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Stabilization in Brazil

Introduction

Following the collapse of the Plan Collor I in December 1990, Brazil entered a path of high inflation from which it still has not come out in mid-1994. Accelerating inflation, demonetization and persistent indexation were the basic monetary developments of the period. On the fiscal side attempts were made, with some success, at controlling public sector deficits. Operational results were substantially improved starting in 1990 and have kept improving since then. Attainment of operational surpluses was made difficult due to the positive and raising real interest rates that generated a high burden on the significant amounts of outstanding public debt.

Inflation was only temporarily reduced during the first few months of the Collor I stabilization attempt that froze a large fraction of bank's deposits. As the time for the repayment of the frozen deposits approached, inflation gradually accelerated again, rising from less than 10% monthly at the beginning of 1991 to close to 50% monthly by 1994.
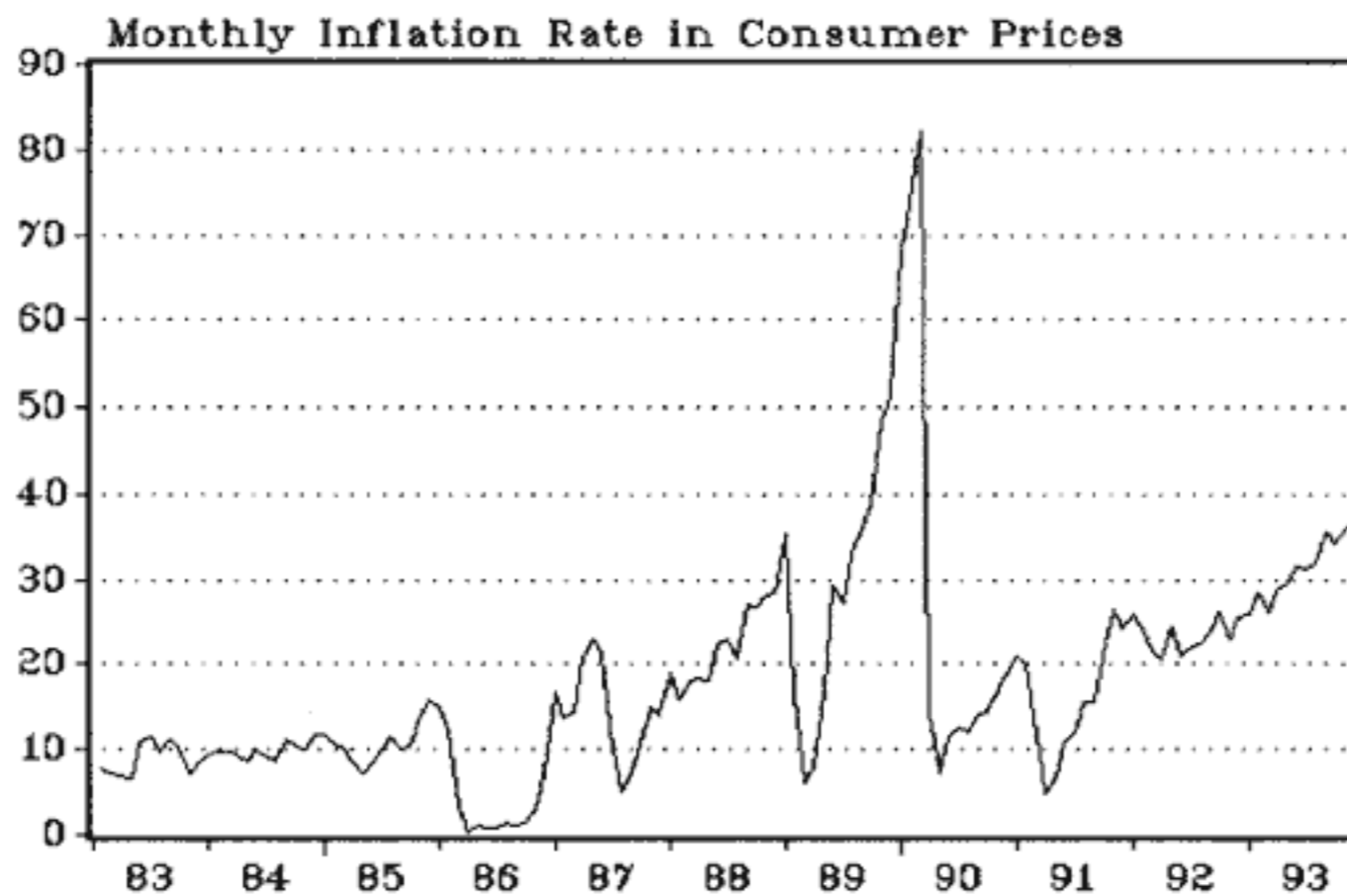

Figure 1

The Central Bank followed a nominal exchange rate policy that aimed at keeping the real exchange rate relatively constant, a fact that, coupled with fiscal improvements, helped to generate large trade surpluses. Lower interest rates in the US also helped the external sector by reducing the burden on the external debt and inviting capital inflows.

External sector surpluses coupled with the policy of keeping a relatively constant real exchange rate, made any attempt at controlling inflation quite difficult. The Central Bank was forced to devalue at rates similar to inflation at the same time that it monetized the large reserve inflows from the external sector. High inflation generated the inflation tax required to purchase the growth in international reserves.

The External Sector and Inflation.

On the external front, monetary authorities instrumented an unannounced pegging of the real exchange rate. This was achieved by devaluing in proportion to internal inflation. Such policy forced authorities to purchase all the foreign exchange offered at the announced exchange rate and implied a de facto endogeneity of the money supply, leaving the inflation level basically undetermined. To counteract for the expansionary effect of purchases of foreign exchange, authorities resorted to some capital controls and sterilization by issuing Central Bank paper. International Reserves rose steadily during the period, from 7.3 billion in January 1993 to 27 billion by October 1993. By March 1994, they stay around 32 billion. The accumulation of Reserves became the primary source of monetary expansion in 1993, a tendency that still continues in 1994.

The contribution of the external sector to monetary expansion has gradually increased in recent years and may be announcing the need for a correction in the level of the real exchange rate that has been kept practically unchanged since 1990. In 1990, the external sector explained only 30.7% of the increase in the monetary base. In 1991 that contribution was raised to 53% of the change in the Base. In 1992 and 1993, fueled by the revival in capital inflows, the external sector raised its participation in the growth of the Base to 73% and 112.9% respectively.

Table 1

	FACTORS DETERMINING THE GROWTH IN MONETARY BASE (Million NCr.)					
	Treasury (1)	Public Debt (2)	External Sector (3)	Other (4)	Monetary Base (5)	Contribution External Sector (6)=(3)/(5)
1990	159.9	770.9	477.1	145.9	1553.8	30.7%
1991	-307	-966	2470.2	3523.7	4720.9	52.3%
1992	-17467	-90	45867	34558	62868	73.0%
1993	-85014	95380	1526081	-184651	1351796	112.9%

During 1992, the external sector improved significantly. The Current Account was favored by a sharp raise in the Trade Surplus (over 50% relative to 1991) and a fall in the interest burden due to the reduction in dollar rates as a consequence of the Federal Reserve policy. The lower world interest rates also incentivated capital inflows. Foreign capital entered Brazil at rates never experienced in the last decade: the net capital inflow was 10 billion dollars in 1992 versus less than a billion one year before.

