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## Capital flows and monetary control under a domestic currency substitution regime: The recent Brazilian experience

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DEPARTAMENTO DE ECONOMIA

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N.º 304

**CAPITAL FLOWS AND MONETARY CONTROL UNDER A  
DOMESTIC CURRENCY SUBSTITUTION REGIME:  
THE RECENT BRAZILIAN EXPERIENCE**

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**CAPITAL FLOWS AND MONETARY CONTROL UNDER A  
DOMESTIC CURRENCY SUBSTITUTION REGIME:  
THE RECENT BRAZILIAN EXPERIENCE**

by

**DIONÍSIO D. CARNEIRO AND MÁRCIO G. P. GARCIA**

**ABSTRACT**

The 90s have witnessed a resumption in capital flows to Latin America, due to the conjugation of low interest rates in the US and economic reforms in most LA countries. In Brazil, however, substantial capital flows have been induced by the extremely high domestic interest rates practiced by the Central Bank as a measure of last resort given the absence of successful stabilization policies. These very high interest rates were needed to prevent capital flight in a context of a surprisingly stable inflation rate above 20% a month, and keep interest bearing government securities preferable to foreign assets as money substitutes. We carefully describe how this domestic currency substitution regime (interest bearing government securities are substituted for M1 as cash holdings) requires the Central Bank to renounce any control over monetary aggregates. In this domestic currency substitution regime, hyperinflation is the most likely outcome of an isolated (i.e., without fiscal adjustments) attempt by the Brazilian Central Bank to control money.

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## I. Introduction

The continuous fall in dollar interest rates from 1989 to 1993 and the steady liberalization of capital movements in spite of a deep economic crisis raised the prospects for good risk premia for those investors inclined to have a stake in the eventual recovery of the Brazilian economy. Thus, as many other countries in Latin America, Brazil has recently experienced a revival of the inflow of foreign capital.<sup>1, 2</sup> Domestic causes for the recent capital movements seem to have varied widely from case to case but in the Brazilian case the size and the timing of the inflows can be associated with monetary and exchange rate policies, and not necessarily with new investments' opportunities created by resumption of economic growth since, contrary to what happened to most other LA countries, inflation stabilization is yet to come.<sup>3</sup> In fact, in spite of this year's expected recovery of real GDP growth of around 3 to 4%, the Brazilian economy is still rather stagnant as investment/GDP ratio is expected to be closer to the recent years dismal performance of around 15% than to the historical experience of 22%. The control of megainflation, currently at a 30% monthly rate, is the single most important issue of economic policy and thus, after so many unsuccessful experiments, policy uncertainty concerning the nature of future stabilization attempts is the dominant feature determining investors and consumers' behavior.

What do investors fear? After the experience of the recent years, the new menu of options include price freezes, compulsory de-indexation with monetary reform to cancel old contracts, wage and price controls, internal debt repudiation and, of course, after the Argentine experiment, exchange rate based stabilization (both as a fiscal anchor and as a price coordination device). Expectations concerning the future stabilization set-up have been, therefore, part and parcel of inflation dynamics since the last price freeze of February 1991 (the so-called Collor II program) as well as the investors' decisions concerning the composition of financial portfolios.

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<sup>1</sup>In 1991, Brazil received gross capital flows in the amount of \$11.6 billion (2.7% of GDP). In Latin America, this figure was surpassed only by Mexico (\$ 16.1 billion). Argentina received \$5.1 billion; Venezuela, \$4.8 billion; and Chile, \$1.7 billion. In 1992, the Brazilian gross capital inflow increased to \$17.7 billion.

<sup>2</sup> Calvo et al. (1992b) estimate that significant flows of \$24 billion in 1990 and some \$40 billion in 1991 have moved into the region. Net inflow has been negative from 1982 to 1991 but are highly positive for 1992 (some \$6.9 billion) according to the UN World Economic Survey - 1993 and will probably more than double this figure for the current year.

<sup>3</sup> In another paper by the same authors (Calvo et al., 1992a) they conclude that external factors have been dominant for the present flows, up to 1992, but there is still ample room for the difference between the nature and stability of the movements from country to country.

Visitors to Brazil can't help being surprised by the survival of the transactions demand for cruzeiros in a country with such a long and troubled inflationary experience. Behind this phenomenon, a complex maze of private and public financial institutions developed in the Brazilian economy which is almost entirely devoted to the day-to-day supply of indexed substitutes for the domestic currency.<sup>4</sup> This provision of indexed reserves of purchasing power is based on the holding of public bonds of varying maturity backed by the Central Bank supplying the financial intermediates with the necessary liquidity. The financial system has been successful in preventing the currency substitution (dollarization of the transactions) that has been the rule in other megainflationary experiences (as well as an element in sparking open hyperinflations) but it has done so by allowing the nonfinancial public to work with very little cash and indexed deposits instead of dollars. In this task of protecting financial wealth denominated in an unsafe currency, the liquidity of whole financial system depends on the monetary policy pursued by the Central Bank, summarized on the daily posted open market interest rate, that is the rate at which federal bonds are converted into bank reserves, which ends up signaling inflation expectations and real interest and forming a reference for all other financial transactions.

In this paper, following a brief review of the post Collor II stabilization policies (Section 2), the essential mechanisms of monetary policy in Brazil are described, a step which is necessary to understand the problems created by the recent capital inflow (Section 3). It is shown how capital flows responded to the combination of stable rules and continued liberalization in the capital account plus high interest rates policy thereby aggravating the sterilization problem posed by the release of the cruzados deposits which had been blocked since the Collor I program.<sup>5</sup> Furthermore, the government has been facing severe political constraints in the last two years which have prevented the adoption of convincing measures of fiscal austerity (higher taxes, lower expenditures and higher control over official financial institutions both at federal and state levels) that go beyond deficit repression. This stalemate led the Brazilian economy to the verge of a classical hyperinflation, as the ability to control monetization of the quasi-monetary assets is perceived as precarious: control of the demand for dollars has been based on a monetary policy

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<sup>4</sup> See Carneiro, Garcia and Werneck (1993) for a brief description of the evolution and characteristics of this system.

<sup>5</sup> See Carneiro (1991) for a description of the Collor I program.

stance which tends to perpetuate megainflation in its permanent mission to avoid a run of financial investors in the direction of dollars. In Section 4, the difficulties to foreign reserves sterilization in the Brazilian recent experience is analyzed and in the last Section, policy recommendations are summarized.

## 2. Post Collor II Stabilization

In February 1991, the Collor government did it again. Less than a year after the big bang of the Collor I program which blocked an estimated US\$ 50 billion of financial assets<sup>6</sup>, froze prices, and sparked off a wave of legislation purporting to promote a thorough reform of the Brazilian economic institutions including trade liberalization, privatization and measures to put an end in chronic inflation. Between April and December 1990, the gist of the program—the stabilization attempt—had gone to pieces and in the beginning of 1991, inflation was back to a 20% monthly rate, policy credibility reduced to an all time low as the economic team fought to stay afloat. The release of the blocked deposits was scheduled to start in September and open hyperinflation was feared by many analysts to be inevitable as remaining asset-holders were expected to fly away from the domestic financial markets. The economic team led by Minister Zelia Cardoso de Mello decided to promote yet another price freeze in February and, as a last attempt to regain control of the situation, tried to put an end to short run backward looking indexation.

An interesting legislation was sent to Congress which imposed limits to financial indexation (confining ex-post monetary correction to contracts over 3 months, for example, and creating a new official interest rate to reflect forward-looking changes in nominal values, the so-called TR) and restoring the Central Bank's ability to control short term interest rates by means of discount bonds (the so-called BBC - Central Bank Bonds). From the viewpoint of monetary policy, the new rules aimed at replacing a system which had been based on backward looking indexation—which was found to be acceptable for long contracts but highly inconvenient from the viewpoint of monetary policy—by a system in which short-term contracts would be essentially forward-looking, thereby adding flexibility to prices and interest rates.

The separation between Central Bank and Treasury financial operations was performed through the announcement of a new series of indexed Treasury Bills of varying maturities (from 90 days to 4 years) which could be linked either to the exchange-rate, the monthly TR or to different price indices, and which would, hopefully, be accepted by the financial system as a safe haven for

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<sup>6</sup> About half of the blocked deposits were actually released in a rather clumsy manner in the first two months of the plan.

financial wealth released from the blocked deposits. Finally, overnight indexed deposits were ruled out for individual accounts while individuals' transactions balances which traditionally had been in short-term quasi-monetary indexed deposits, were offered (imperfect) inflation protection by means of the so-called FAF's (a type of Money Market Fund). The latter are operated by banks which sell quotas to their depositors. The value of these quotas depend on the daily performance of the Fund but does not offer any guarantee to protect depositors against inflation and although they can be cashed daily, quotas of less than three-week maturities are heavily taxed so as practically eliminate financial gains.<sup>7</sup> Such Funds would have government securities as 60% of their assets and were created as a last attempt to offer depositors an asset to replace the old overnight indexed demand deposits. The FAF's constituted an effort to restore a voluntary market to government securities, to avoid a monetary explosion following the unblocking of the retained cruzados.

