Exchange rate based stabilization plans: the Brazilian experience with a target zone regime*

Maria Luiza Falcão Silva[§]
Thomas S. Torrance[¤]

RESUMO

Esse artigo avalia a experiência recente brasileira com um programa de estabilização ancorado no câmbio, o Plano Real, seu desenvolvimento e perspectivas. Os aspectos relacionados com o uso da taxa de câmbio como âncora neste programa de combate à inflação, o papel desempenhado pela credibilidade do público nas políticas governamentais e a interação entre credibilidade e expectativas com respeito à sustentabilidade e viabilidade de políticas governamentais de estabilização são discutidos. Finalmente, os problemas que surgem quando novos arranjos institucionais, do tipo mudança no padrão monetário ou criação de uma regra para expansão da base monetária, são implementados e a evolução dos principais indicadores econômicos, durante e após a adoção do plano de estabilização, são examinados numa tentativa de retirar desse experimento lições para o futuro. Os efeitos da crise mexicana de dezembro de 1994 sobre a economia brasileira são, também, enfatizados.

Palavras-chaves: Plano Real, políticas de estabilização, credibilidade, âncora cambial.

ABSTRACT

This paper analyzes Brazil's recent experience with an exchange rate based stabilization program, the Plano Real, its development and future possibilities. The feature of using the exchange rate as an anchor in a disinflation program and the role of its credibility and its interaction with expectations regarding the sustainability and political feasibility of government stabilization policies are examined. Finally, the problems that have arisen while establishing new institutional arrangements, such as a new currency or a policy rule for monetary base creation, and the evolution of the main economic indicators, during and after the implementation of the program, are briefly discussed in an attempt to draw from this stabilization experiment lessons for the future. The effects of the Mexican crisis of December 1994 upon the performance of the Brazilian economy are also emphasized.

Key words: Real Plan, stabilization policies, credibility, exchange rate based stabilization programs.

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§ Departamento de Economia, Universidade de Brasília, Brasil.

¤ Department of Economics, Heriot-Watt University, Edinburgh, UK.

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1 Introduction

The subject of this paper is the development of the new Brazilian stabilization reform and its future perspectives. In Section 2 previous exchange rate based disinflationary programs implemented in Latin American countries are described, and in Section 3 we present a brief discussion of how a target zone regime works. The main elements that compose the Real Plan are analyzed, and the evolution of the main economic indicators during and after the implementation of the plan comprise most of Section 4. It becomes clear that one of the main limitations of the program is related to the connection between exchange rate policy and its dual:the rate of interest. Public savings are transferred to domestic and foreign bond holders while the internal public debt grows steadily. The overvalued exchange rate explains the low competitivity of the export sector and the bad performance of the trade account. High interest rates curtail all kinds of investment and lead to the slowing down of the economy to a growth rate of around 4% a year.

Summarizing the main conclusions of the study, presented in Section 5, the authors argue that in its reliance on volatile foreign savings of a very short-term and speculative nature, the Real Plan may suffer from long-run credibility.

2 Exchange rate based stabilization experiments: an overview

The hyperinflations prevailing in several developing countries, particularly those in Latin America countries in the late 1970s and 1980s led to a variety of deflationary stabilization experiments. The successive failures of most of these experiments (exceptions are Chile and Israel) has led several of these countries to implement alternative types of the so-called exchange rate based stabilization programs (ERBSP). Historically, since the late 1970s, some Latin American countries, particularly those from the Southern Cone - Argentina (December 1978), Chile (February 1978), and Uruguay (October 1978), decided on inflation stabilization programs based on an announced path for the exchange rate with a declining rate of devaluation (the *tablitas*). The most recent experience is Brazil's (July 1994) attempt, the case study that will be examined in this paper. The argument was that stabilization programs based on the exchange rate exerting the role of a nominal anchor would act directly on inflationary expectations, which were considered a key determining factor of short-term inflation, thus increasing the chances of lowering inflation at no significant real cost. This type of stabilization program has not been restricted to Latin American countries. Several developing economies elsewhere have engaged in similar programs. Kiguel and Liviatan (1992a), for example, drawing on the empirical evidence of exchange rate based stabilization programs in countries

with chronic inflation highlighted that the response of the economies to such programs follows a pattern that resembles a "boom-recession cycle", which contradicts conventional wisdom, according to which stabilization is expected to be followed by an immediate recession.[1] Other analysts (Calvo and Végh, 1994) claim that stabilization processes from high inflation situations are sometimes expansionary, but they have attributed this outcome to temporary booms accompanying ERBSP, which often turn out to be unsustainable. Nevertheless, some recent research and experience suggest that robust and credible disinflationary strategies can be more successful in controlling inflation at lower output costs. Actually, at least for high-inflation countries, a better, rather than worse, output performance has accompanied lasting disinflation experiments. This effect has been reasonably immediate, following the implementation of the stabilization program. This has been a source of confusion and puzzlement for economic theorists and policy makers alike, as Calvo and Végh (1993, p. 5) point out.

The literature in the area constantly refers to the attempts at explaining this 'business cycle' pattern of reaction, considered as an unusual characteristic of exchange-rate-based disinflation programs, presented by Rodríguez (1982), Végh (1992), Calvo and Végh (1993, 1994), and others. Easterley (1996), after reviewing the literature that deals with output behavior during episodes of stabilization from high inflation, and drawing from a sample containing 28 successful inflation stabilization experiments,[2] examines the phenomenon (the boom-recession cycle) from the point of view of exchange rate based stabilization programs (ERBSP) versus money based stabilization programs (MBSP). According to his study, the facts emphasized in this literature are: when the stabilization implemented is an ERBSP, there is an initial output expansion followed by a contraction[3] but, MBSP, in contrast, are said to have an initial contraction, followed by a later expansion. The issue is sometimes described as the choice between recession now versus recession later. Easterly (1996, p. 91) wonders: "Is the short-run expansion in ERBSP merely postponing the inevitable recession?" His main conclusions are: a) when stabilizing from high inflationary processes, stabilization is, on average, expansionary either for ERBSP or MBSP. Furthermore, empirical evidence does not confirm that the initial output expansion has to be followed by a recession later on, as inflation sharply decreases; b) this interpretation is not applicable to industrial economies and does not mean that it is easy and of no cost to lower inflation (the history of successive failures of stabilization efforts in Latin America, reported above, makes this point evident); and c) it is not easy to keep inflation down even after it has been under control for a period of two years (Mexico's December 1994 crisis is a strong example).