The combined result of tendencies for improved Trade, Service and Capital accounts could have resulted in a significant real appreciation of the Cruzeiro. However, monetary authorities preferred to keep unchanged the real exchange rate and to accumulate reserves instead. Reserves of the Central Bank raised by 15 billion dollars in 1992, an amount equivalent to 3.7% of GDP.
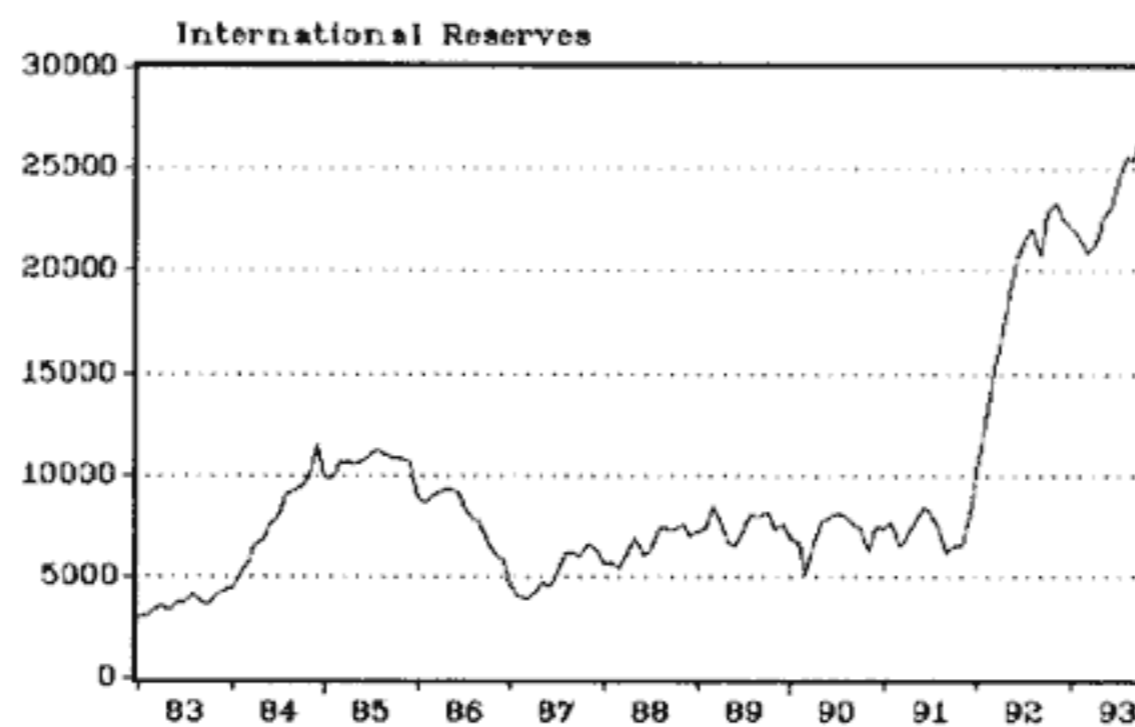

Figure 2

While some degree of capital controls have persisted after 1990, significant liberalization was done in the currency market, so that the black market premium that had prevailed up to 1990 was practically eliminated. This fact can be appreciated in Figure 3, showing the real exchange rates evaluated at both the official and black market rates. It is also clear from Figure 3 that from 1991 onwards, the official real exchange rate starts a trend that keeps it practically constant over time.

In recent years, monetary authorities in Brazil have allowed for much less variability in the real exchange rate than many of its neighbors that suffered similar types of severe monetary disturbances, like Peru or Argentina. Such result may have been due to the fact that predictability of key macroeconomic variables is one of the essential ingredients of policy in Brazil, to the extent that authorities repeatedly adhere to the "no shocks" policy.

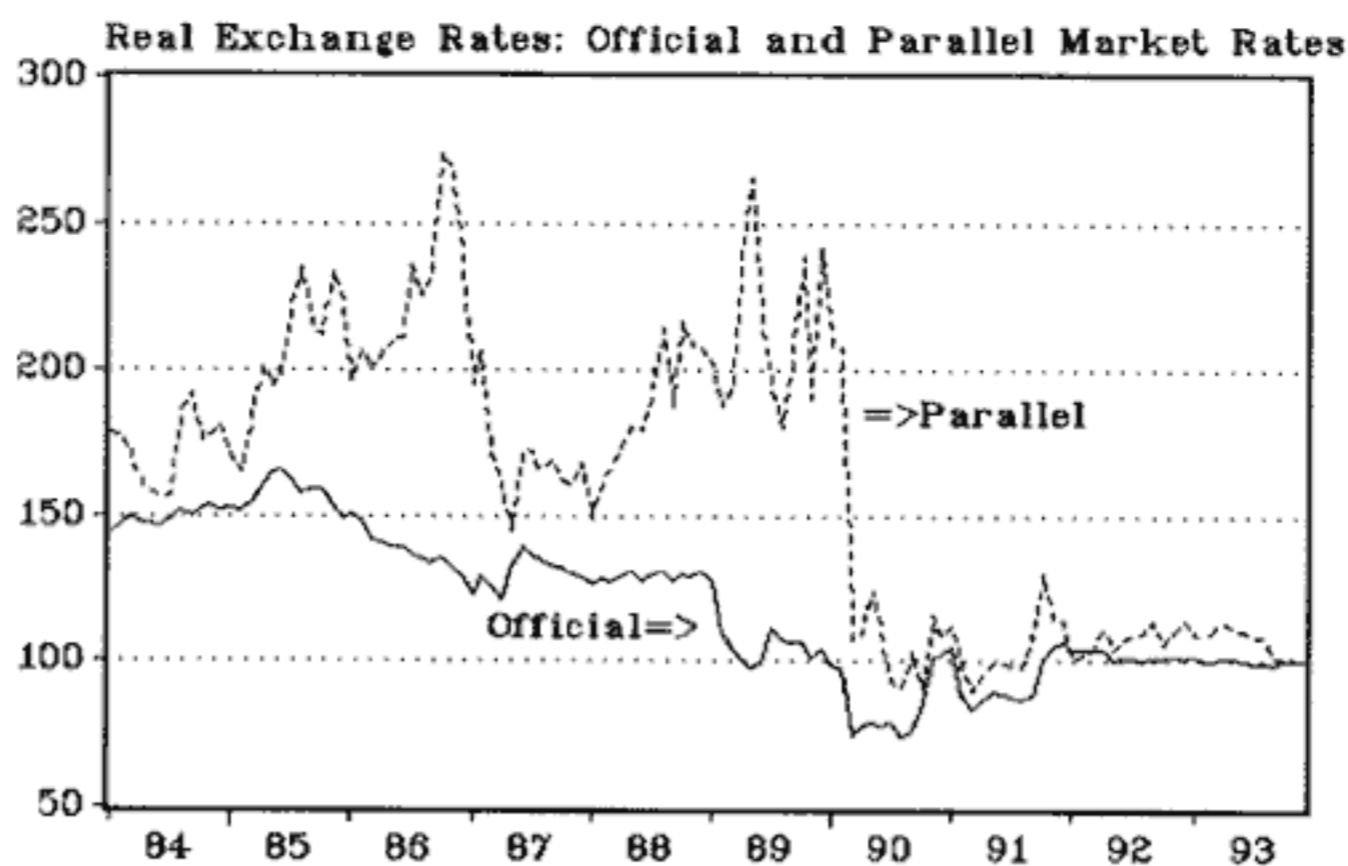Real Exchange Rates: Official and Parallel Market Rates

Figure 3

Nevertheless, the real exchange rate of Brazil has experienced a secular negative trend that has reduced its level to about two thirds of the level it had a decade ago. Table 2 shows the bi-annual values of the real exchange rate for commercial transactions (computed using the ratio of consumer prices for Brazil and USA and the commercial exchange rate) and the within period variance for the 24 monthly observations. The real exchange rate declined almost continuously from 1984 until it made bottom in 1990-91.

The coefficient of variation of the monthly values of real exchange rates increased in each 24-month period between 1984 and 1991, from 3.9% in 1984-85 up to 11.8% in 1990-91. In 1992-93 there was a significant policy change as the real exchange rate reversed the downward trend, raising by 13% with respect to the previous two years, while the coefficient of variation of the monthly observations was reduced to only 1.6%. It is clear from the above evidence that the real exchange rate practically stood constant during the two year period 1991-1992.

Table 2

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Real Exchange Rate
(From monthly values)

	Average Value	Stand.Dev.	C.of Var
1984-85	153	5.9	3.9%
1986-87	134	7.1	5.3%
1988-89	117	12.6	10.7%
1990-91	89	11.8	11.8%
1991-92	101	1.6	1.6%

Note: The RER is computed vs. the USA using consumer prices and the commercial exchange rate.