In May 1992, following a last attempt to reactivate private investment in the middle of generalized loss of credibility and with the inevitable decline in overall economic prospects as high inflation was seen as a signal that yet another gimmick would be forthcoming, Minister Zélia Cardoso de Mello was replaced by Ambassador Marcílio Marques Moreira. Mr. Moreira, Brazilian Ambassador to the US Government, had been conducting a careful and successful restoration of relationships between Brazil and the international financial institutions in Washington as part of a process to re-negotiate the Brazilian external debt.

Minister Marcílio had built a good reputation as a sensible analyst of the Brazilian scene, a competent diplomat with some experience in banking and a patient and discreet negotiator. He had to restore confidence in the government's possibilities to stabilize the economy and he chose to do so by promising to set prices free, to enhance trade and capital liberalization, to speed up external negotiations with the Washington institutions as well as with the Paris Club and with private creditors. He nominated Francisco Gros, an experienced conservative banker, as president of the Central Bank to lead a team of economists with excellent reputation and decided to start

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<sup>7</sup> Actually quotas which are cashed in less than 7 days have their gains practically confiscated by a tax on financial operations.



from scratch the hard task to recover the prestige of monetary and fiscal policy as the main instruments towards stabilization.

Besides the general skepticism of economic agents concerning the schedule to unblock the retained cruzados, the government had two additional hurdles to overcome in order to conquer a credible image and enhance the effectiveness of monetary policy: expectations of a new round of price controls and of a midi-devaluation to compensate for the fall in the real exchange rate during the first month of the freeze.

From May to August of 1991, more and more prices were freed, public prices were corrected and the dismantling of protective trade tariffs was sped up. On the eve of release of the first installment of the blocked deposits, the situation was still bleak: inflation had resumed, reaching 15% a month; fiscal imbalances persisted and a cash surplus was maintained through postponement of disbursements and deficit repression; there was a generalized fear that the possible generation of a massive monetary expansion in presence of pessimistic expectations would give rise to a drastic dollarization of financial wealth. Furthermore, the monthly trade superavits were declining due to exchange rate appreciation, and there was concern about foreign reserves losses. Overall confidence in the future of economic policy was still very low. The new economic team was unwilling to announce drastic measures, in spite of the generalized suspicion that the President's bold style would eventually prevail, and either a new economic team or a new policy shock by the same team was inevitable to halt ever-growing expected inflation.

In order to stop the deceleration of the exports revenue which led the trade superavits to decline by around 50% from January to August, expectations regarding a real devaluation became unbearable, setting off a dangerous speculative move in the exchange and the gold markets. Instead of selling gold to depress the parallel and buying dollars in the official market as it had been doing as a means to control the exchange premium, the Central Bank decided to let the market follow its course and promoted a surprising and abrupt 13% real devaluation of the Cr\$, on the 30th of September 1991 prompting immediate fears that an inevitable de-stabilization of expected inflation would occur. Despite the good effects this devaluation achieved in the trade balance, higher inflationary expectations sparked generalized preventive price adjustments and the

Central Bank immediately raised the interest rates. The inflation rate immediately breached the 20% **monthly** limit which everyone believed to signal an inevitable new wave of controls.

On the fiscal side, the new minister realized that the same credibility he needed to enhance the effectiveness of monetary policy, was needed in order to pass legislation to increase overall control over state and local governments' indebtedness, so that daily control of cash disbursements according to the availability of revenue implied delaying the payments of the expenditures. With a monthly inflation of over 20%, a three-month delay in paying an expenditure cuts it almost in half. This, together with the loss imposed on public employees' real wages by imperfect indexation, were the main levers the Marcílio team resorted to in their attempt to impose fiscal discipline. The generalized discomfort caused by imperfect indexation in a context of high inflation and the limited (but important) price flexibility achieved by forward looking indexation in the short run completed the team's limited arsenal to restore policy credibility.

We should note that after many years of learning in Brazil, fiscal revenues are better indexed to inflation than the expenditures. What happens in Brazil is the reverse of the so-called Olivera-Tanzi effect by which inflation increases the fiscal deficit, as noted by Bacha (1993). Although this might be eventually stabilizing, if on one hand the government manages to control the definition of budget expenditures, on the other it makes the government a prisoner of inflation, because with (unexpected) lower inflation, a much higher real tax revenue is needed in order to achieve the same real deficit. It should also be emphasized that unlike seignorage, the implicit fiscal revenue created by this reversed Olivera-Tanzi effect (defined as the erosion in the real value of expenditures) is not subject to any sort of Laffer curve. This is because the real value of expenditures declines 1% for each 1% rise in inflation (i.e., the elasticity is always unitary). Therefore, for that implicit "revenue" there is no effect analogous to the remonetization that happens when inflation falls (the loss of inflation tax may be compensated by the gain of real money holdings). Inflation performs a coordination role as it cuts the real value of fiscal expenditures to keep the total value in line with fiscal revenues. If inflation falls, this role must be performed by the government itself in the political arena. This turns the disinflation into an even more painful task for the government.

Unable to correct the imbalance through standard fiscal measures (tax raises or expenditure cuts), and pressured by the release of the blocked cruzados accounts, the new economic team resorted to a very restrictive monetary policy, with extremely high real interest rates. The rationale for much higher interest rates came also from the external side. Indeed, the Central Bank not only increased the real rate, but also decreased its volatility, in order to send a clear signal to the market that a much higher real interest rate was going to be sustained. Figure 1 displays the interest rates paid by government short-term securities in the period. Most (currently around half of \$35 billion outstanding) of the Brazilian internal debt is now formed by those short-term discount bonds, the BBCs. Those nominal interest rates are, therefore, risk free in Cr\$ terms, subject only to the sometimes high policy uncertainty. Figure 1 also displays the *ex post* real rates in US\$ terms, by extracting the exchange rate (Cr\$/US\$) depreciation from the nominal rates. (The scale on the left hand side refers to the *ex post* real rates (bars), while the scale on the right hand side refers to both the exchange rate depreciation (black squares) and the nominal rate (white squares).) Note that as a result of the policy change in October, from December 1991 onwards, even after the policy uncertainty related to the release of the blocked cruzados had decreased, the real rates became consistently very high (both scales are in % per month) thereby creating a substantial premium to those with access to foreign capital. The unequivocal liberalization commitment efforts of the then External Director of the Central Bank, Armínio Fraga, certainly contributed to reinforce the economic incentives.

The very high real rates induced a significant foreign capital inflow.<sup>8</sup> Figure 2 shows the profile of foreign reserves (cash concept) in the period. Note how the reserve loss that was taking place until October 1991 was reversed after December 1991. Foreign reserves grew steadily until September 1992, when real interest rates began to fall from their previous extremely high level, although they were kept at high levels if compared to international rates. We will come back to this period when we analyze the monetary effects of such capital inflows.

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<sup>8</sup>How much of this capital inflow was owned by Brazilian nationals is still a unanswered question. An important share of the estimated \$35 billion assets held by Brazilian residents abroad is thought to be in low yield funds and therefore are good candidates to move back into the country when the incentives are right and specially when they are offered the same treatment currently offered to foreign capital.

Figure 3 displays the inflation path. After the already mentioned jump in October 1991 which was certainly helped by the abrupt exchange rate devaluation, inflation remained above the 20% level despite the very high real rates and the low level of activity. It should be also noted that contrary to the previous experience, and also contrary to expectations, the flexibility introduced by the Collor II indexation rules generated a month-to-month oscillation in the rate of inflation which gave hope of a demand-induced control of the inflation, while policy credibility was built up by the new economic team's acquired reputation. From February 1992 to May 1992, there was a decline of 8 percent point in the monthly rates in spite of the maintenance of an (informally) indexed exchange rate, a de-regulation of public prices and a total decontrol of prices in the private sector as never observed in Brazil in the post-war years. For the first time in many years monthly inflation rates were shown to decline without any resort to price controls. In May 1992, the country suffered a major political shock with the process which ended up in the impeachment inquiries and the resignation of President Collor in September. Needless to say, the whole process of building up credibility as a means to pass legislation granting the government more power to exert fiscal restraint was severely impaired by the political deterioration of the government support in Congress. Throughout those traumatic months, there were frequent talks that government intervention in the price mechanism could not be avoided so as to prevent that mounting uncertainty concerning the future of the government degenerated into hyperinflation. In the next Section we will analyze how it was possible to keep a surprisingly stable inflation rate at such high a level, and the problems it creates to monetary policy, especially when the monetary base is under a constant pressure from foreign capital inflows.