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1 See Ball (1993) for some recent qualification about the conventional wisdom that stabilizing inflation from low to moderate levels is costly.

2 Success is defined as inflation falling below 40%, during, at least, two consecutive years.

3 See Kiguel and Liviatan (1992b), and Calvo and Végh (1994).

According to Easterly (1996), regardless of the fact that the 'boom-recession cycle' cannot be considered a characteristic of ERBSP, "*it is certainly plausible that there is a boom-recession cycle associated with unsustainable exchange rate pegs.*"(*op. cit.* p. 91)

The behavior of the real interest rate in exchange rate based stabilization programs has also been a topic subject to much debate in recent analyses of macroeconomic adjustment in developing countries. The evidence suggests that:

> *"while real interest rates declined at the inception of the program in the Southern Cone "tablita" experiments of the late 1970s, they rose sharply in the heterodox programs of the 1980s implemented in Argentina, Brazil, Israel, and Mexico."*(Agénor and Montiel, 1996, p. 339)

Attempts to explain the divergent behavior of the real interest rate have relied on models focusing on lack of credibility and the presence of additional nominal anchors, and on expectations of future fiscal policy shocks.[4] Calvo and Végh (1993) suggest, for instance, that if money is used as an additional anchor, capital controls are imposed or a credit target is adopted, then real interest rates may rise rather than fall, at the beginning of 'an imperfectly credible exchange-rate-based stabilization program' Although it is a useful line of argument, their interpretation is not a consensus. Agénor and Montiel (1996, p. 357) argue that: *"there does not appear to be much evidence suggesting that credit policy was significantly different in the programs implemented in the 1970s and 1980s in Latin America. Capital controls were not apparently intensified at the inception of those programs either."*

It has been claimed that a lack in the recent literature relates to the fiscal implications of exchange rate based stabilization programs. Velasco's (1993) view is that an unanticipated reduction in the rate of devaluation leads to a deterioration of the financial position of the public sector, through the loss of *seigniorage* and the increase in the real cost of servicing the past fixed-rate debt issued at higher nominal interest rates. This argument, however, can be questioned.(Talvi, 1996)

A very interesting interpretation, pursued initially by Dornbusch *et alii* (1990), is the idea that everything becomes endogenous in high inflation: budget deficits, money supply etc. In this context, it is very hard to identify structural relationships between policy action and the

4 Agénor and Montiel (1996, p. 356-59) summarizes some of these models.

performance of economic variables. Following this same line of reasoning, Talvi (1996) studies the dynamics of an 'inconsistent exchange rate based stabilization policy', defined as a policy that fixes the exchange rate without an underlying fiscal adjustment to ensure that the exchange rate policy is sustainable in the long run. His analysis, however, is performed in the context of a perfect foresight, intertemporal optimizing, cash-in-advance model. He starts from the literature on balance of payments crises,[5] pioneered by Krugman (1979) with the additions introduced by Calvo (1987). The latter considers the initial consumption boom and subsequent contraction associated with observed ERBSP.[6] Talvi's (1996) work is an interesting attempt to link the consumption boom and public sector finances. He suggests that:

> *"Since temporary stabilisations in this context generate a boom in the level of consumption, tax revenues increase together with consumption and the fiscal deficit endogenously improves. The improvement may conceivably.....eliminate the fiscal deficit altogether. As a consequence, along the path to the b-o-p (balance-of-payments) crisis the economy displays no fiscal deficit and no loss of international reserves."*(Talvi, 1996, p. 4)

From the ideas presented above, we can conclude that, in fact, the implementation of stabilization programs by developing countries is a challenging decision .Understanding the whole process is a conundrum. As Talvi (1996) very appropriately puts it: "*what you see is not exactly what you get.*"

But there are at least three common aspects to all the ERBSP recent experiments:

The first of these aspects is, of course, the fact of using the exchange rate as an anchor. Regardless of having been used in most past experiences, by countries adopting an

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5 According to Krugman (1993, p. 62 and 75), a balance of payments problem - defined as a situation in which a country is gradually losing reserves- becomes a balance-of payments crisis when speculators attack the domestic currency in the sense of a run against it. A speculative attack on government's foreign reserves is interpreted as natural outcome of maximizing behavior by investors a process by which investors change the composition of their portfolios, reducing the proportion of domestic currency and increasing the proportion of foreign currency. "*This change in composition is then justified by a change in relative yields, for when government is no longer able to defend the exchange rate the currency begins depreciating*" (*op.cit.* p. 62). Therefore, the final outcome is a sudden fall of international reserves to a critical level leading to the collapse of the exchange-rate regime.

6 The intuition behind the consumption 'bubble' is the following: as the result of the reduction in the rate of devaluation (understood, however, as a temporary phenomenon) the nominal interest rate also falls reducing the current effective price of consumption in relation to future prices. The outcome is an intertemporal substitution effect, leading to an increase in current consumption. However, "*when the policy is abandoned - i.e. the rate of devaluation is increased - consumption falls below its pre-stabilization levels.*"(Talvi, 1996, p. 3)

exchange-rate anchor, the initial conditions were characterized by: fundamental indexation, an accommodative monetary policy, and a crawling peg exchange rate policy - with the currency periodically devalued according to, for example, the purchasing power parity principle (PPP). In the new experiments, the adoption of predetermined or preannounced exchange rate anchors represents a fundamental change in the exchange rate regime. Its success becomes conditional on the credibility of the policy shift.