The policy of the monetary authorities of keeping the real exchange rate practically constant may have implication for the inflationary outcome through the effects that this policy has on the rate of monetary expansion. If we denote by **e** to the real exchange rate and by **T(e)** to the Current Account surplus as a positive function of the real exchange rate, and by **KI** to the rate of capital inflow, one can express the rate of reserve purchases by the Central bank as the sum of this last two components:

(1) ΔReserves = T(e) + KI

The Monetary Base(**B**) will expand by the value of the purchases of Reserves and contract to the extent that the Treasury generates a surplus in the form of increased deposits at the Central Bank (**Fiscal Surplus = FS**):

(2) ΔBase = E * [T(e) + KI] - Fiscal Surplus

Define GDP as nominal income, V as the velocity of the Base (**V= GDP/Base**), **r** to the ratio of reserves purchases to GDP [**r = E.T(e)+KI**] and **f** to the ratio of the fiscal surplus to GDP (**f=FS/GDP**).

Using the above definitions, the monthly rate of change in the Base can be expressed as:

(3) $\Delta B/B = V \cdot (r - f)$,

where V, r and f refer to the ratios in relation to the monthly GDP: Monthly velocity is about 1/12th annual velocity, while r and f have the same value as the annual ratios since they are dimensionless (formally, expression (3) is an approximation to the continuous time rate of change in the Base; using daily data would yield an even better approximation. For large numbers, such as in the case of Brazil, this expression would grossly underestimate annual inflation if used with annual data).

Expression (3) determines the rate of expansion of the monetary base as equal to velocity times the difference between reserve purchases and the fiscal surplus, both expressed as ratios to GDP. The annual velocity of the base takes a value of around 170, so that the monthly velocity is about 1/12th, or 14. If authorities are able to reach the objective of an operational balance, the monthly expansion of the base will equal 14 times the rate of reserve purchases. For example, reserve purchases of 4% of GDP (they were 3.7% in 1992) would imply a rate of expansion of the Base of 56% per month (with B= 2.4 billion dollars and reserve purchases of 1.34 billion dollars per month, the monthly rate of expansion is 56%). A monthly rate of expansion of the Base of 56% is equivalent to an annual rate of expansion of more than 20,000%, a value that will certainly result in terminal hyperinflation.

From the above presentation it can be concluded that it will be very difficult to continue devoting the inflationary tax to the purchase of international reserves to the tone of 3-4% of GDP a year. **Reduction in the rate of reserve purchases requires either:**

(i) a deterioration in the Current account surplus(which would require a fall in the real exchange rate or an increase in external debt service) or

(ii) a reduction in the rate of capital inflows.

On the other hand, reserve purchases may not have an inflationary impact if a compensatory fiscal surplus is generated, so that reserves are purchased with genuine fiscal resources and not through the use of the inflation tax.

Interest Rates, Stabilization and Fiscal Balance

Capital inflows failed in bringing down domestic real interest rates to world levels. Uncertainties about the refinancing of the external debt, the raising inflation and the very high level of internal public debt kept real interest rates at very high levels. The real interest rate paid on overnight operations in the financial market was 10.6% annual during 1991, 32.1% in 1992 and 20.1% in 1993.
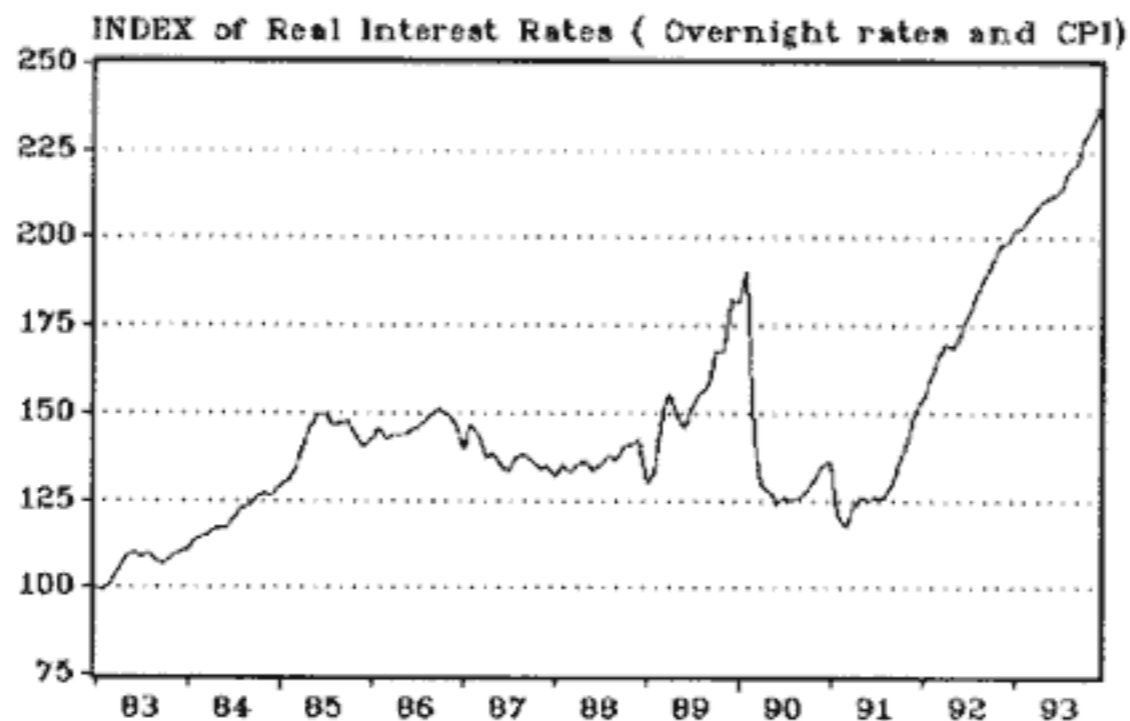

Figure 4

Figure 4 shows the behavior of a real interest index, computed using the overnight money market rate and CHI inflation. The index is computed according to the formula:

$$INDEX(t) = INDEX(t-1)*[1+R(t)],$$

where $R(t)$ is the real interest rate.

It can be observed in Figure 4 the meltdown of debt that took place as a consequence of the hyperinflation that lead to the Collor I plan. The high and raising inflation rates generated negative real interest rates that accumulated into a negative effect of about 30% over the first quarter of 1990. **Such loss in earnings was quickly recuperated by the raise in real interest rates that took place after 1991.**

The level of real interest rates is a crucial determining factor of the fiscal outcome of any stabilization attempt, since the public sector is by far the most significant debtor in Brazil. High interest rates may mean tight money at present, but they may also be an indicator of easy money in the near future as the burden of the internal public debt raises, thus implying that more money will be issued to service the debt in the absence of additional fiscal tightening.

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The relation between monetary tightness and fiscal imbalances was one of the crucial factors in determining the collapse of the Argentine currency during the hyperinflation of 1989. In this experience, stabilization was only obtained after the significant meltdown of the public debt that was generated by the hyperinflation and further helped by the mandatory refinancing established by Decree in January 1990.

Both the service of internal debt and reserve accumulation are important factors in determining the inflationary outcome in Brazil. While debt service or capital inflows may be small when measured in relation to GDP, they are unreasonable high when measured in relation to the size of the Monetary Base, whose rate of expansion is the most significant sustainable factor in the determination of inflation.

The sustainability of inflation requires the monetary base to increase at rates consistent with the ongoing inflationary process. On November 1994, the monetary base was equivalent to 2.4 billion dollars, only 6/10th of 1% of GDP. From this perspective, numbers that seem to be small in relation to GDP may be quite significant in relation to their impact on the inflationary process. For example, in November 1994, the outstanding stock of Central Bank Bonds in the market stood at a value equivalent to 4.2 times the monetary base. With a real interest rate of 20%, this means that the service of the real burden of the Central Bank debt stays already at 84% of the real value of its non-interest earning monetary base. Such numbers are highly significant for an institution that normally produces no cash revenues (most of the revenue of the Central Bank takes place in the form of accruals on its holdings of Treasury Bonds; such accruals have little chance of ever being paid as the Treasury does not have the required surpluses to rescue its outstanding debt with the Central Bank).