### 3. Monetary Policy, High Inflation and Policy Uncertainty

In this Section we describe the main features of the monetary policy regime of 1991/1993 as well as the challenges it has been facing by the inflow of foreign capital. Among its characteristics, the very small size of the monetary base stands out as generating peculiar obstacles to interest rate targeting.

With inflation running as high as it did in Brazil in the last few years, money holdings have been reduced to a minimum. This is shown in Figure 4: M1 in the recent months is only around 1.5% of GDP, with the monetary base being roughly half of this figure. This is less than 10% of the M1/GDP ratio in the US, for example. In other words, money velocity is more than one order of magnitude higher in Brazil than in the US.

How does such a system work? After all, the monetary services required **per unit of GDP** are roughly the same in Brazil and in the US. That is, when a household buys a refrigerator, it must use about the same amount of M1, be it in Brazil or in the US. The same applies to firms, government, etc.. Since the ratio M1/GDP is so low in Brazil, flows of comparable magnitude must have much greater impacts in the Brazilian monetary market than in the US's. That is exactly what we will show below, with special emphasis on the monetary flows generated by the capital inflows. First, however, we must introduce a description of the institutional framework underlying the Brazilian monetary system.

With high inflation, interest targeting by Monetary Authorities requires that nominal interest movements track current inflation movements as close as possible, so that interest accruing to assets that are seen by wealth-owners as close money substitutes are able to keep such accounts competitive to, say, dollar holdings. The basic instruments for interest targeting are the interest rates accepted in the weekly auctions of Central Bank Bonds (BBC's) and the daily actions of the Central Bank which determines the cost of borrowing reserves by the banking system.

Everyday, before the open market begins to operate at 9am, the Brazilian Central Bank makes an estimate of the net bank reserves position of the banking system. This position varies a lot because the Brazilian Treasury must have all its accounts directly at the Central Bank. This

obligation creates huge movements in banks reserves whenever payments are made to or by the Treasury. Secondly, because the Central Bank imposes narrow limits to the holding of foreign exchange reserves by banks, and therefore short run movements in the demand for foreign assets such as those prompted by an expected change in the devaluation policy or a change in interest rate policy are immediately reflected in the market for bank reserves.

Take the example of tax collection. Taxes are usually paid by agents to banks, who keep them for two days before passing them to the Treasury. The final payment to the Treasury by the banks is made by debiting the banks' reserves accounts (and crediting the corresponding amount in the Treasury account at the Central Bank). Since the amounts involved in tax collection are usually large compared to the monetary base, flows generated by tax collection create a substantial need for bank reserves by the whole banking system. This is because the banks must fulfill reserve requirements which are determined by their past deposit record, and those do not vary when the taxes are transferred to the Treasury account at the Central Bank.<sup>9</sup>

Therefore, in a given day when taxes must be passed to the Treasury, most banks are short in reserves. When the banking system as a whole does not have enough reserves to fulfill the aggregate reserve requirement, the Central Bank must provide those reserves, usually by means of open market purchases of government securities, since it is the only participant in this market that can create bank reserves. When this situation happens, the Central Bank is said to be **oversold**. The discount window in Brazil is seldom used by private banks because the Central Bank adopts the so-called Rieffler doctrine. That is, resort to the discount window automatically prompts an inquiry into the bank's books in order to prevent solvency problems.

When the reverse situation happens, that is when as an aggregate, banks are long in reserves, the Central Bank is said to be **undersold**. In this case, the Brazilian Central Bank usually conducts open market operations mop up the excess liquidity in order to prevent interest rates to fall below targets. That is, the Central Bank sells government securities with repurchase agreements (usually

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<sup>9</sup>This statement is not 100% exact. However, to be 100% precise, we would need to explain how reserve requirements are computed, and that would take us very far away from our main interest, without adding any qualitative gain.

overnight). By doing so, the banks keep their liquidity intact without incurring the opportunity cost of carrying free reserves or unduly depressing the nominal interest rate.

Throughout a trading day, the Central Bank conducts several go-arounds to achieve its objective of providing liquidity (when it is oversold), or withdrawing liquidity (when it is undersold). The idiosyncrasy of the Brazilian Central Bank is that, before the open market closes at the end of the day, it always provides the banks with a last opportunity to obtain the reserves they need, or to purchase government securities overnight. Those trades involve a rather small penalty in terms of interest rates. This automatic clearing of the bank reserve market or the so-called *zerada automática* has been widely used throughout the years of high inflation except in significant moments (a few days) of the Minister Marcilio Moreira term, between February and September 1992, when the Central Bank tried to operate an undersold regime (see Figure 5) .

The rationale behind this mechanism is of course that it gives the Central Bank an almost complete control over interest rates especially when it is oversold. By automatically clearing the reserve market at the end of the day, the Central Bank significantly reduces the risk taken by banks in their daily supply of cash to the economic system. Banks are always trading bank reserves (a large component of monetary base) for securities. Given the smallness of the monetary base, very often banks may be short of reserves to fulfill their obligations, and, therefore, could potentially incur in substantial capital losses. This is especially true when interest rates swing wildly, as it is feared to happen if the Central Bank does not monitor the reserve market so closely.

The Brazilian Central Bank's monetary policy regime is thus to target interest rates. Usually, the procedure to compute the targeted level aims to minimize the cost of rolling over government debt without jeopardizing the real yield paid to final savers. In order to achieve such objective, the Central Bank is always willing to clear the excess reserves within a narrow band around the targeted interest rate. By acting in this fashion, the Central Bank keeps the interest rate at the desired level, and also limits the potential losses and gains of financial institutions. It is clear, therefore, that when the variance of expected inflation increases the targeting of interest rates is more complex, and so is the case when unforeseen reserve movements such as those brought

about by significant changes in foreign exchange reserves which disturb expected exchange rates. If exchange rates were allowed to absorb part of the energy set off by such unforeseen reserve movements, as it may happen in a more stable regime, the overvaluation of the exchange rate could be a stabilizing element in restoring equilibrium. High uncertainty concerning the response of capital flows, for example, has prevented the Central Bank to let prices do their part in the adjustment, either through decline in interest rates or through a smaller devaluation. The Central Bank's monopoly as a holder of foreign reserves defines this way another policy objective: maintaining the alignment of the **real** exchange rate so as to avoid sending discomfoting signals to exporters and investors.

The rationale for this behavior of the Central Bank may be found in the experience of the past two years. In the presence of high overall policy uncertainty, the apparent comfortable position of the monetary authorities provided by the combination of large foreign reserves and steady demand for domestic financial assets rests on a fragile and potentially self-destructing foundation: the maintenance of a high interest rate to compensate domestic asset holders for the high risk and the maintenance of an indexed exchange rate as a means to offer exporters a guaranteed real income. As a result of this double guarantee, foreign investors are offered a permanent opportunity for arbitrage gains: the higher the risk perceived by domestic asset-holders, the higher the gains for arbitrage.



#### 4. Sterilization in the Context of High Uncertainty

The above description of the institutional framework underlying monetary policy in Brazil emphasizes the idea that interest rate targeting in Brazil requires a much more active role from the Central Bank than in other countries. This happens because flows of magnitudes comparable to those in other countries (per unit of GDP) impact a much smaller monetary base. As a consequence, the price in the market for bank reserves (the interest rate) becomes much more volatile, forcing the Brazilian Central Bank to intervene much more often to guarantee the stability of interest rates at the desired level. As a consequence, in order to prevent interest rates movements to send undesirable signals as to the government's views concerning expected inflation, the monetary base becomes highly volatile. The trade-off between quantities and interest rates in the context of high inflation and policy uncertainty is replaced by a conflict between variances and the choice is almost certainly to try to control the variance of interest rates. In the context of an open economy subject to large capital movements, the Central Bank must also take into account the costs associated with the variability of the exchange rate.

The recent literature spurred from the European experience with exchange rate bands seems to be changing the practical implications of fixed interest vs. fixed exchange rates regimes.<sup>10</sup> There seems to be more room for autonomous monetary policy in the case of exchange bands as evaluations of the European experience suggests. However, in the case of megainflation, the trade-off between exchange rate variability and interest rate variability may acquire additional dangerous options. Since the monetary policy regime we have been describing stresses the importance of policy uncertainty, agents must give an extra importance to phenomena which may prompt policy changes.<sup>11</sup> Therefore, accepting a higher variability of the exchange rate, for example, may imply accepting the risk that the fall in export revenues may turn the Balance of Payments untenable in the policy horizon thereby prompting a change in policy regime. The room for the precarious maintenance of stable inflation in high rates may thus become even smaller, in the presence of volatile foreign flows.

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<sup>10</sup> See, for example Svensson (1992).

<sup>11</sup> In the Brazilian experience, such changes may bring about serious changes in rules presiding over financial transactions.