The second aspect is related to the fact that by the late 1980s a different strand of analysis stressed the disinflation aspect of the programs, rather than short-term output stabilization, as a foundation for the choice between monetary and exchange rate targeting. (As a matter of fact, Chile decided to follow this path in the 1970s.)

The third aspect is that ERBSP have been implemented in a scenario, the late 1980s or the early 1990s, clearly characterized by enormous transformations in the global economy. The globalization of finance proceeding more rapidly, and being more extensive, than the globalization of trade (Kregel, 1996, p. 3). This has created additional problems for stabilization policies and has disrupted stabilization efforts. As Edwards (1996) suggests, these stabilization programs, when combined with large capital inflows intermediated by weak banking systems, may generate situations of exchange rate overvaluation, vulnerable financial sectors, and eventually the collapse of the currency.(*op. cit.* p. 176)

The experience with exchange rate based disinflation stabilization programs has not been restricted to Latin America and/or developing countries with chronic high inflation. Detragiache and Hamann (1997) review the experiences with ERBSP of Italy, Ireland, Portugal and Greece during the period 1980/96. According to their analysis, the outcome of these programs do not match the general pattern identified by the literature. Most programs were not accompanied by an initial expansion as disinflation tended to be contractionary. Italy (1987-92) and Greece (1994-96), however, exhibited most of the elements of the ERBSP identified above.

The purpose of this paper is not only to examine whether the stylized facts that characterize most ERBSP underlie Brazil's recent stabilization efforts, but also to search for further interpretations.

Easterly (1996) points out that there is some fragmentary evidence when examining historical hyperinflation, which suggests that employment does not recover as well as output after an inflation crisis. This is an additional outcome that can, and should, be better investigated. It seems that understanding the first and the third aspects is the key to the correct answer. The first aspect is directly connected to the so-called 'credibility issue'. As Edwards (1996) states:

> *"If the public believes that the authorities' preferences have changed, inflationary inertia is likely to decline very rapidly. On the other hand, if private agents doubt the authorities' commitment to the new exchange rate regime, inflationary inertia will barely be affected."*(Edwards, 1996, p. 176)

In the section that follows, some relevant characteristics of target zones, the main exchange rate arrangement that has been applied in the context of the ERBSP recently implemented in Brazil, will be briefly qualified. ERBSP come in two ways: either a truly nominal fixed exchange rate system (as embodied in currency boards, for instance); or a pegged regime with escape clauses (as embodied in target zones). The Brazilian option in the course of the implementation of the *Real Plan* was the target zone regime (in contrast, Argentina adopted the first alternative).

3 Target zone arrangement

The target zone arrangement is a system in which the exchange rate can move 'freely' within the edges of the zone or bands - a lower and an upper limit - established explicitly or implicitly by the monetary authorities. The fixed reference target (the FEER - Fundamental Equilibrium Exchange Rate), around which the exchange rate fluctuates, is theoretically estimated as a parity that is thought likely to guarantee the internal and external balance of the economy. In order to reconcile this proposition with the defense of flexible exchange rates, Williamson (1987, p. 203) argues that the wider the bands around the fixed FEER, the more advantage the country can take of the 'social functions' of exchange rate flexibility, in a context of fixed exchange rates. The literature on target bands developed enormously after Krugman's (1991) seminal paper on this subject. His main intuition was that exchange rate bands dampen the volatility of the exchange rate.

The basic idea of these models is strikingly simple, although the mathematics is not. When the bands are credible and rational expectations prevail, the movements of the exchange rate, once determined by 'fundamental variables', will not go beyond the limits of the band, given the expectation that governments are committed to intervene to defend its limits.

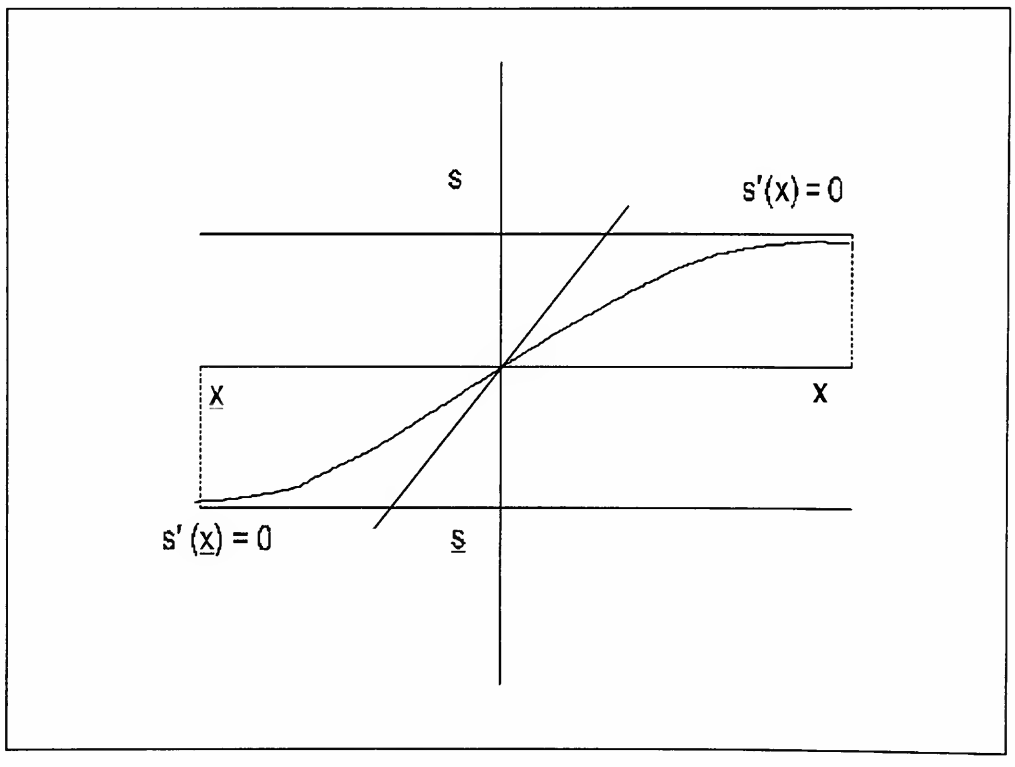
The main points are the following:

Target bands stabilize the exchange rate, turning its path away from a free floating regime.

