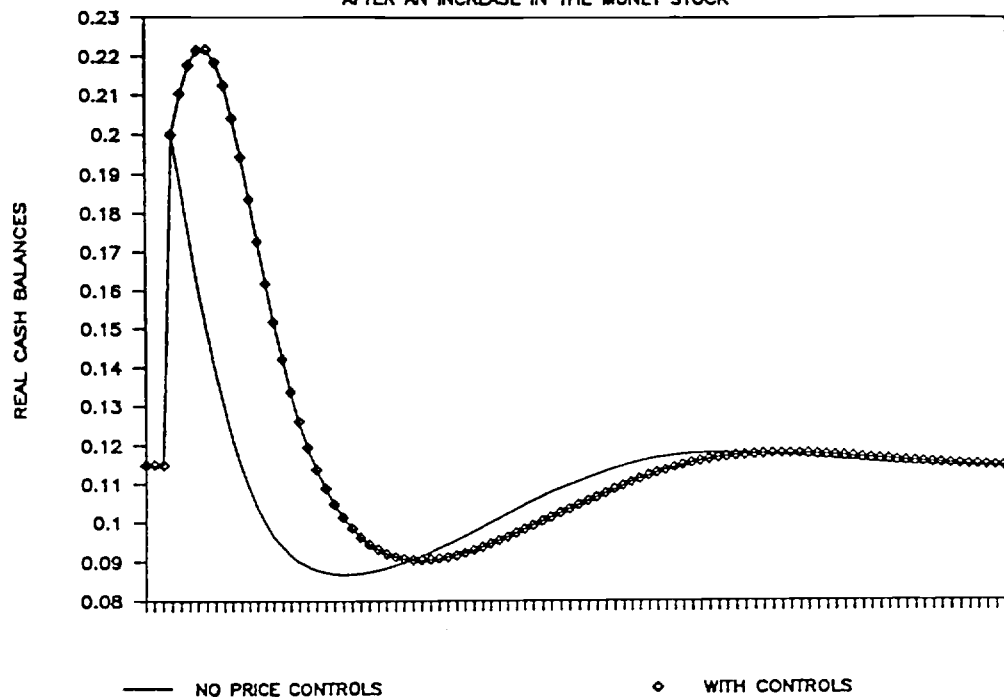
FIGURE   8

REAL MONEY (M1)
BRAZIL: JAN.1970 – MAY 1989
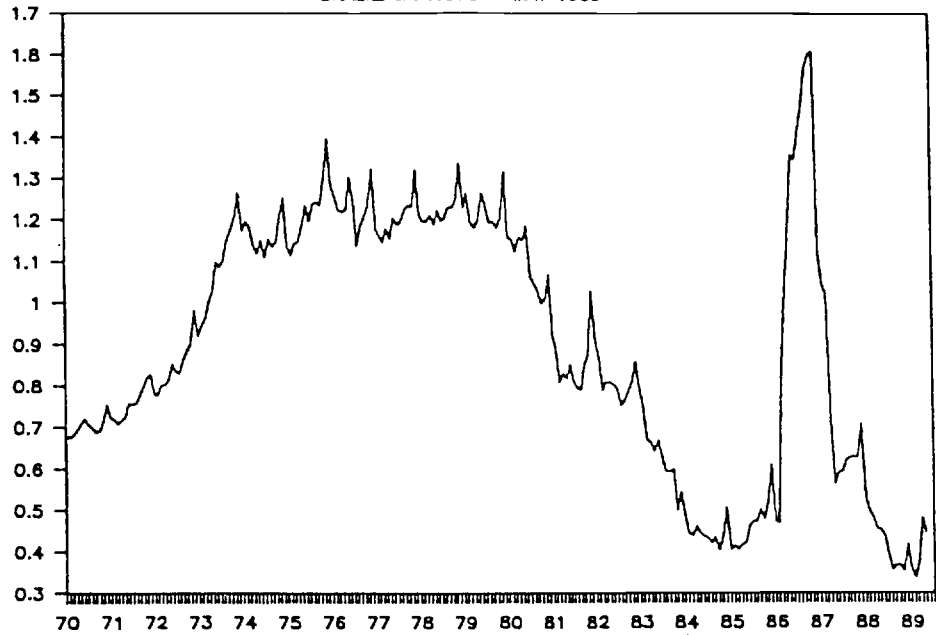
SOURCE: Conjuntura Economica