A common phenomenon in Latinamerica is the sharp raise in interest rates observed during the initial months of successful stabilization experiences. Figures 5-8 report the dollar equivalent interest rates that prevailed in the local financial markets of four well known experiences of stabilization in Latinamerica: Argentina after 1991, Bolivia in 1985, Mexico in 1987 and Peru in 1990. The rates shown are the borrowing and lending rates in local currency in the banking system corrected by the actual rate of devaluation. All rates reported are therefore expressed in dollar terms, although they correspond to lending operations in local currency. The existence of a common pattern to interest rates after the stabilization is evident from all four cases. In all cases interest rates raise sharply at the start of the stabilization and fall very gradually to their long run levels in a process that takes between one and two years.

Table 3 shows the behavior of the dollar equivalent interest rates in the four stabilization at selected intervals after the stabilization started.
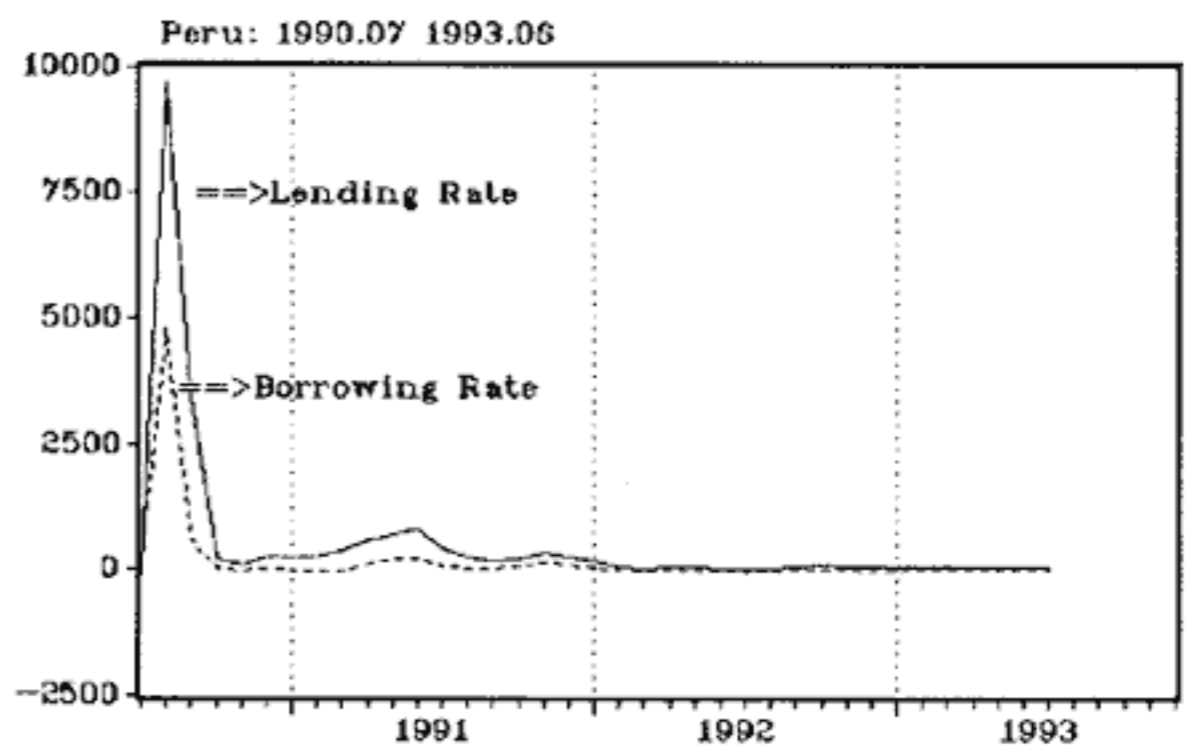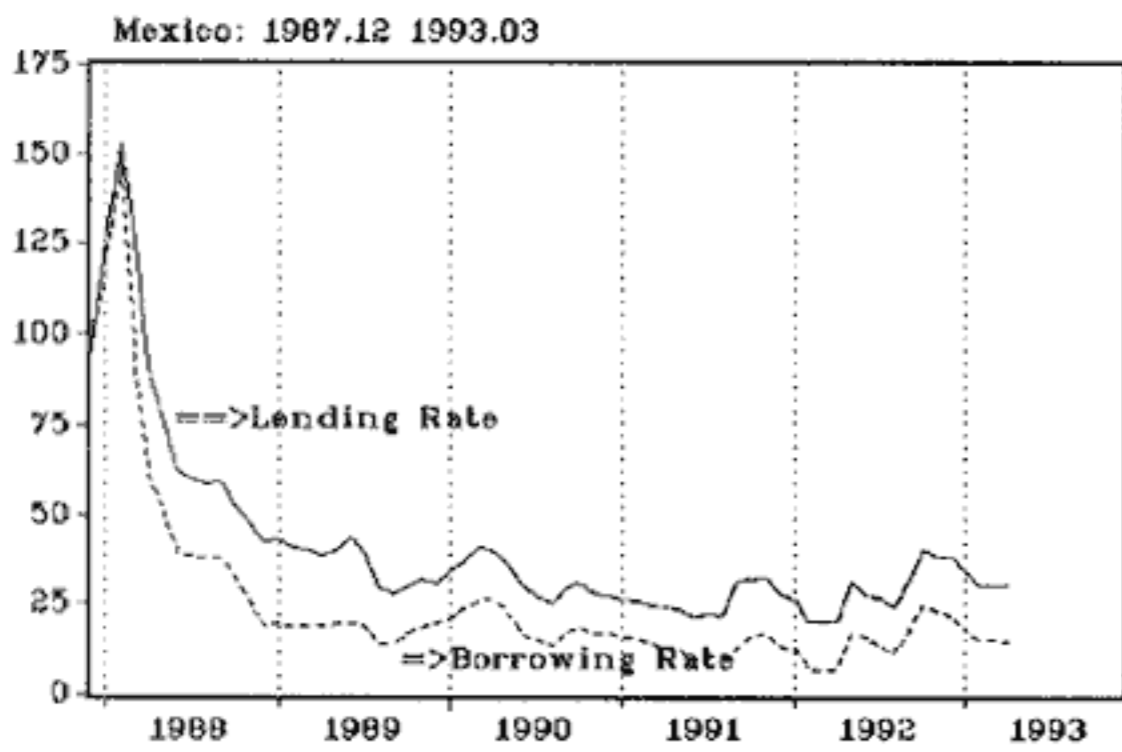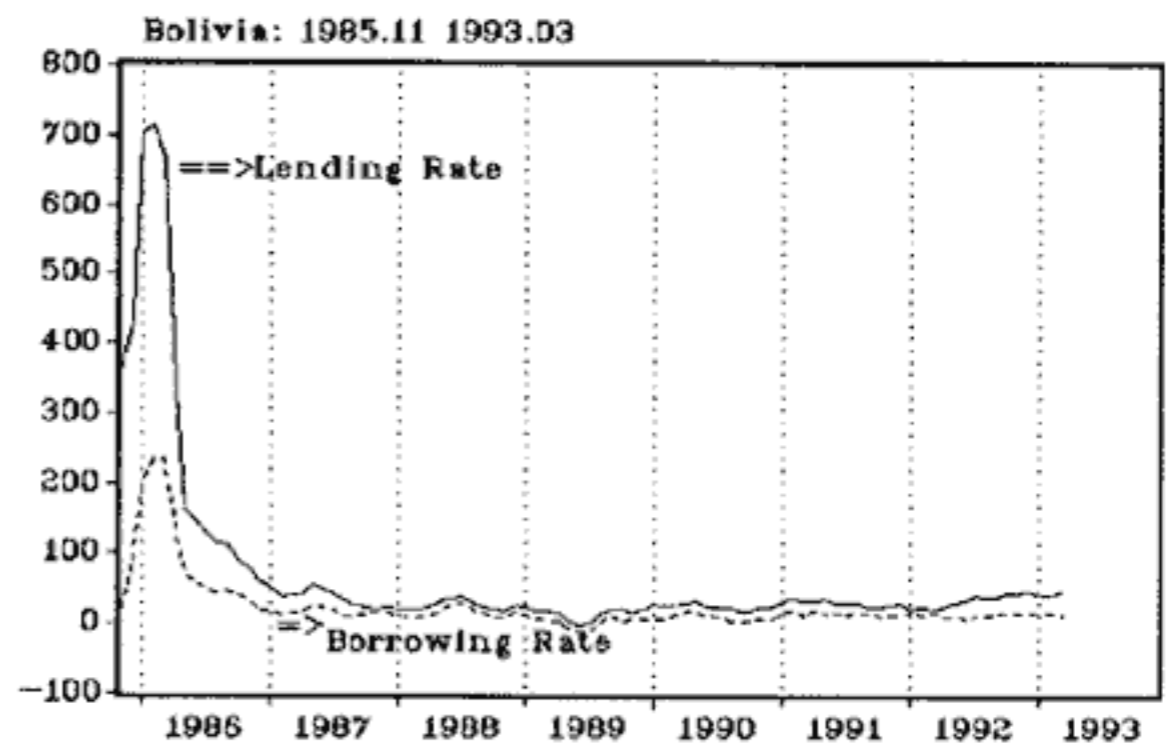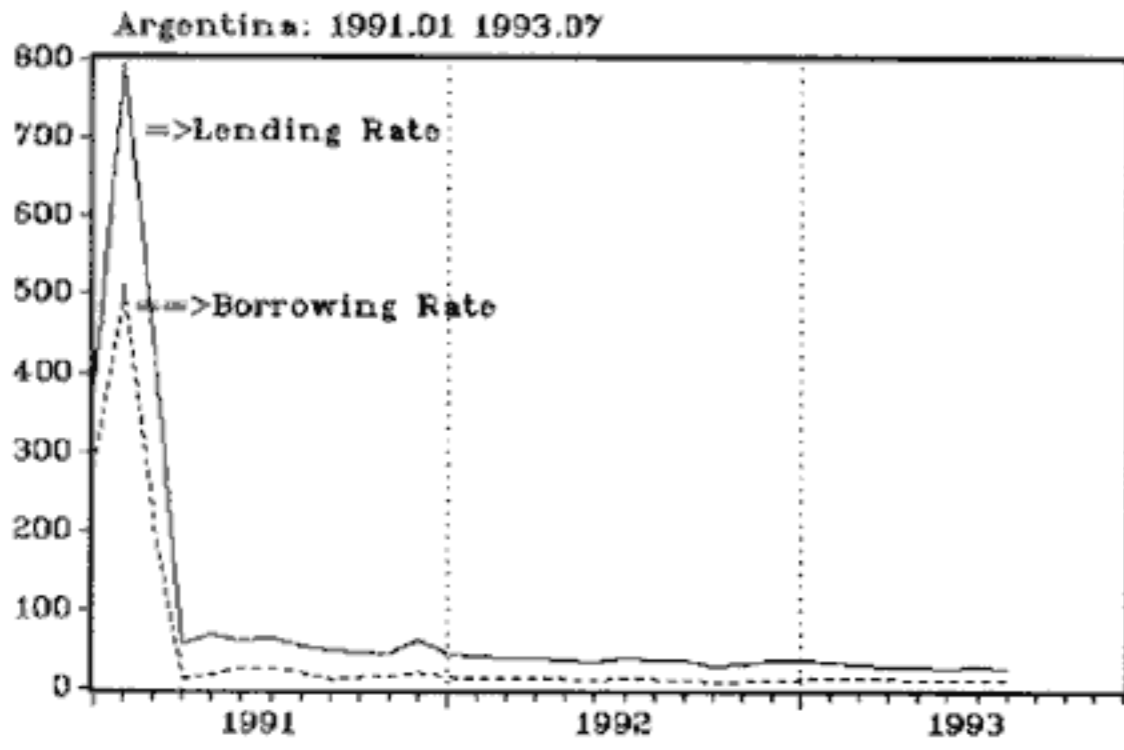
Table 3