The dependence of the movement of the exchange rate on the movement of the 'economic fundamentals' decreases as the exchange rate gets closer to the borders of the band by the anticipation of government intervention.

Chart 1 shows the functioning of a target band system. It is assumed that the authorities implement a policy of keeping the exchange rate (s) in the following interval: $\underline{s} \leqq s \leqq \bar{s}$ In order to obtain this, the government is expected to intervene so that the fundamentals (x) will be constrained to an interval of $\underline{x} \leqq x \leqq \bar{x}$ Thus, in other words, the imposition of a band on the exchange rates implies a band for the fundamentals as well.

Chart 1
Target Band Arrangement



The commitment to defend the exchange rate band is not enough to sustain the band. The same consistency limits imposed on the fixed exchange rate are valid on the exchange rate band. Excessive credit supply will invariably reduce the stock of reserves and induce a speculative attack on the currency.

The imposition of target bands is frequently regarded as convenient. According to Frenkel and Goldstein (1986), it works as an anchor for exchange rate expectations in the medium term, playing a stabilizing role that avoids the volatility that characterizes exchange rate movements when they are left to float freely. Furthermore, the bands could allow the

establishment of discipline and coordination among macroeconomic policies, preventing misalignment of currencies and creating conditions favorable for sustained growth. It is argued that they could facilitate a more effective control by institutions such as the International Monetary Fund (IMF), acting towards an alignment of currencies and reducing the asymmetries of adjustment processes. Finally, the bands, when credible, could allow economies to escape from the effects of high capital mobility, the huge amounts of inflow and outflow of speculative capital, and the sudden changes of interest rates - all of which contributed to the collapse of the Bretton Woods system.

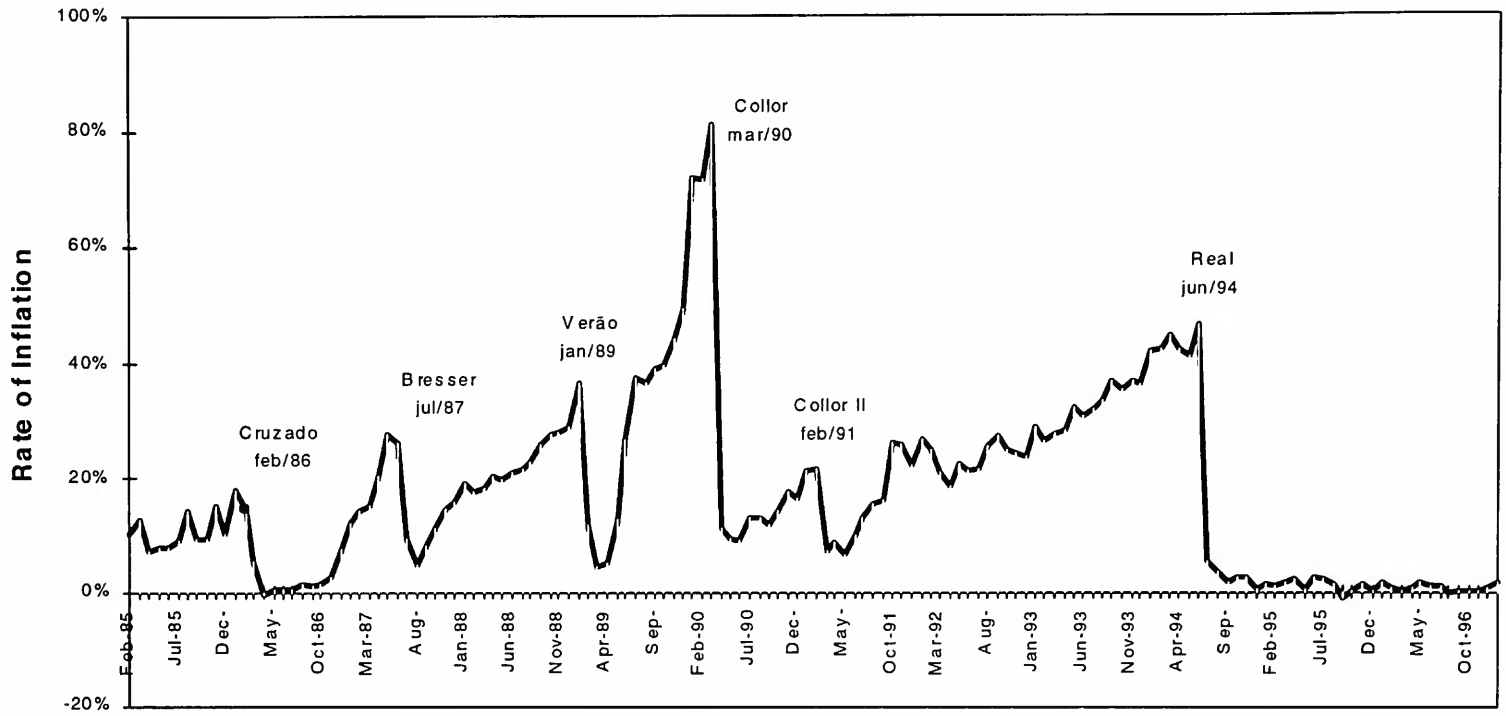
The band system is conveniently placed in between a fixed system and a floating one, representing an attempt to avoid not only the volatility of the latter, which characterized the period after 1973, but also the awkwardness of the former, which causes problems for the government and allows currencies to be subject to speculative attacks whenever the maintenance of the fixed exchange rate parity becomes difficult. Besides, the band system partially reaffirms the role of a discretionary monetary policy which is impossible in a fixed exchange rate framework.