Figure 5 displays the magnitude of the movements that impact the monetary base. What is different in the Brazilian economy is that the potentially de-stabilizing effects which may be associated with the size of the movements in bank reserves lead the Central Bank to try and keep interest rates from varying too much and thereby sending wild signals concerning expected inflation. Figure 5 displays the ratios of the oversold position to total bank reserves (scale on the left hand side), and of oversold position to monetary base (scale on the right hand side). It is not infrequent for the Central Bank to have to borrow or lend reserves in one single day in an amount greater than the entire monetary base. Thus the smallness of the monetary base would not mean much per se if expected inflation were not so dominant in movements of the targeted interest rates. Fluctuations induced in interest rate movements by flows that affect the monetary base may have a de-stabilizing effect on expected inflation.<sup>12</sup>

We now turn to the way foreign capital flows have recently impacted the monetary base with many consequences to monetary control.

In the precarious control of megainflationary process we have been describing so far, expected inflation plays a very important role. The combination of price de-regulation with forward-looking indexation in the context of the potential monetization of the blocked financial assets led to a general view by policy-makers that eventual errors on the "high" end of interest rates targeting would not be as serious as if expected inflation were underestimated in the definition of interest rate targets, since the latter could spark hyperinflation. The very high real interest rates the Central Bank began to set after October 1991 together with the policy of keeping the real exchange rate fairly constant, plus the increasing confidence of investors on the irreversibility of the liberalization of capital movements had the effect of inducing a very large capital inflow, especially linked to interest arbitrage operations intermediated by banks and to institutional investors in the US taking a stake in the Brazilian stock market. The result of such movements can be seen by the upward trend in foreign reserves from December 1991 to August 1992, shown in Figure 2. The accumulation of foreign reserves in 1992 totaled US\$ 14,3 billion.<sup>13</sup>

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<sup>12</sup> Of course if the daily interest rate has a more important role as a determinant of the correction of nominal values the phenomenon is still more complex, but this argument will not be considered here.

<sup>13</sup> About one half of this figure corresponds to loans and 1/3 to direct investments.

In an attempt to avoid the explosion of the very small monetary base, the Central Bank engaged in a policy of massive sterilization of both flows (the foreign capital and the released cruzados deposits). Figure 2 shows the evolution of the internal government debt, that grew enormously from December 1991 to July 1992. Of course, a large portion of such "growth" in outstanding debt resulted from a mere replacement of compulsory financing (the blocked deposits) by voluntary financing by private investors. The restoration of the market for government debt which took place in this period was a positive signal that at least some confidence was recovered, but the costs of this recovery may be seen from the data on the determinants of the evolution of the monetary base.

Figure 6 displays four of the factors affecting the monetary base. Those are aggregates of accounts on the asset or liability side of the Central Bank balance sheet, excluding the monetary base. Since the algebraic sum of all accounts in a balance sheet must be zero, the variations of those accounts may be interpreted as factors affecting the monetary base. Four series are displayed. As for those increasing the monetary base, the two major movements can be detected. First, the unblocking of the cruzados deposits, averaging something around \$2 billion per month.<sup>14</sup>; second, the impact of balance of payments (*External Sector*), from November 1991 to August 1992. Since the monetary base in that period was around \$4 billion, since December 1991 until almost August 1992, the Central Bank had the huge task of sterilizing **one monetary base per month** only due to those two factors. This can be seen by the behavior of the series *Bills* in Figure 6, which corresponds to the contractionary effect on the monetary base of sales of Treasury Bills (mainly the BBCs). One can also see from Figure 6 that the *Treasury* (this is the account the Treasury has at the Central Bank) did not exert expansionary effect in the recent period, except for a few months. This last statement, however, must **not** be taken to mean that a significant fiscal adjustment had taken place, since we already warned that fiscal repression was by and large obtained by letting inflation erode the real value of fixed nominal expenditures.

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<sup>14</sup>The unity of Figures 6 and 7 is Cr\$ billion of January 1992. The relevant exchange rates were 1068.80 (Cr\$/US\$) for the last day of December 1991, and 1319.45 (Cr\$/US\$) for the last day of January 1992.

In Figure 7, we highlight the importance of the balance of payments flows (*External Sector*) in expanding the monetary base. All other factors affecting the monetary base are aggregated in the series *Others*. The seignorage revenue is the series  $[\Delta(MB)]/P$ , the increase in the monetary base in real terms. Since the monetary base grows in nominal terms for most of the months, this series is usually positive. However, the variation in the real monetary base— $[\Delta(MB/P)]$ —is quite often negative. The latter concept equals the former minus the inflation tax. In a zero economic growth steady state,  $[\Delta(MB/P)]$  is zero, and seignorage equals the inflation tax.<sup>15</sup> Figure 7 makes clear the importance of the external flows for monetary control.

The sterilization of both the unfrozen deposits and the capital inflows was performed mostly through the sale of short term Central Bank Bonds (the BBCs). However, even the sale of 28-day maturity BBCs could require an absurdly high interest rate signaling the difficulty of the task for the monetary authorities, given the policy uncertainty perceived by the market. In this case the path chosen by the policy-makers was mop up excess liquidity by rolling over the BBCs daily, selling a significant part of the government securities with daily repurchase agreements. Not all of the negative values in the first half of Figure 5, however, correspond to this situation. The Central Bank was undersold for most of the period when the NCz\$s were being unfrozen and the high interest rates were pulling short term capital from abroad because the Central Bank tried to make use of the price flexibility allowed by the post Collor II indexation regime by practicing some interest rate flexibility. Had the Central Bank decided to sterilize those flows with final sales of government securities (without the daily repurchase agreement), the interest rates would probably have been even higher. The experiment became more and more difficult after June 1992 when the political situation became even more uncertain in the episodes leading to the replacement of President Collor.

In September 1992, when the pressure coming from the unfreezing of the NCz\$ ended (Figure 6) and the Central Bank was able to bring interest rates down, although keeping a still high real rate (Figure 1). A new source of uncertainty started with the replacement of President Collor by

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<sup>15</sup>“...*seignorage revenue* denotes the real value of money printed by the government; *inflation tax* denotes the loss in real value of money (or, more generally, all nominal assets) held by the public. Authors use these terms interchangeably only in steady state, where real money balances are constant” (Bruno, 1988).

President Itamar, in the middle of generalized opposition to high interest rates and new expectations concerning the possibilities of new round of price controls.

The Central Bank then widened the margins around the targeted interest rate, inducing more intra-day volatility in the interest rate. That procedure encouraged banks to move from the daily purchase of BBCs with daily repurchase agreements to the final purchase of BBCs at the auctions especially as price controls and lower interest rates were present in the daily newspaper headlines. With more intra-day variability of interest rates, the rolling over option became riskier *vis-à-vis* the final purchase one. This is the movement from negative to positive values (undersold to oversold) displayed in Figure 5 by September/October 1992.

Since September 1992, the Central Bank has returned to the old practice of been oversold most of the time, the important exception being the episode between mid-January and February 1993 when the expectations regarding a compulsory exchange of BBC's for longer bonds was expected to be announced anytime. When the Brazilian Central Bank is oversold, the monetary policy by means of interest targeting becomes quite trivial, once the Central Bank has good inflation forecasts. This is because the aggregate of banks always need a substantial volume of bank reserves as compared to the size of the market (Figure 5). In such a situation, the Central Banks finds itself in a position of a monopolist facing a highly inelastic demand curve. It can virtually set the price (interest rate) anywhere it seems fit.

The counter face of such monetary policy regime, however, is to let the monetary base fluctuate as much as it is needed to accomplish the stabilization of both the expected real interest and the real exchanges rates.

## 5. Conclusions and policy issues

The previous Sections told a rather peculiar story. By the available data the Treasury seems not to have pressured the Central Bank to finance its deficits (Figure 6). At the same time, monetary pressures came from the unfreezing of the NCz\$ and the external inflow of capital (Figure 6), the latter attracted by extremely high real interest rates (Figure 1). In spite of the very high real interest rates, monetary control was not achieved. The monetary base oscillated as needed to accomplish the combined objective of stabilizing both the expected real interest and the real exchange rates. For stabilization policy purposes, one relevant question is the following: *is it possible for the Central Bank to reassert its control on money, and by doing that fight inflation?*

### Reassert monetary control only with lower inflation

Taking a pragmatic route to answer the above question, we begin by noting that monetary control is virtually impossible with megainflation. This is because the very small size of the monetary base renders the interest rate very volatile. Given the major importance of the open market interest rate for the rest of the economy, the Central Bank has no alternative but to try to stabilize it. By doing so, the monetary base inevitably becomes very volatile, and the Central bank can not have any hope of controlling it.

The obvious reply to this idea is that monetary control may itself bring inflation down, and by that reason, may be reinforcing. That is, if the control of the monetary base brought inflation down, the monetary control would then become much easier.