Dollar Equivalent Lending Interest Rates After Stabilization				
	Argentina	Bolivia	Mexico	Peru
1st.Six Mo.	57.2	535.9	111.4	2231.3
2nd.Six Mo.	44.7	124.9	56.4	514.4
3rd.Six Mo.	34.9	60.2	40.8	215.1
4rd.Six.Mo.	32.3	38.2	33.5	27.1
5th.Six.Mo.	26.3	21.0	36.4	56.8

In evaluating the data in Table 3 it should be considered that both Argentina and Mexico instrumented their stabilization with a fixed exchange rate, while Bolivia and Peru resorted to Floating or crawling peg. It is clear that the two cases with fixed exchange rates experienced substantially lower interest rates than in the other two cases where exchange rate flexibility was used.

It can also be appreciated that interest rates take a long time to fall to their normal post-stabilization levels. In general, the four experiences shown in Table 3 indicate that interest rates take about 24 months to fall back to normal levels after the successful stabilization is implemented.

Figures 5-8
Borrowing and Lending Ex-Post Dollar Interest Rates After Stabilization

Argentina: 1991.01 1993.07
=>Lending Rate
=>Borrowing Rate

Bolivia: 1985.11 1993.03
==>Lending Rate
=>Borrowing Rate

Mexico: 1987.12 1993.03
==>Lending Rate
=>Borrowing Rate

Peru: 1990.07 1993.06
==>Lending Rate
==>Borrowing Rate

The level of interest rates is crucial in any stabilization attempt to be adopted in Brazil, particularly in light of the large outstanding public sector debt whose service may affect fiscal balance and therefore the stabilization process itself. In designing a stabilization strategy, the above discussion seems to suggest that **fixed exchange rate would have a smaller effect on interest rates and therefore would be more suited to a situation where there the fiscal balance is a constraint, as it is likely to be.**

Monetary Developments and the Inflation Tax

Since 1990, real M shows a clear downward trend consistent with the high inflation rates being experienced. As shown in Figure 9, from a level of 100 in 1993.01, real M1 fell to only 35 in 1993.01. The Figure 9 also shows the sharp increase in real M1 that took place during the short lived Cruzado Plan in 1986-87. The monetization that occurred then was due to the simultaneous implementation of price controls and monetary financing of deficits that created an unsustainable situation. The collapse of the Cruzado Plan set the pace for the spiraling inflation that has affected the country since then.
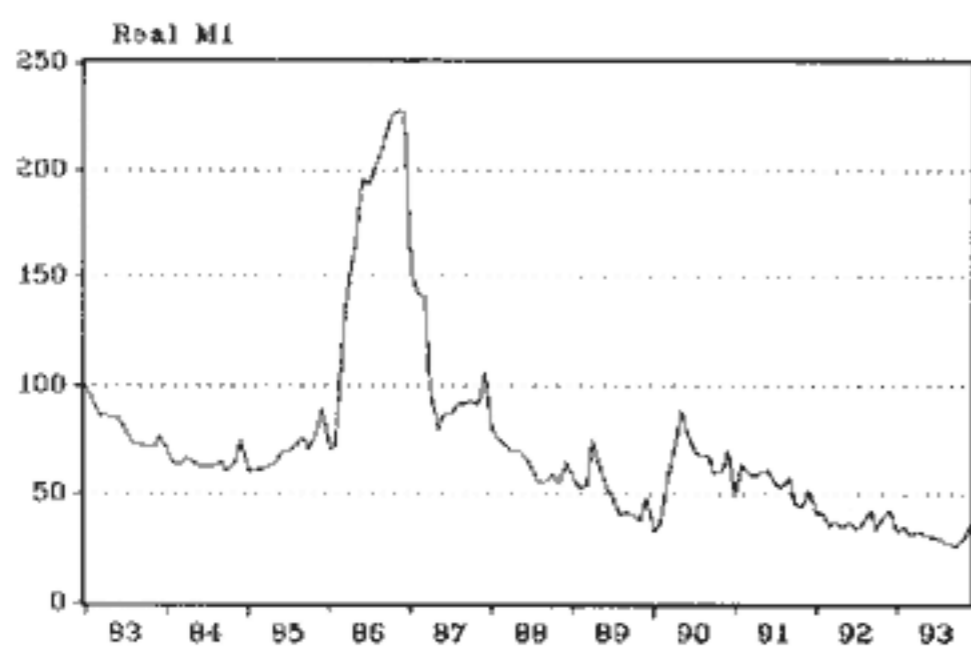
Figure 9
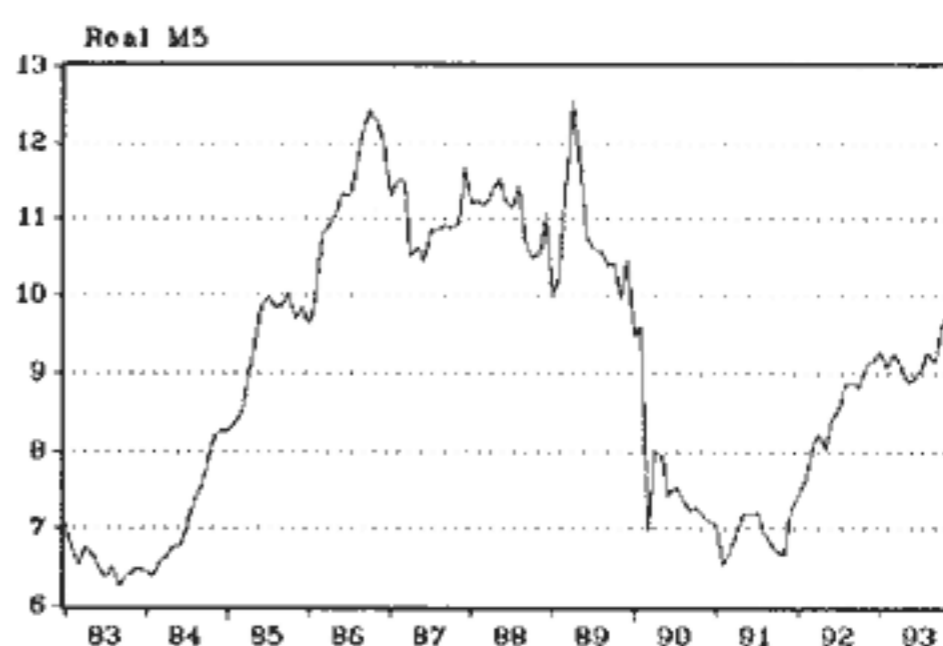
Figure 10