The main advantage of target bands seems to be the fact that they guarantee some degree of freedom for monetary policy. Within the band, the economy enjoys some of the advantages of a floating exchange rate system.

4 Brazil's economic performance under the Real Plan

The *Real Plan*, officially introduced on 1st July 1994, has been considered by several analysts as the most successful stabilization program in the history of Brazil. As Malan (1995) puts it: "previous attempts were overtaken by events within a few months of their implementation and failed to reach even a first anniversary." The main goal of the recent stabilization program has been the achievement of price stability, which fosters economic development and improves income distribution - one of the country's major problems. At the end of the first half of 1994 inflation had achieved the astonishing annual rate of 7000 percent, and a monthly average rate of around 43 percent. Carefully examining Figure 1, below, we have an idea of the Brazilian monthly inflationary trend, and the succession of stabilization plans for the period between 1985 and 1996.

Figure 1
Brazil: Monthly Inflation and Recent Stabilization Programs
(1985-1996)



A detailed analysis of the Brazilian inflationary process and the contribution of Brazilian economists to its understanding appear in Silva and De Andrade (1996), who argue that inflation in some Latin American countries, and especially in Brazil, surprises economists in several ways:

It can reach absurdly high rates of 80 percent in a month (Figure 1) but never explodes.

It looks harmless to society since no social convulsion or political crisis results from a 3, 4, or 5 digit yearly inflation rate. Nevertheless, numerous Central Bank presidents and finance ministers have been 'deposed' on being blamed for their inability to control inflation. As a matter of fact, from 1985 to 1997 there were 15 different Central Bank presidents.[7]

One important element in the inflationary process beginning in 1985 is that it presents a clear inverse relationship to growth. As Silva and Andrade (1996, p. 431) point out, most of

7 The turnover of the staff in charge of the economic policy of a particular country has been used as an indicator of credibility of stabilization programs in Latin America and elsewhere.(King, 1995, p. 3)

the stabilization interventions are succeeded by a cycle characterized by the acceleration of GDP growth, followed by resumption of inflation, and then by stagnation or recession of economic activity. Indeed, this reproduces typical patterns of recent exchange rate based disinflation programs (Rodríguez, 1982) which have had as a common feature the use of exchange rates as anchors.

According to several Brazilian analysts,[8] what differentiates the new stabilization program from previous ones is the fact that numerous attempts were made to achieve equilibrium in the fundamentals before the implementation of the *Real Plan*. Moreover, the favorable picture developed on the international scene contributed to the achievement of several goals related to price alignments, balance of payments performance (current and capital accounts), budget corrections, and successful agreements for foreign debt refinancing with the Paris Club and private banks, especially after the Brady Plan in 1990.[9]

Exchange rate anchor and target zone regime

The principal element of the Real Plan was the exchange rate nominal anchor. According to the Law (Law number 9.069 approved in 29.06.1994) that created the Real (a new monetary unit), monetary policy was designed to keep in line with the dollar reserves. The relationship between changes in monetary base and movements in foreign reserves was not explicitly stated, allowing some degree of discretion. However, the Brazilian Congress established monetary targets for the first quarter following the approval of the Bill. For the next periods to come, quarterly monetary programs had to be submitted by the Central Bank to the *Conselho Monetário Nacional*, and once approved, they had to be submitted to the Senate for acknowledgment, and finally to the Brazilian Congress for approval. In December 1994, the last Provisional Measure defining the new monetary unit clearly reinforced the Law on the issue, stating that the Congress should approve monetary targets. These measures were consistent with the exchange rate policy based on a quasi-target zone regime. An upper limit to the exchange rate of one-to-one was announced and the lower limit, regardless of no explicit written commitment, was perceived by the market as lying around R$ .85 per dollar. This was identical to the establishment of an upper limit, or of a regime having just a one side band. Whenever the exchange rate came close to that parity, the market would face monetary authority intervention on the foreign exchange market.

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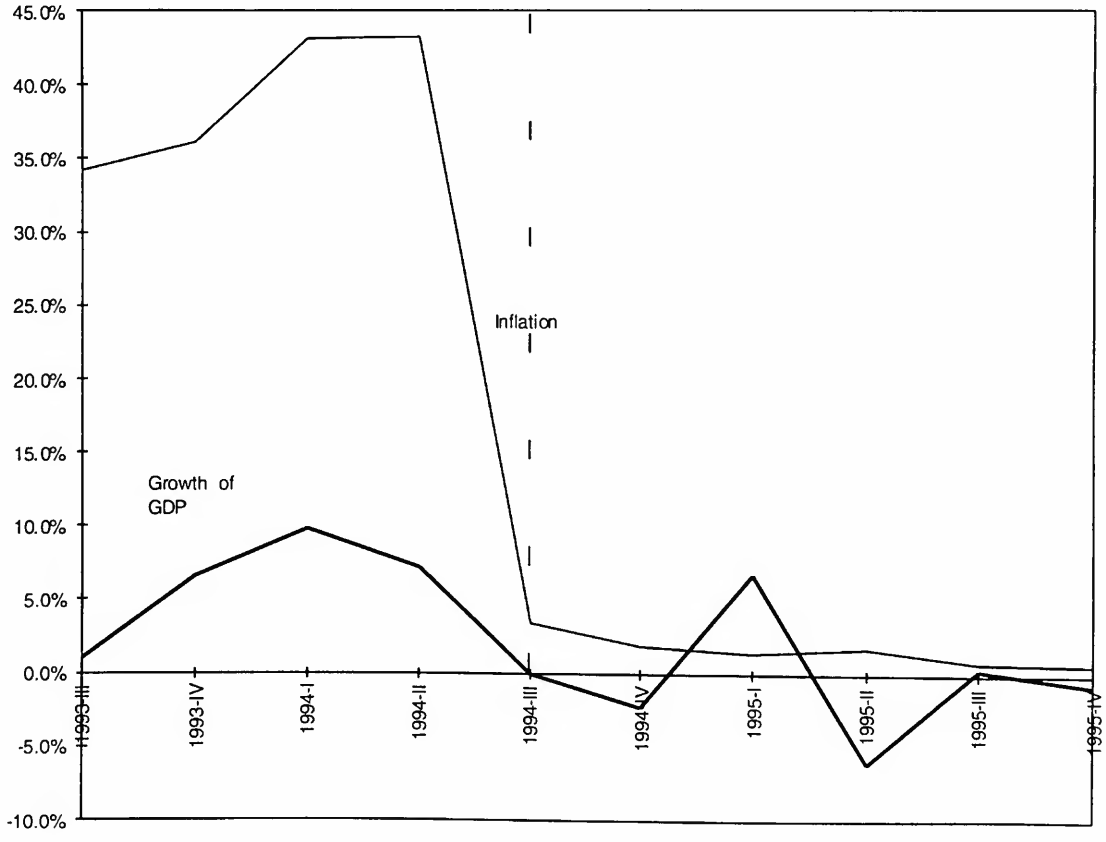
8 See Portugal (1995), and Carneiro (1995).