### Domestic currency substitution and the need for fiscal measures

We do not share the view that monetary control may be, *in isolation*, an effective anti-inflationary tool. The fiscal imbalance in Brazil is far too great, however unmeasured, to allow monetary control to be capable of bringing down inflation. Without a clear change of regime in the fiscal side, one that bridges the gap between revenues and budgeted expenditures (not the eventual outlays, that are only a share of the ones in the budget), the expected inflation will remain high despite of all other efforts.

In fact, the following paradox is valid for the Brazilian economy: *hyperinflation is the most likely outcome of an isolated attempt by the Brazilian Central Bank to control money*. Because of the negligible size of the monetary base, the isolated attempt to control money without fiscal measures will only produce even higher and extremely volatile interest rates. This, in turn, will force banks to offer less liquid assets, or to reduce the yields on the more liquid assets, reducing the attractiveness of money substitutes denominated in Cr\$. A likely outcome is that foreign currency becomes a widely used money substitute, chasing out the Cr\$, and sparking a classical hyperinflation.

The monetary policy that has so far prevented hyperinflation can not help being accommodating in some sense, as long as it has to keep an eye on signaling positive interest rates and no nonsense exchange rate policy in order to maintain a minimum of credibility. The credibility achieved by this policy, however is necessarily temporary as long as the fiscal regime is perceived as untenable in the long run. Without fiscal control, all monetary policy can do is to prevent expectations from precipitating a run on the domestic currency, it will not bring inflation down, nor will it prevent currency substitution to occur in an "orderly manner".

In fact, what the Brazilian Central Bank accomplishes with its monetary policy could be called **domestic currency substitution**. Without fiscal measures, the only thing monetary policy can do is to try to offer a good money substitute still denominated in Cr\$, the so-called indexed money (nowadays, the already mentioned FAFs). If the Central Bank tries to control the monetary base, this domestic money substitute will no longer offer the liquidity attributes required by a medium of exchange, and, therefore, will be rejected by agents, who will look for other alternatives (foreign currency), sparking an open hyperinflation.

### **Difficulties for a Argentine-type experiment**

A frequent question when one analyses the present situation in the Brazilian economy is to what extent an experiment like the Cavallo plan would be applicable to the Brazilian case. Two positive aspects would favor the adoption of similar measures: the first one is the size of reserves vis-à-vis the monetary base, and the second one is the convenience of having an outside limit to fiscal expenditures which would be more than welcome given the present obstacles to fiscal control.

On the negative side, there are several important differences which may reduce the chances of success for a fixed-exchange policy as a basis for a disinflation coordination. The first one is that precisely because of the policy regimes described in this paper, currency substitution has not yet occurred in Brazil to any similar extent as it has occurred in Argentina. Neither daily transactions have been dollarized nor have price corrections been pegged to the exchange rate to the extent they had been in Argentina, specially after the two hyperinflationary experiences. The second one is that the current monthly rate of inflation seems to be too high for any sudden stop of the exchange correction to be sustainable, due to the lagged effects of current price rises on price indices. Perceived overvaluation could immediately bring about expectations of devaluation. The third one, not unrelated to the other two is the degree of openness of the Brazilian economy: the import content of the consumption basket is much smaller in the Brazilian case, where imported consumption goods are still a very small fraction of total imports (which are around 5% of GDP). Fourth, given the diversified nature of Brazilian exports, the perception of an overvalued currency could have far more devastating effects on the sustainability of the Balance of Payments than in the Argentine case. Finally, the real exchange rate today is almost half of its value in the first half of the eighties (Figure 8) and is still lower than its value before the devaluation of February 1983, in spite of the recovery observed after the fourth quarter of 1990, so that the room for exchange valuation seem to be small unless one adopts a rather optimistic view of the future gains of productivity which may be hoped to gained as a consequence of stabilization.



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Figure 1

Interest Rates on Government Short-Term Bills (BBC)