Contrary to the non-interest earning M1, the interest earning monetary aggregates have shown spectacular rates of growth even during the high inflation periods. The high real interest rates that have prevailed thanks to the indexation of financial operations have allowed for a large increase in the aggregate M5, after the deep fall it took during the freezing stage of the Collor Plan. As shown in Figure 10, during 1992 alone, real M5 increased by xx% , helped by annual real interest rates in the order of 32% for overnight money market instruments.

It should be mentioned that most of M5 consists of obligations of a maturity of less than 30 days. This short maturity makes the aggregate M5 highly liquid so that it practically performs the role of money. In fact, banks and financial institutions normally will transfer automatically funds from the interest earning accounts to the checking account of the customer at the time a check is presented. From the perspective of providing monetary services, therefore, M5 behaves just as M1. In consequence, we can say that in Brazil, money pays interest. Of course, much of the counterpart of the liabilities of M5 are holdings of Government Bonds by the financial institutions. The interest on these bonds is normally paid by issuing more bonds that become the collateral for the issuance of more M5. Therefore, in Brazil money pays interest by means of printing more money. Such behavior is highly unstable and can easily end up in hyperinflation as soon as there is any need to obtain any inflationary revenues for an additional purpose (For a discussion of this issue see Rodriguez, C.A. "Comments" in Inflation and Stabilization, edited by Bruno, Dornbusch, Di Tella and Fischer, MIT Press 1988).

Since monetary authorities only have direct control over the monetary base, not over higher monetary aggregates, it is of importance to notice that the real demand for base has consistently fallen in recent years, probably as a consequence of the high inflation and financial deepening that allowed for the creation of very liquid financial assets that did not require the use of base as reserves.

The ratio of the monetary base to GDP has fallen to levels of less than 1% while the base stands at only 3.5% of M5 as of late 1993 -as shown in Figure 11. With such small ratios between base and other monetary aggregates, it is very difficult, if not impossible, to attempt any direct control of the base since this may be offset by relatively larger variations in international reserves (which were 12 times the size of the base by 1993) or in the demand for the outstanding Central Bank bonds (which were 4 times the size of the base by November 1993).

The smallness of the monetary base does not imply that the inflation tax collected has been negligible: due to the high inflation rate prevailing, the public may be forced to acquire several times during the year the same amount of real holdings of monetary base. On the other hand, the inflationary process may start with a high initial level for the Base: in consequence, the initial inflation tax is relatively high and it is only reduced slowly as the public decreases its demand for the real monetary base.
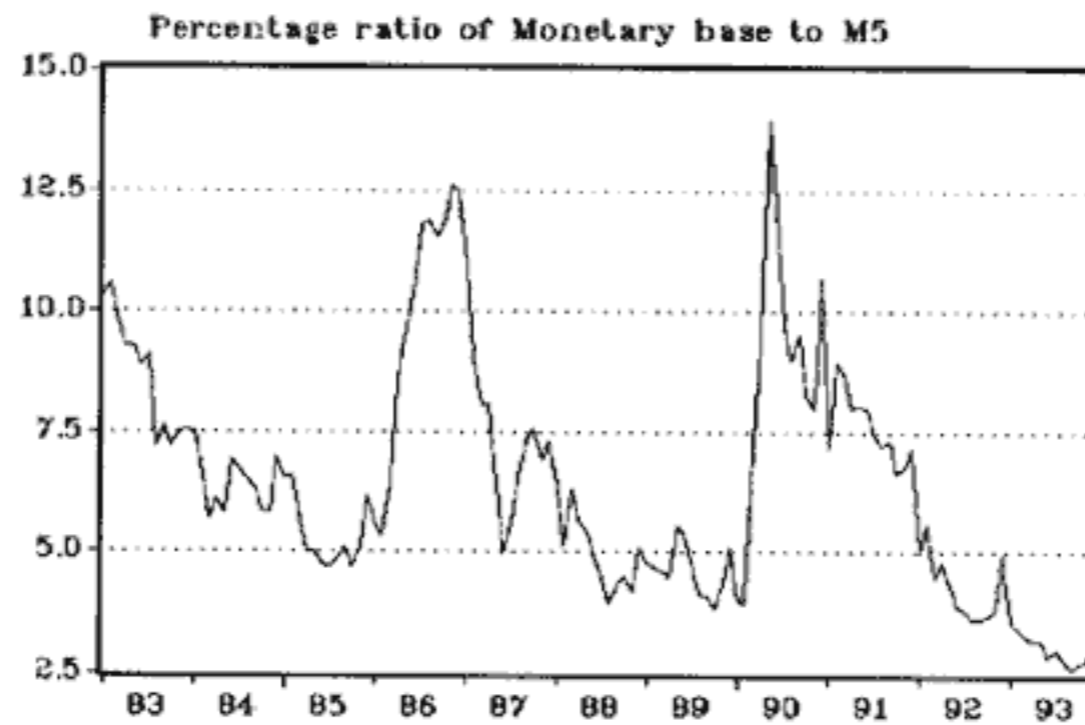
Percentage ratio of Monetary base to M5

Figure 11

The revenue from the inflation tax is usually defined as the increase per unit of time in the nominal monetary base divided by the price level at the same instant. If it is desired to measure the inflation tax in terms of dollars, the nominal increase in Base should be divided by the nominal price of the dollar. Thus, the dollar -equivalent inflation tax collection per unit of time is computed as:

Inflation Tax(t)= Increase in Base(t+1,t)/Exchange Rate(t)

Table 4 presents annual estimates of the dollar equivalent of the collections from the inflation tax. The annual values are obtained by calculating the monthly dollar collections and adding over the 12 months of the year.

The dollar value of the monthly issues of monetary base during 1992, added for the whole year, yielded a revenue of $ 8222 million dollars and in 1993 this value for the inflation tax reached $ 10300 million dollars, or 4 times the value of the monetary base.

In 1991, during the implementation of the Collor II plan, the Central Bank issued enough base to collect an amount equivalent to $ 24 billion dollars in revenue. This large increase in tax revenue did not immediately generate a hyperinflation due to the freeze on prices and wages that was initially implemented as well as several measures of financial repression that forced the increased nominal expansion in Base to be temporarily absorbed by the market. By mid-1991 the effects of the previous monetary expansion were felt in the form of a higher inflation that persisted until present.