9 For details see Silva and Andrade (1996, p. 444-48).

Economic boom

Although economic activity level after the plan reproduced the usual economic boom that follows stabilization programs based on exchange rate anchors, it did not originate from a decline in real interest rates. In fact, interest rates have remained high throughout the period. But, as we can see in Figure 2, the activity level was stimulated as inflation rates went down in the fourth quarter of 1994 and the first quarter 1995. In the Brazilian case, the boom appears to have originated as a result of the reduction in the inflation rate, and an income shift towards the non-tradable sector (mainly services with a strong wage component), with a consequent change of income distribution toward wage earners. The wage behavior revealed a substantial increase in the period, as can be seen in Table 1, and obviously contributed to the consumption boom.

Figure 2
Brazil: Quarterly Inflation and Growth
(1993-1995)



Source: Authors' elaboration based on data published by *Boletim do Banco Central do Brasil* (several issues), and IBGE.

Indeed, there is strong evidence that income distribution substantially improved for the poorest-off. The data from PNAD (National Household Survey) shows that between 1993 and 1995 the median real wage of the 10% poorest increased 82.7% in prices of September 1995, while the top 10% had a rise of 24%.

According to Dornbusch (1997), improved income distribution with growing availability of credit explain most of the so-called consumption boom.[10]

Table 1
Brazil: Median Real Wages and Salaries
(1993-1996)(Index July 1994=100)

	1993	1994	1995	1996[1]
Median Real Income	94.0	105.1	116.3	124.6
São Paulo	105.9	109.5	122.7	137.1
Rio de Janeiro	105.9	109.5	122.7	137.1
Real Median Wage (FIESP)	95.5	104.7	113.9	119.8

[1] September 1996.

Source: Dornbusch (1997), calculated from data published by *Conjuntura Econômica*, several issues.

The exchange rate (Figure 3) appreciated substantially during the implementation of the program. The alternative measures for the real exchange rate suggest an appreciation of 40% in the period January 1994-January 1997 Two approximations of real exchange rate measures were used. One was the value of wholesale prices in dollars. It is clear that a jump occurs in June-July 1994 when the appreciation reaches approximately 50%. The other index examined was the ratio between the consumer price index and the wholesale price index, the ratio of the price of non-tradables vs. tradables. The relative price has risen to about 35%, representing a substantial shift towards non-tradables.

Cardoso (1996) presents a broad range of real exchange rate measures that confirm, in some cases, a 40% appreciation. Some additional measures are presented in Table 2 below, reproduced from Dornbusch (1997). As can be seen from these estimates, all the measures point to a substantial appreciation of the new domestic currency- the *Real*. As a consequence, the trade balance slipped into substantial deficits.

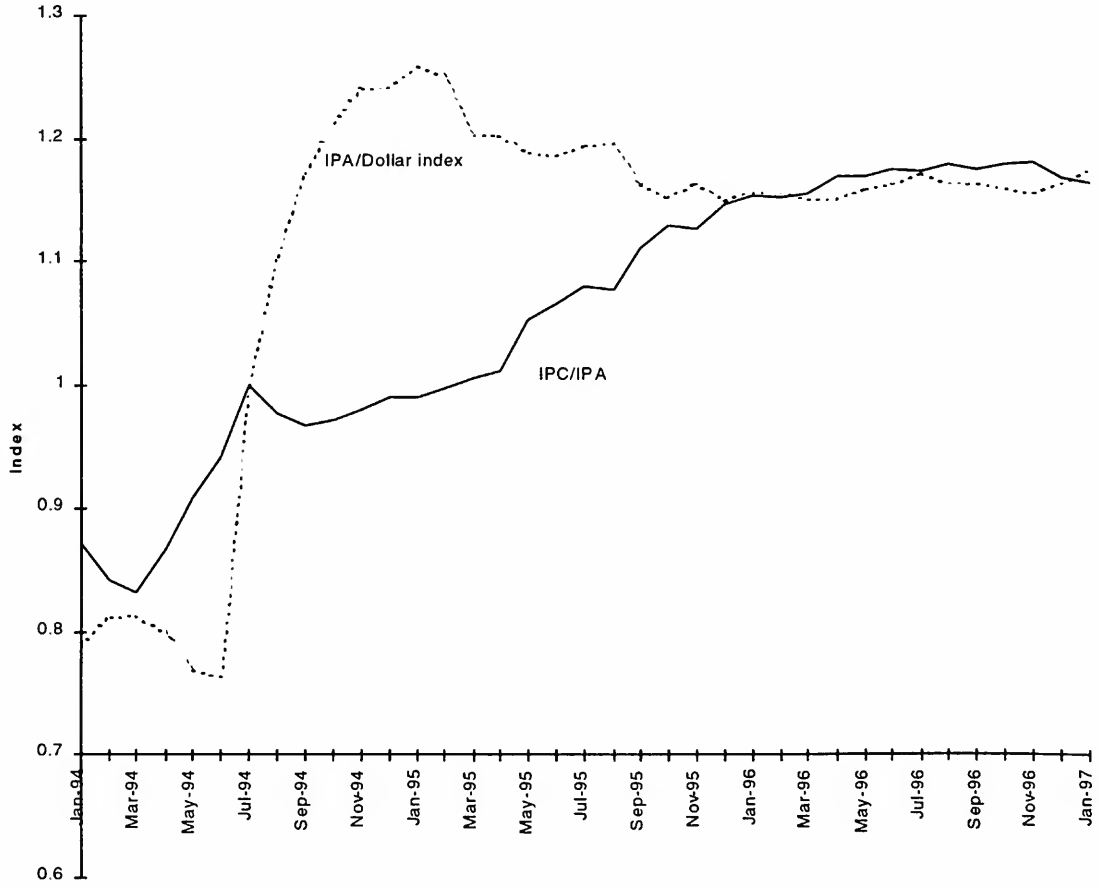
10 "*With a cumulative inflation of 38% July-94 to July-96, the total credit of the financial system expanded by 76.8 percent. Credit to consumers over that period increased by 98.7 percent.*"(Dornbusch, 1997)