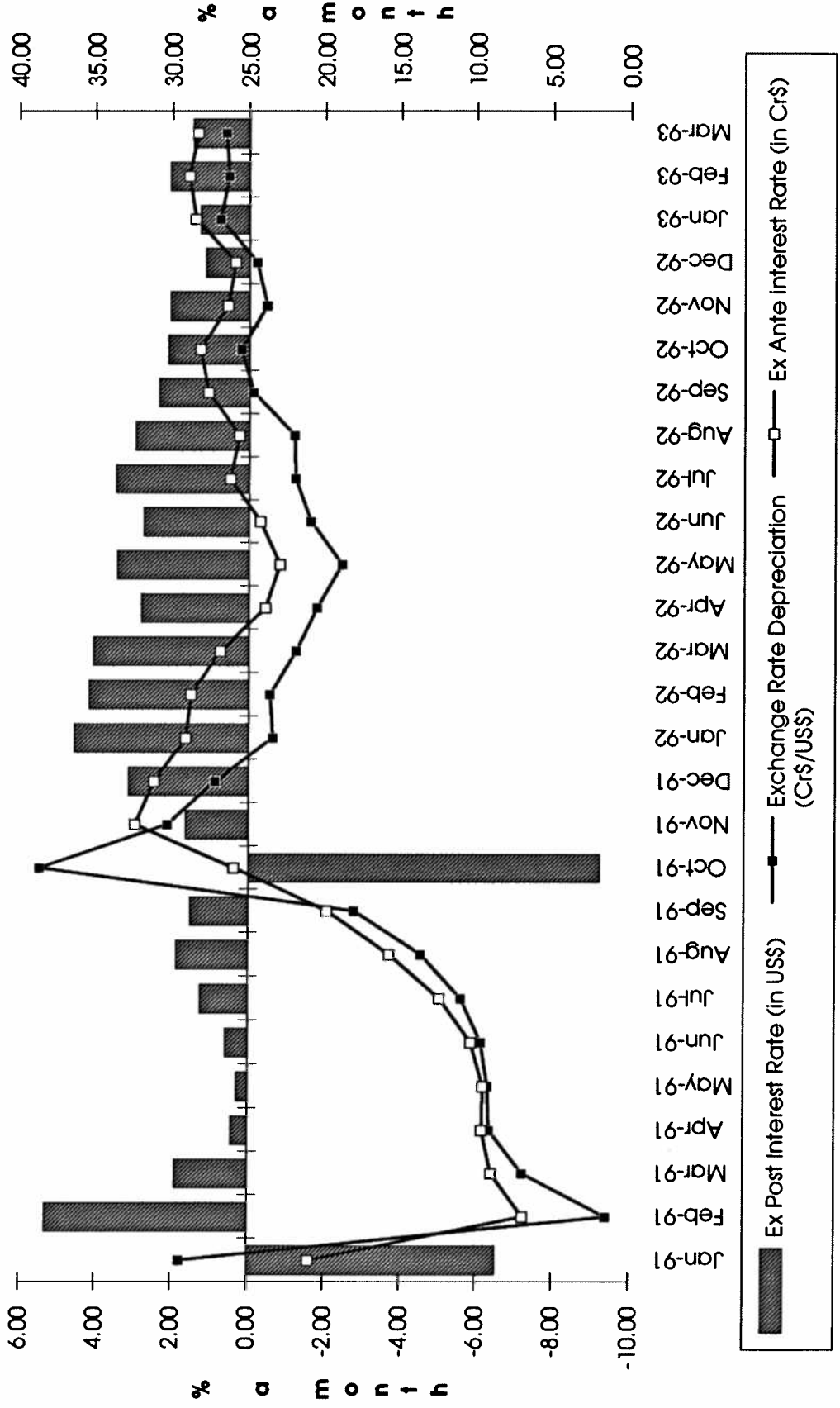


Figure 2

Foreign Reserves and Internal Debt

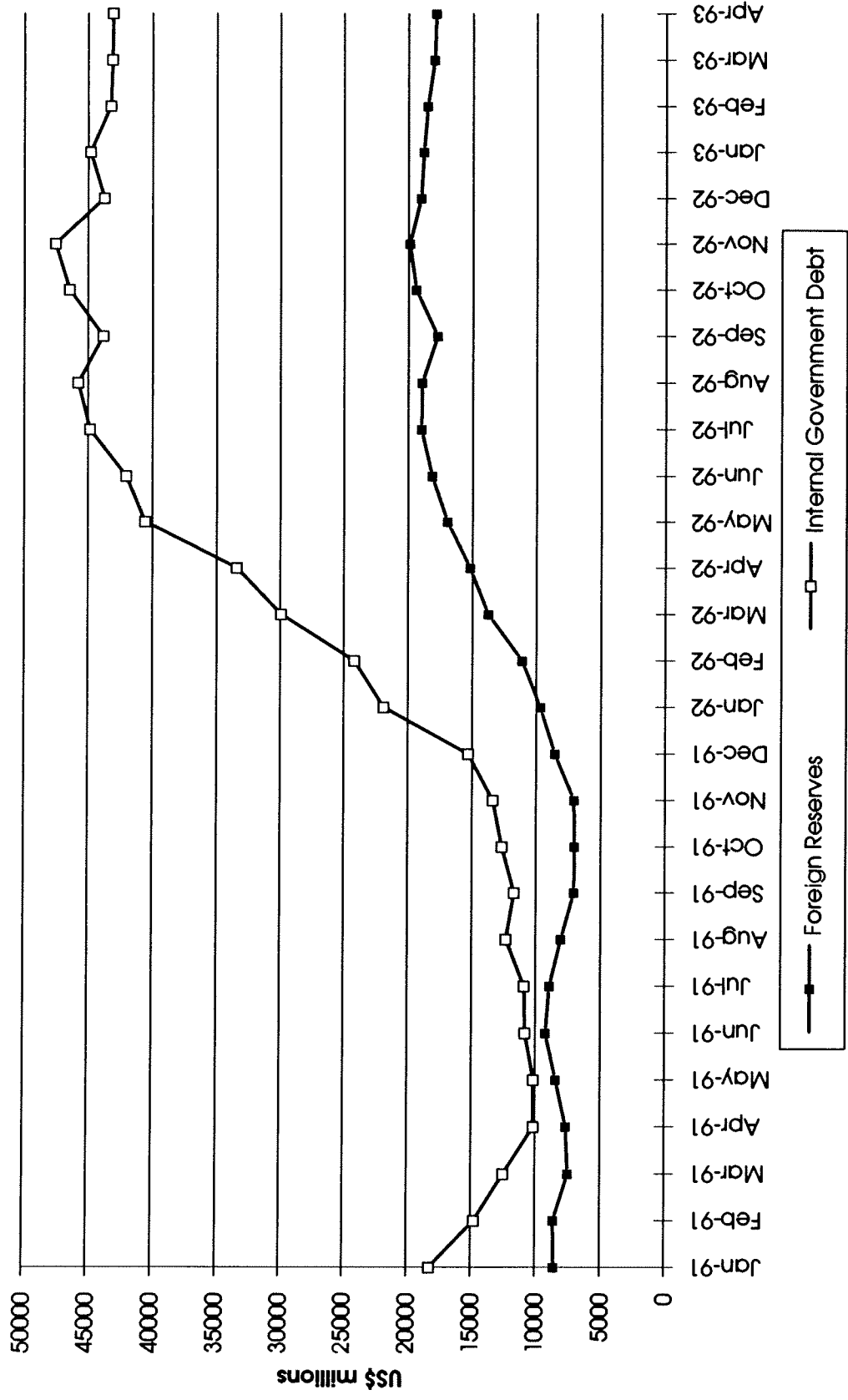


Figure 3

Monthly Inflation Rates (IGP-M)