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Table 4

COLLECTIONS FROM THE INFLATION TAX		
INFLATION TAX (Millions of us$)	INFLATION RATE (Dec/Dec)	BASE TO GDP RATIO (June Values)
1984 2155	207%	1.57%
1985 4247	239%	1.28%
1986 4343	59%	3.28%
1987 9622	395%	1.47%
1988 5818	994%	1.05%
1989 8720	1863%	0.80%
1990 15275	1314%	2.56%
1991 24504	585%	1.50%
1992 8722	1149%	0.75%
1993 10300	2489%	0.42%

The high rates of inflation have eroded the real value of the monetary base that the market will demand. The negative relation between the demand for monetary base and the inflation rate is evident from the data in Table 4. As shown there, during the last decade the ratio of the Base to GDP has exceeded 2% only in 1986 and 1990, the initial years of the two most significant stabilization attempts taken (Plans Cruzado and Collor I). In both cases, inflation initially was significantly reduced and as a consequence the demand for Monetary Base did increase.

The important reduction observed in the ratio of the Base to GDP is most significant in determining the sustainability of the ongoing fiscal and real exchange rate policies. The Central Bank policy of keeping constant the real exchange rate by purchasing international reserves with new issues of monetary base is sustainable only to the extent that the rate of monetary expansion does not generate hyperinflation The other viable alternative open is for the proceedings for the reserve purchases to come from a fiscal surplus.

The above points can be made more evident by recalling expression (3), reproduced below, which establishes the algebraic relation between the monthly rate of expansion of the Monetary Base (the determinant of inflation), reserve purchases and the fiscal deficit (or surplus):

Monthly expansion in Base =
            = Monthly Velocity * (Reserve Purchases - Surplus)

        With the Base reduced to only 7.2% of monthly GDP,
any 1% of fiscal imbalance results in almost 14 points of monthly
expansion in the Base. At the present level of low monetization,
therefore, a relatively small rate of fiscal imbalance or of
reserve purchases may result in rates of expansion in the
monetary aggregates that quickly lead into hyperinflation. With
2% reserve accumulation and 2% fiscal imbalance, the annual rate
of expansion in the Base would exceed 20,000%.

Inflation and the Fiscal Process

        Brazil has taken significant steps towards fiscal
adjustment following the implementation of the Collor I Plan in
1990. In 1989 the Consolidated Non-Financial Public Sector
(CNFPS) showed a primary deficit of 0.9% of GDP and an
operational deficit of 6.9% of GDP. Since in that year the
Monetary Base was only 1.47% of GDP, it is clear that full
inflationary financing of such deficit would have destroyed the
monetary system. The deficit was financed partly with debt, also
with arrears, and finally with money, yielding and inflation rate
of 1800% for the year.

        By 1990, controlling inflation required not
only the reduction in the deficit but also some measure regarding
the spiraling quasi-fiscal deficit resulting from the service of
the public debt.   The stabilization strategy that was then
implemented not only did enforce significant fiscal adjustment on
both the revenue and expenditures fronts, but also implemented a
temporary freeze on financial instruments in order to reduce the
burden of the service of the public debt. The fiscal adjustment
of 1990 yielded a primary surplus of 4.6% of GDP and operational
surplus of 1.3% of GDP (an improvement of 8.2% of GDP over the
previous year).

        Figure 12 shows the magnitude of the fiscal
adjustment adopted after 1990 by plotting the monthly dollar
value of the deficit of the National Treasury on a cash basis.
While in the last months of 1989 the deficit was running at a
rate of about 3 billion dollars monthly, the public finances
improved substantially in the first semester of 1990 with the
deficit turning into a surplus exceeding 2 billion dollars for
the first few months.

After the initial effort at generating a cash
surplus, the result was that the budget remained roughly
equilibrated during all remaining months until mid-1992. This
result was due mainly to a strict cash management of the
Treasury, allowing disbursements only on the basis those funds
that were already available. However, such a behavior could not
be maintained for long, and since mid-1992 the Treasury balance
has shown a tendency towards larger deficits and greater
oscillations in the monthly results, a result probably due to
political instability and the resurgence of high inflation (being
both cause and effect as discussed later).

Figure 12

Brazilian authorities and economists (see Bacha
paper) repeatedly claim that inflation has been needed in Brazil
in order to reduce public spending and therefore to balance the
deficit. The implicit assumption in the argument is that
political forces negotiate the level of **nominal** public spending
for the year. After an agreement has been reached on the nominal
budget, increases in the price level would reduce the real level
of spending, the argument goes. However, one might think that
policy makers would present their demands for nominal spending in
the annual budget based on a hypothesis about the expected rate
of inflation. From this perspective, if expected inflation is
higher, the requested nominal spending would also be higher.
Under these circumstances, real spending could only be reduced by
unanticipated increases in the inflation rate.

The above argument points to the existence of a
reverse Olivera-Tanzi effect that, if proven to exist, could be
generating some instability in the dynamic process of adjustment
during stabilization. As a practical matter, authorities have
expressed their preoccupation about the incremental fiscal
spending and fall in revenues that could be induced by a sharp
fall in inflation brought about during the initial stages of
stabilization.

The first point to consider in evaluating this proposition is that the relevant variable for the determination of inflation or international reserve losses of the Central Bank is the overall fiscal deficit and not the real expenditures or revenues individually. It may be possible that a reverse O-T effect exists on real spending, but there could also be a positive effect on real taxes of a reduced inflation rate(the direct O-T effect). The net effect on the deficit of a reduced rate of inflation would thus be ambiguous.

The question of the interrelation between real government spending and inflation is quite relevant for the design of a stabilization policy of the fixed exchange rate type. A fixed exchange rate could initially reduce inflation by fixing the local currency price of internationally traded goods, but if the fiscal deficit increases and requires Central Bank financing, international reserves would be lost and the sustainability of the fixed exchange rate would be imperiled.

Using monthly data for the National Treasury revenues and expenditures on a cash basis, we have tried to determine statistically the relevance of the hypothesis of the reverse Olivera-Tanzi effect. In order to avoid spurious correlations we have worked with first order monthly differences for the inflation rate and real revenues and expenditures.

Our empirical estimates yield support for the existence of both a direct and a reverse Olivera-Tanzi effect. These results are show in Table 5. According to Regression 1, current changes in real spending are negatively associated with lagged changes in the inflation rate (determining causality in the Granger sense). The coefficient of lagged inflation on real spending (in the first differences) is negative significantly different from zero at the 99.9% level.

Real taxes are also negatively associated to inflation, as shown in Regression 2, but both the value of the coefficient and its significance are much lower than for the level of real spending. Since our evidence shows that both spending and taxes depend negatively on inflation, the relation between the deficit (the difference between spending and taxes) and inflation may go either way depending on the relative strength of both effects.

In assessing the causality from inflation to the fiscal deficit we had to correct for first and second order autocorrelation, as depicted by Regression 3. As it turns out, the coefficient of lagged differences in inflation on the changes in the deficit is negative but not significantly different from zero. Our results validate the generalized belief that inflation reduces real public spending, but do not show a significant effect of inflation on the overall fiscal deficit. This result allows for a clear interpretation of relations of causality: inflation depends on monetary policy which finances the fiscal deficit which is due to fiscal policy.

To the extent that the fiscal deficit is financed through the Central Bank issues of monetary base (directly, or indirectly through the accommodation of new issues of federal or state debt in the open market), we will find that the deficit is the fundamental cause of inflation.

The empirical results do yield a very strong causality of the fiscal deficit on inflation. Regression 4 indicates that lagged changes in real deficit affect positively current changes in inflation with a level of significance of 99.99%. Thus, conventional theories about the origins of inflation still seem to be relevant in the case of Brazil. This evidence yields support to the basic monetarist argument that stabilization must initially rely on fiscal adjustment(see Sargent and Wallace on "Some Unpleasant Monetarist Arithmetics"in Monetarism in the UK, Eds. Griffiths and Wood, St.Martin Press, 1984). Such point has been recognized in the current stabilization strategy under Minister Cardoso, based on three differentiated stages, the first of which has been that of fiscal adjustment.