The pattern of stabilization plans with an exchange rate anchor is clearly confirmed: an initial boom in GDP (Figure 2), an appreciation of the exchange rate (Table 2), and, finally, a deterioration of the trade balance (Figure 4). The political pressures for depreciation of the currency was, therefore, a natural outcome of this kind of episode.

> *"Beginning in October 1994, the Central Bank began to intervene in order to avoid wide swings in the exchange rate. It should be noted that the Bank intervened both to buy and to sell in order to keep the rate within a band, but did not announce the upper and lower limits of the band."*[11] (Malan, 1995, p. 24)

At the same time measures were designed to stimulate the demand for dollars and reduce their supply.[12]

Figure 3
Brazil: Monthly Real Exchange Rates
(1994-1996)



Source: Authors' elaboration based on data published by Fundação Getúlio Vargas and *Boletim do Banco Central do Brasil* (several issues).

11 Malan (1995, p. 24). Malan is the former Finance Minister of Brazil, and a well known economist both domestically and abroad.

12 *Ibid. op. cit.* p. 24-25.

Table 2
Brazil: Real Exchange Rates - Alternative Measures
(1990-1996)

	1990	1991	1992	1993	1994	1995	1996
CPI/WPI[1]	100		109	114	129	154	172
JP MORGAN REER[2]	100	80	73	82	95	101	97
Manuf REER[3]	100	73	74	82	89	94	92
Indust REER[4]	100	78	78	89	96	98	97
CPI REER[5]	100	88	78	82	93	112	120
Wage in Forex[6]	100	83	89	107	139	196	245

Sources: Dornbusch (1997).
[1] Index 1990=100, Source IMF; [2] Index 1990=100, Source J P Morgan; [3]Index 1988=100, Source Ipea; [4] Index 1992=100, Source Fundap; [5] Index 1992=100 Source Fundap; [6] Index 1988=100, Source IPEA.