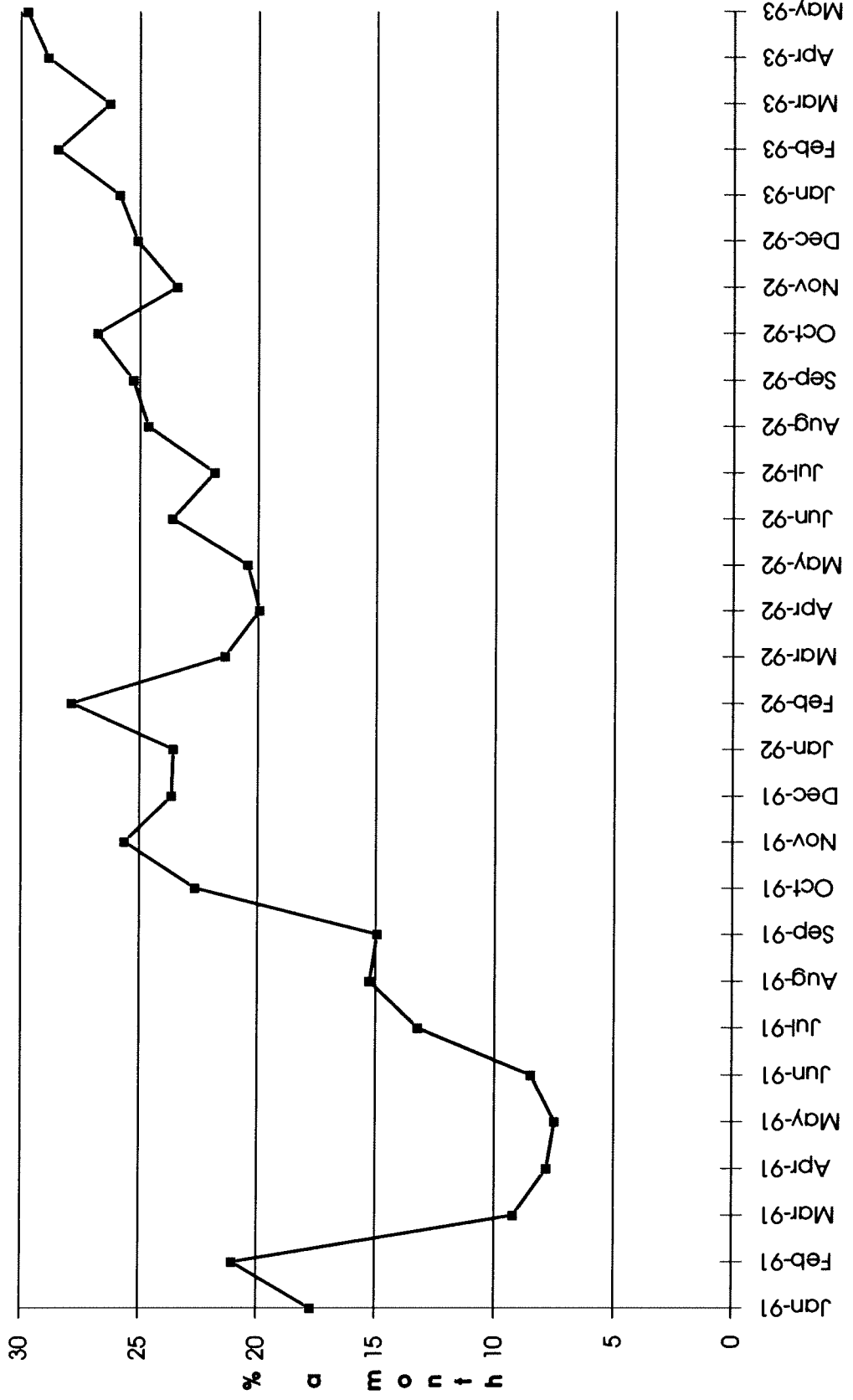


Figure 4

**BRAZIL: Narrow (M1) and Broad (M4) Money**

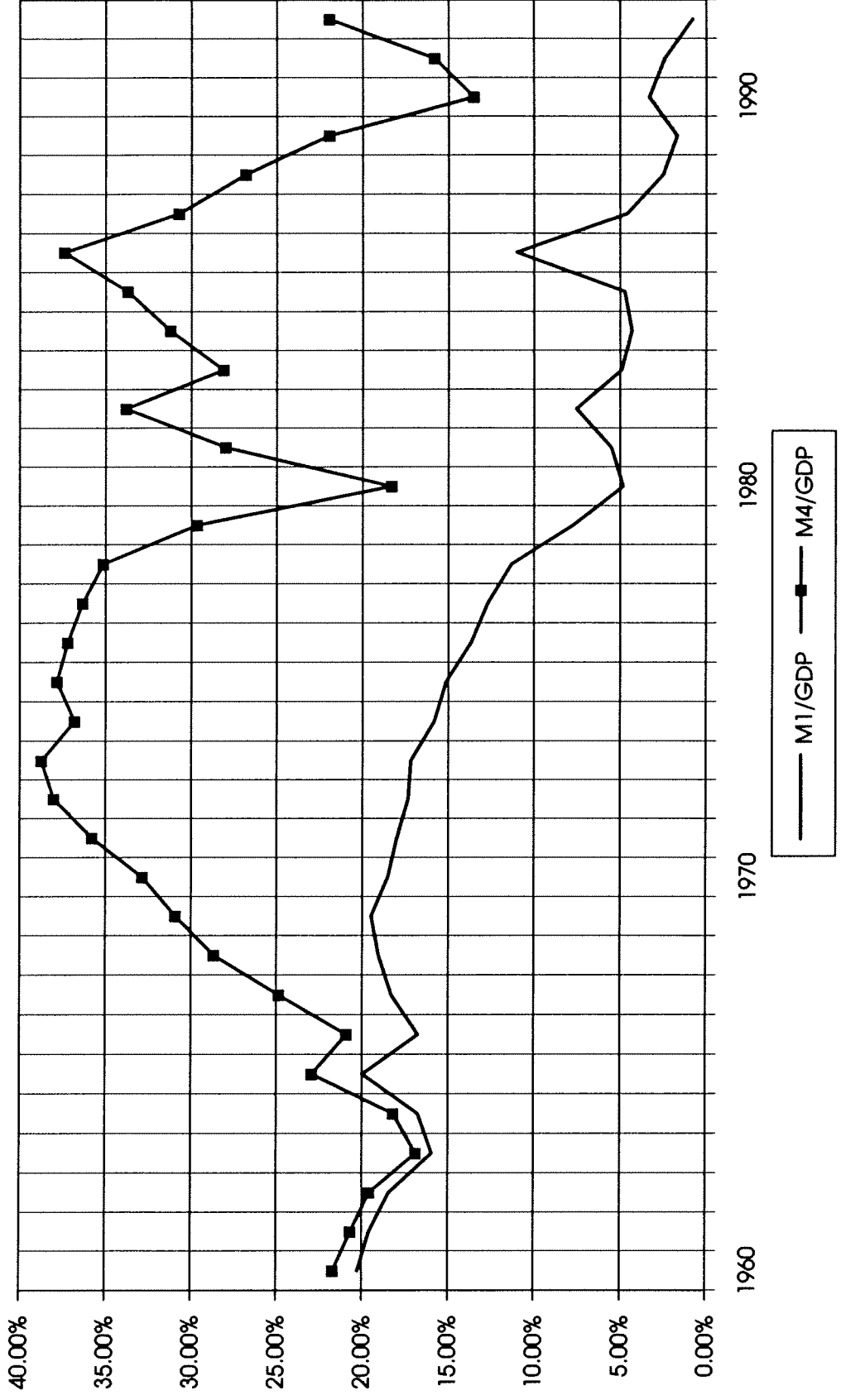


Figure 5

### Oversold (+) and Undersold(-)

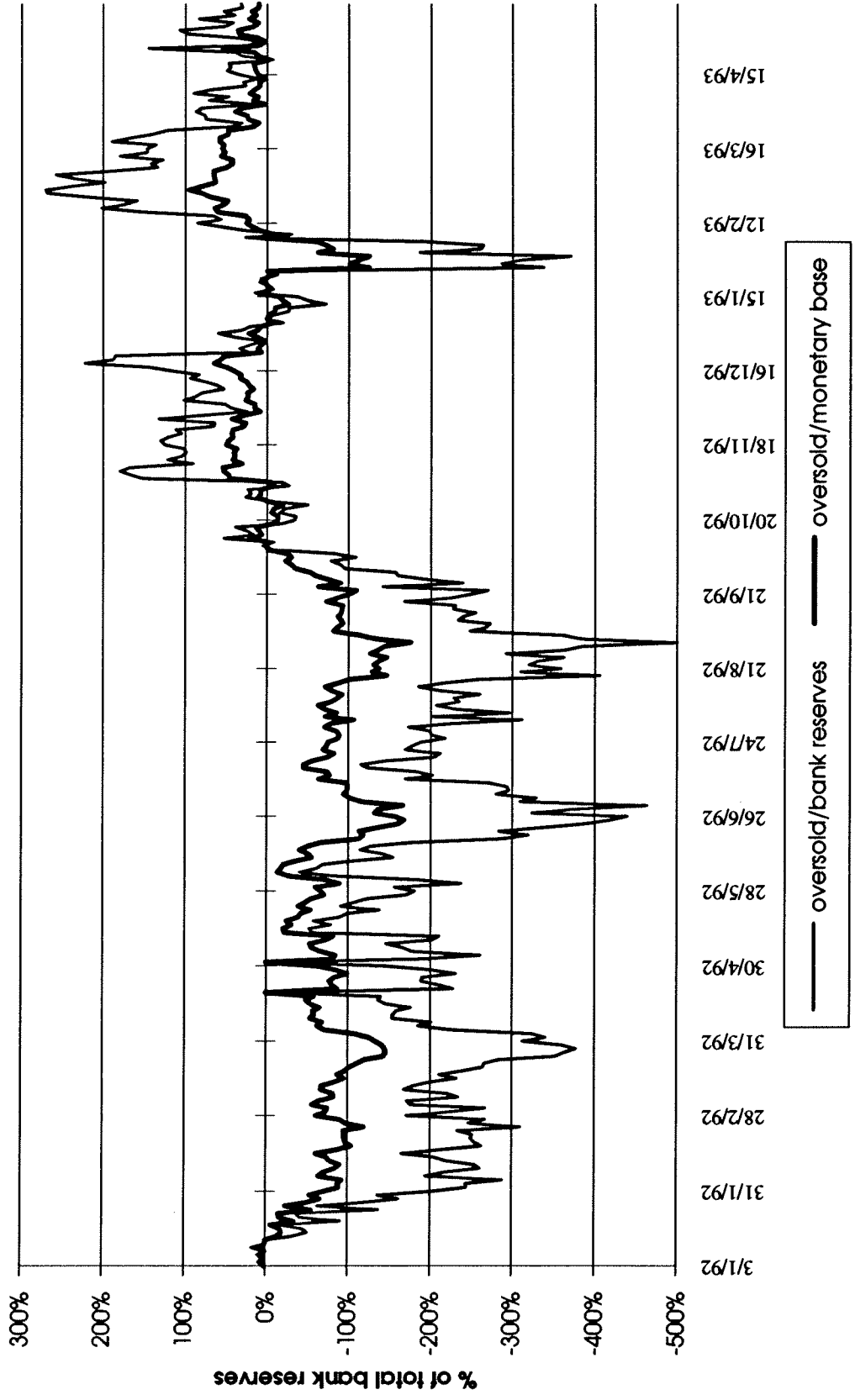


Figure 6

### Factors Affecting the Monetary Base

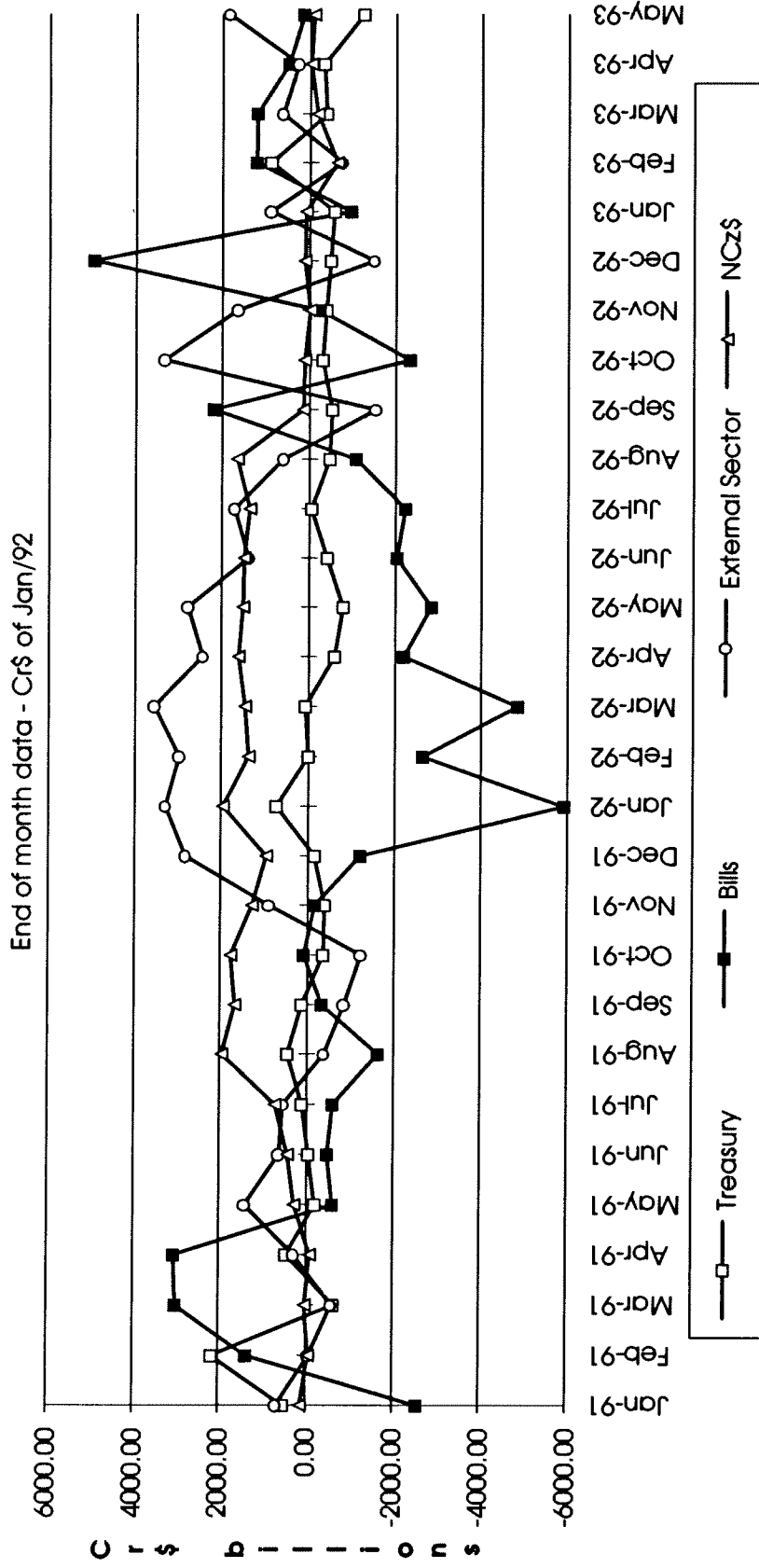