FIGURE   9

FIGURE   10

FIGURE   11

REAL INTEREST RATES
ACCUMULATED PAST 12 MONTHS
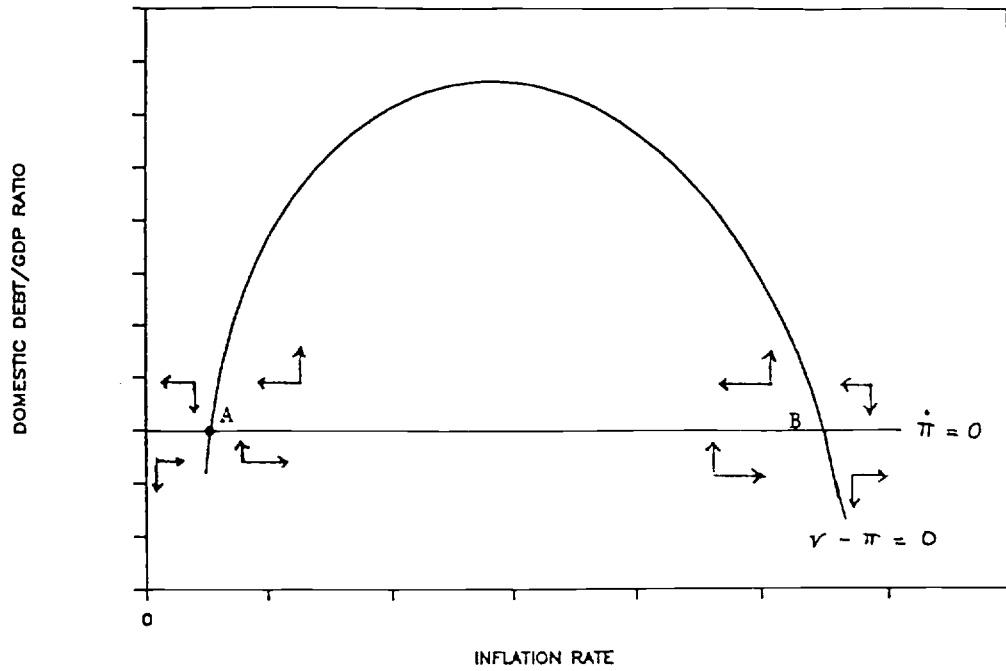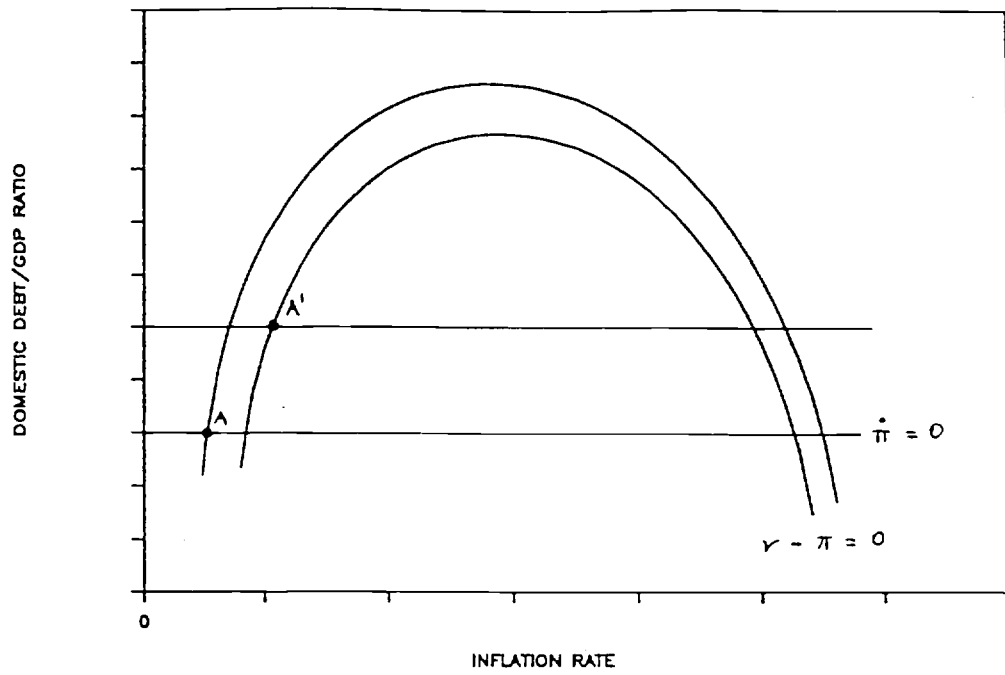
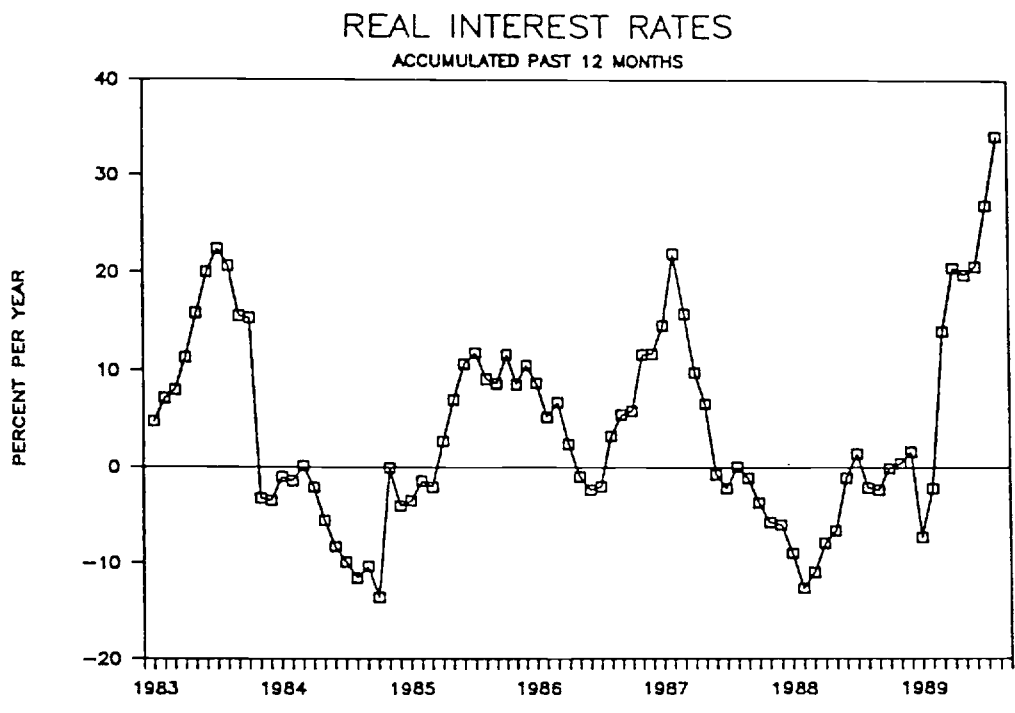

The interest rate is the overnight rate published by Andima, <u>Sinopse</u>

<u>Mensal</u>.

FIGURE   12