Table 5

Causality relations between inflation and fiscal variables
First Order Differences in Inflation, Real Taxes, Real Expenditure and Deficit from the Treasury on a Cash Basis. Monthly Changes, 1990.01 1992.12

R1) ΔReal Expenditure(t) = -10.85   -   3.60 ΔInflation(t-1)
         (T-Value)   (-0.92)   (-3.7)

    R2 Adj.= 0.26
    D-W. Stat.= 2.15

R2) ΔReal Revenues(t) = - 3.87 - 2.23 ΔInflation(t-1)
         (T-Value)   (-0.26)   (-1.88)

    R2 Adj.=0.067
    D-W.Stat.= 2.20

R3) ΔReal Deficit(t) =   -7.00 - 0.295 ΔInflation(t-1)
         (T-Value)   (-0.77)   (-0.6)
    R2 Adj.= 0.61
    D.W.Stat.= 2.2
    AR(1)= 0.73 (6.2)
    AR(2)= -0.58 (-.5.7)

R4) ΔInflation(t) = 0.227 + 0.122 ΔReal Deficit
         (T-Value)   (0.27)   (9.18)
      R2 Adj.= 0.56
      D.W -Stat.= 1.80

Method of Estimation: Ordinary Least Squares

The Cardoso Stabilization Plan

On December 7, 1993, Minister Enrique Cardoso announced the implementation of an ambitious stabilization plan aiming at the permanent eradication of inflation. The plan was to be implemented in three stages. The first stage consists of fiscal adjustment, the second of the creation of a new indexation unit called URV in terms of which most prices will be stipulated and the third stage will create a new currency with an initial conversion value equal to that of one URV.

First Stage: Fiscal Adjustment.

The package of fiscal adjustment announced on December 7, 1993, was approved by Congress by a Constitutional Amendment. The package creates the Social Emergency Fund which will count with the extra fiscal resources required for the implementation of the stabilization. The resources are authorized on an extraordinary base for a period of two years and basically consist of two types:

(i) A set of temporary taxes, several falling on the financial system, that are expected to yield 2.6 billion dollars, or 6/10th of 1% of GDP.

(ii) Temporary elimination of the mandatory earmarking for 12.9 billion dollars of fiscal revenues. This would allow the Treasury to implement additional reductions in spending.

Through the implementation of the above two measures and the continuation of the strict management of spending on a cash basis, authorities expect to balance the Operational result for the Non-Financial Public Sector during 1994. Crucial to the attainment of this objective is the assumption that the government will be able to service its outstanding internal debt at a real rate of only 15% during 1994. This target interest rate may be difficult to achieve in light of the known experiences from other stabilization in the region that suggest that real rates were substantially higher than 15% during the first 12-24 months.

Second Stage: Unidade Real de Valor (Unit of real value)

On February 27, by a Provisory Measure of the President, the second stage of the stabilization plan was legally implemented. The Measure creates the URV, a new indexation unit that further deepens and consolidates the already existing indexation process in Brazil. Previously, prices and wages were indexed to several price levels that were built by the government or private organizations. The URV is an index of monthly inflation constructed with the three most used price indexes: IPC da FIPE, IPCA-E from the IBGE and the IGP-M from the Getulio Vargas Foundation.

According to Decree 1066 of February 27 1994, the monthly value of the URV change shall lie between the maximum and the minimum values for the three indexes mentioned above. The daily changes in the index will be produced by the Central Bank according to projections for the month. Neither the Decree nor the Medida Provisoria establish any other restriction for the construction of the URV. So far, however, the URV has been constructed using the arithmetic average of the monthly changes in the three indexes, but this methodology is not strictly required by law.

Dollarization of Indexation?

By itself, the URV just provides a simplified and more efficient mechanism for indexation, to the extent of even producing an official daily index. The key difference with the previous indexation mechanisms is that more than being a new index number, the URV has been announced as a unit of value that the public can easily remember and therefore it can set prices in terms of URV's. The initial value of the URV was not set at 100 on a certain date, as it is normally done with most price indexes, but it was rather set equal to the cruzeiro value of one dollar on the initial day. The public thus immediately associated the URV with one dollar. Furthermore, the Central Bank has since then pegged the value of the dollar to the daily cruzeiro value of the URV. Thus, the URV and the dollar continued having the same Cruzeiro value.

It has been widely interpreted that the creation of the URV implied the Dollarization of the Brazilian economy. We believe this is not correct at all. The URV is indexed to Cruzeiro prices by Law, while the Central Bank presently follows the policy of setting the value of the dollar equal to that of the URV. These two distinct policies yield the result that while they are both being followed, the dollar and prices will move in the same amounts. The fact is that the URV is not worth one dollar but rather the other way around: a dollar is worth one URV as long as the Central Bank wishes to keep that parity.

It is important to emphasize that the parity one dollar:one URV is not the result of the Medida Provisoria but the result of a discretionary policy of the Central Bank that could well be reversed in the future. However, this has been the policy that the Central Bank has been following in the last two years: devaluing in proportion to some average inflation, as it is evident from the trajectory of the Real Exchange Rate depicted in Figure 3.

It is therefore clear that the Medida Provisoria creating the URV does not require at all any relationship between the URV and the Dollar. While the market may interpret that the URV equals one dollar, the true is that the URV will always be an average of local prices, while the value of the dollar is set by Central Bank policy. **Any future correction in the level of the real exchange rate will necessarily require that the URV must cease being worth one dollar.**

Nominal Wage Indexation

The Medida Provisoria incorporates other important measures regarding the indexation mechanisms. While it allows for the continuation of the indexation of financial obligations by the interest rate index, it mandates all wages to be converted to URV by March 1, 1994. The explicit form in which wages in Cruzeiros must be converted to URV's has been subject to some controversy.

Before the introduction of the URV, wages were normally set in nominal terms and indexed every four months. An exemption was made if the monthly inflation rate exceeded 10%. In that case, the excess over 10% would be automatically granted while the rest would be recovered at the stipulated four months intervals. It is clear that with a positive inflation rate, the real wage in month 1 will be larger than in month 4 while yielding some stipulated average level for the period. If the inflation rate raises, the initial real level would have to be increased while the final real level will be reduced if the same average for the period is to be maintained. Therefore, we conclude that if the inflation rate is to be reduced, the nominal wage correction required to keep the same average must be less than the accumulated four months inflation.

On the other hand, if indexation were to be continuous (daily) the oscillations in the real wage could be virtually eliminated as the real wage would be set continuously equal to the reference average. It is therefore the case that if the indexation frequency is increased, the nominal wage adjustment must be less than the accumulated nominal devaluation if the same period real average is to be maintained. This is exactly what the Medida Provisoria mandates for the nominal wage adjustments that were due on March 1, the date of the conversion of wages to URV's. Since the shift to URV means more frequent indexation (from quarters to months), the Medida Provisoria stipulates that the nominal wage adjustment at the time of the conversion must bring the real wage to the average value for the previous four months period and not to the peak of the previous indexation.

Third Stage: A New Currency

The third stage of the stabilization program refers to the creation of a strong new currency. There is not much that can be said about this stage since little has been said by authorities: the Minister of the Economy Exposition of Motives No.47 of February 1994 describes the three phases of the stabilization strategy in a total of 76 paragraphs of which only two refer to the third stage.

The official information available indicates that the new currency will be called the Real and that the new coins and bills were being produced by February 1994. Paragraph 72 of the Exposicao de Motivos explicitly indicates that there were at the time no decisions made about the rules for the issuance of the new Real. Authorities have repeatedly indicated that the initial value of the Real will be that of one URV. At that point the Cruzeiro will disappear and all prices set in URV will be converted to Reales on a one to one basis.

Less unanimity was found on the issue about the future monetary or exchange rate policy under which the Real will be issued. All options appeared to be kept open since some of those interviewed mentioned fixing the Real to one dollar, others referred to establishing by Law a rate of monetary expansion, and others talked about a crawling peg as another possibility. It is clear to us that what will be done will depend on the political and economic developments in the few months up to the presidential elections.