Figure 7

**Factors Affecting the Monetary Base  
End of month data-Cr\$ of Jan/92**

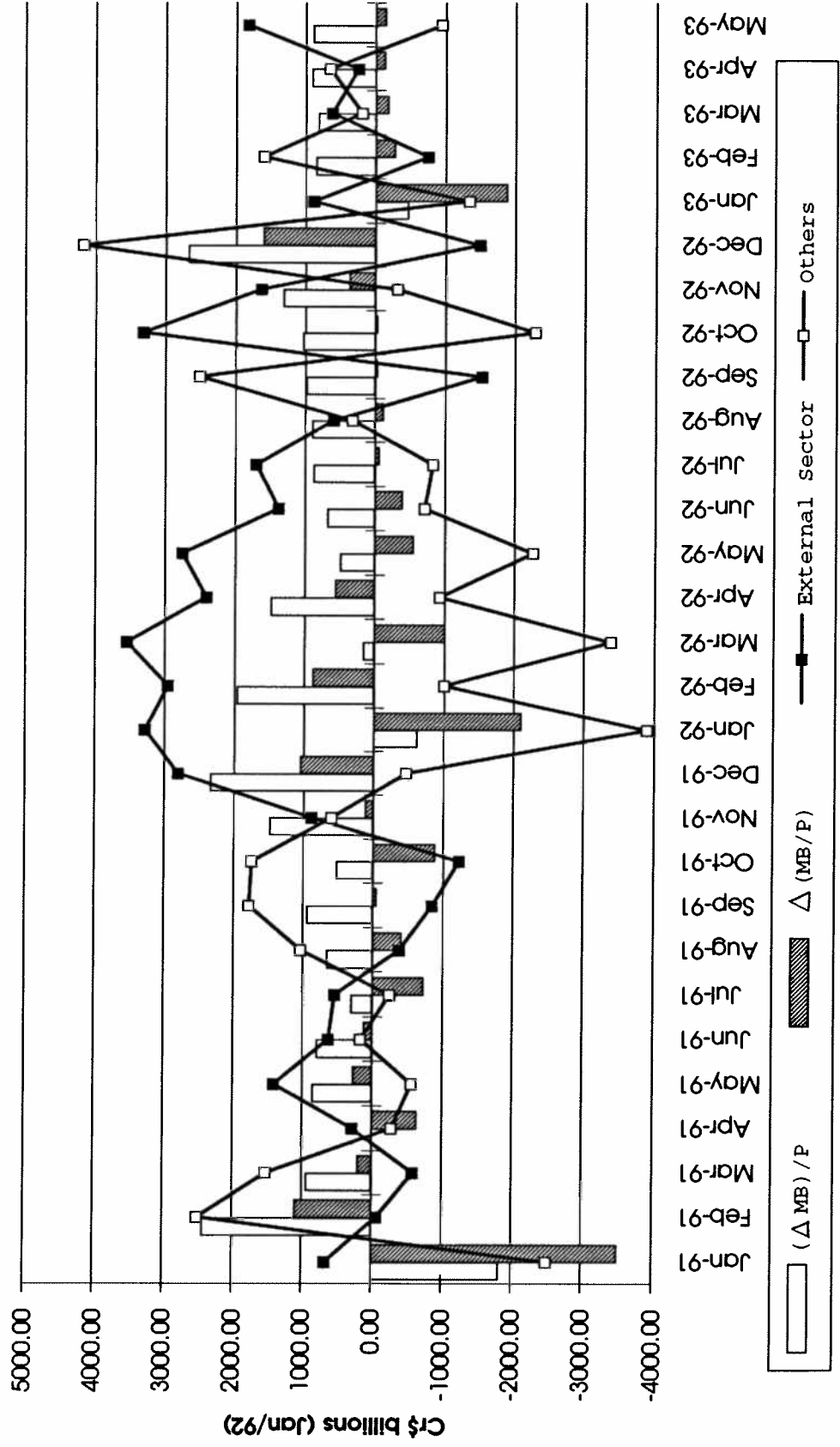
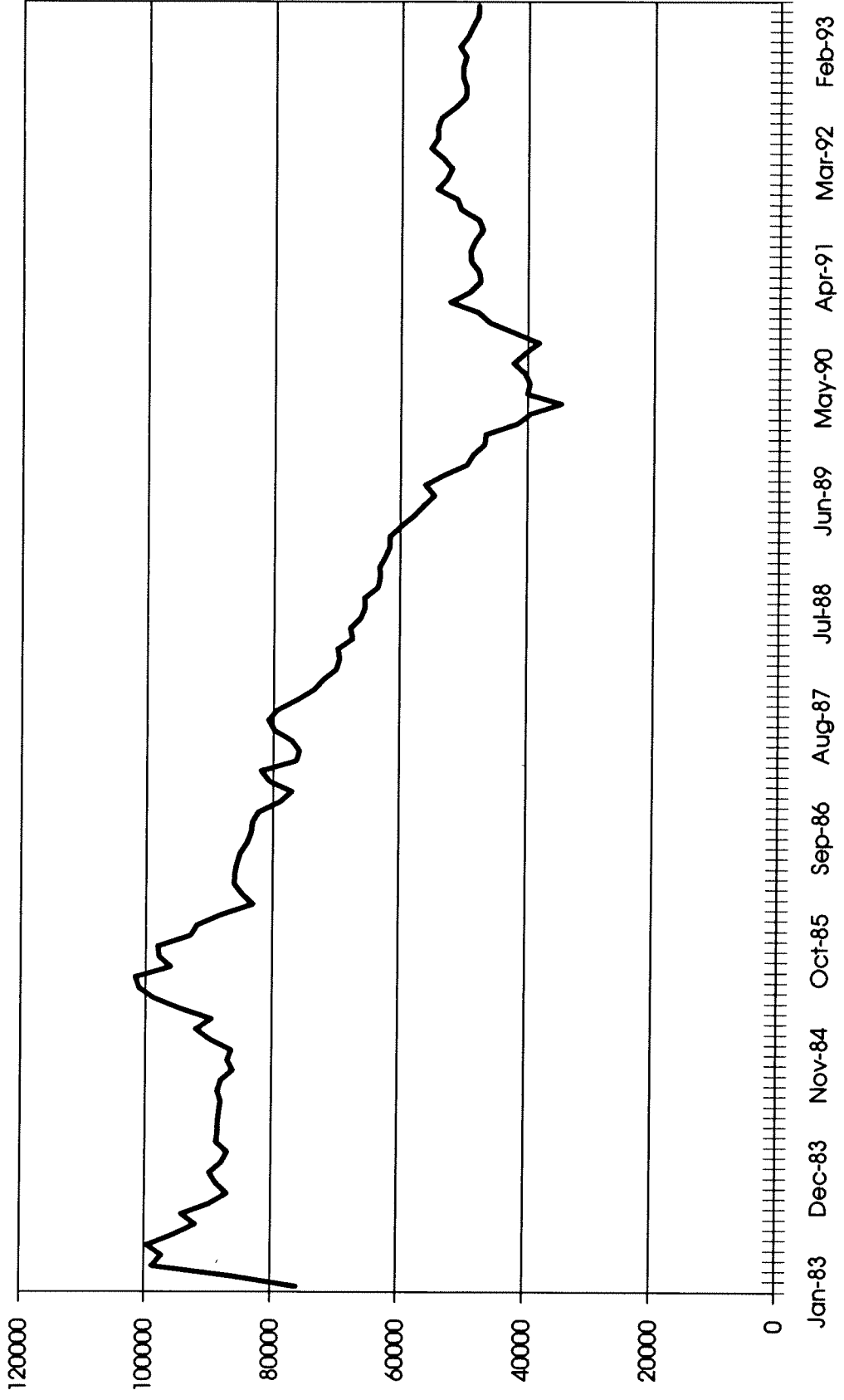




Figure 8

Real Exchange Rate in Current Cr\$ (June 1993)



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