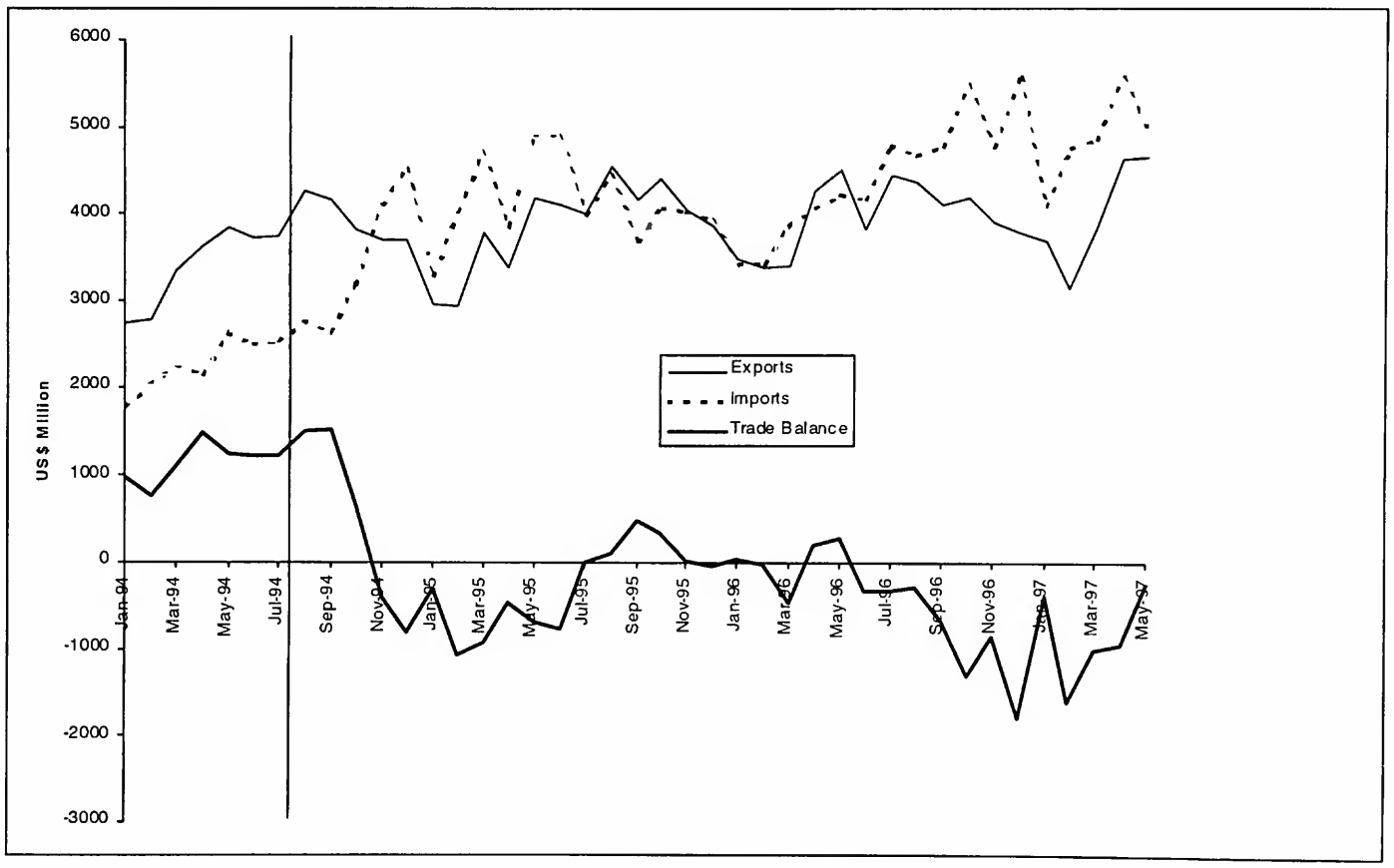
Stability of the program

A fundamental test of the stability of the Brazilian program was the Mexican crisis of December 1994. The government resisted a maxi-devaluation but in March 1995 introduced a system of 'expressly stated' bands, with the possibility of periodic revisions to avoid a misalignment of the exchange rate. In other words, a moving target zone regime. Credibility was challenged, with all the consequences that the recent literature has raised about this important issue. Calvo (1994) illustrates how perverse the effects of stabilization-liberalization programs can be when they are not fully credible. He suggests that a trade liberalization program that individuals think may be abandoned in the future since future tariffs could rise, for example, will induce individuals to buy more imports now then they would if full credibility was the rule.

> *"This intertemporal substitution - which in practice shows up most notably in durable goods - may be socially costly because it is based on an intertemporal distortion (imperfect credibility). Thus, imperfect credibility could give rise to a socially costly consumption boom."*(Calvo, 1994)

Calvo's analysis may help to understand the initial consumption boom that followed the *Real Plan* with repercussions upon the trade balance. Figure 4 depicts the impact of the change in policies upon the trade in visible goods a sharp deterioration.[13]

Figure 4
Brazil: Monthly Trade Balance
(1994-1996) (US$ million)



Source: Authors' elaboration from data published in *Boletim do Banco Central do Brasil*, several issues.

The size of the effects on the financial system, particularly on the foreign assets, on one hand, and on the monetary policy on the other, is of great importance to understand the monetary regime and its commitment to limit discretionary actions.

The spillover of the Mexican crisis seriously affected the net inflow of capital, particularly portfolio capital, as can be seen in Figure 7 below. Between January 1995 and March 1995 there was a net capital outflow of US$ 2,052 million. This is a high figure considering the fact

13 Intertemporal substitution effect that Calvo points out appears whenever there is lack of general credibility on the stabilization plan being not restricted to commercial liberalization policies. In the Brazilian case the performance of the trade balance is certainly related to the overvaluation of the domestic currency discussed elsewhere in the paper.

that in the first six months following the implementation of the *Real Plan* there was a net inflow of US$ 677 million. Brazil was losing reserves due to the speculative outflow of portfolio capital, and also due to a substantial deficit in the trade balance. The latter can be explained partly by the speculation in the trade of visible goods (postponement of exports and anticipation of imports *a la* Calvo's 1994 explanation) but the main cause came from the overvaluation of the exchange rate.

The effects of the Mexican crisis forced a change in monetary and exchange rate policy in order to prevent an increase of the previous speculation crisis. The informal exchange rate band was finally formalized and a regime of adjustable bands began in March 1995. On the other hand, monetary policy led to a reduction of liquidity.

In March 1995, fiscal and monetary austerity measures were implemented to control aggregate demand and to improve the balance of payments. Spending cuts for federal and state enterprises, restrictions on federal payroll outlays, and changes in legislation to increase tax revenues were the main fiscal measures adopted.

To reduce liquidity, several decisions were taken by the monetary authorities: an increase in reserve requirements for time deposits; an increase in the tax rate on financial operations involving bank loans (from 6 to 18 percent); a prohibition on financial intermediation involving commercial paper by banks; and a mandatory 60 percent deposit with the central bank on bank assets used for collateral guarantees and selected loans.

Additionally, several measures were taken on the foreign front to act directly upon the outcome of the current balance. Tariffs on special durable consumer goods and vehicles increased from 20 percent to 70 percent, representing a setback to the former liberalization policy. On the other hand, there was an elimination of taxes on the purchase of Brazilian equities by foreigners and on foreign credit transactions, and a reduction of the tax on foreign investments on fixed income funds to 5 percent. Finally, central bank authorities defined an explicit policy for managing the exchange rate band and the domestic currency was devalued by 5.2 percent.

The results of this set of policies were a slow down of economic growth, as can be seen by examining Figure 2, and, as expected, a recovery of the trade balance as the result of the recession and the currency devaluation. In August 1995, the country presented a trade surplus that remained until October 1995. But, as mentioned before, this trade balance improvement was mainly due to the temporary recession, and disappeared in the second half of 1996 with the slight recovery of the economy.

Appreciation or overvaluation

As noted previously, despite some controversy, the empirical evidence points strongly to a substantial appreciation of the *Real*. It is important to realize that this appreciation came on top of a significant reduction in tariffs, and that, in any case, appreciation does not necessarily mean 'overvaluation'. Two main elements have been brought into this discussion to justify changes in fundamentals. One is the increase in productivity during 1994/95, as can be seen in Table 3. This could accommodate some appreciation of the exchange rate. Nonetheless, this increase in productivity was more than compensated for by the increase in wages. Secondly, the substantial inflow of capital that financed the growing deficits of the current account is shown in Figure 8. The characteristics and the limits of these capital inflows will be examined later.

Table 3
Output, Employment and Productivity

	Production	Employment	Productivity
1970/80	8.96	6.45	2.36
1980/90	-0.21	-0.43	0.23
1990/95	2.83	1.30	2.56

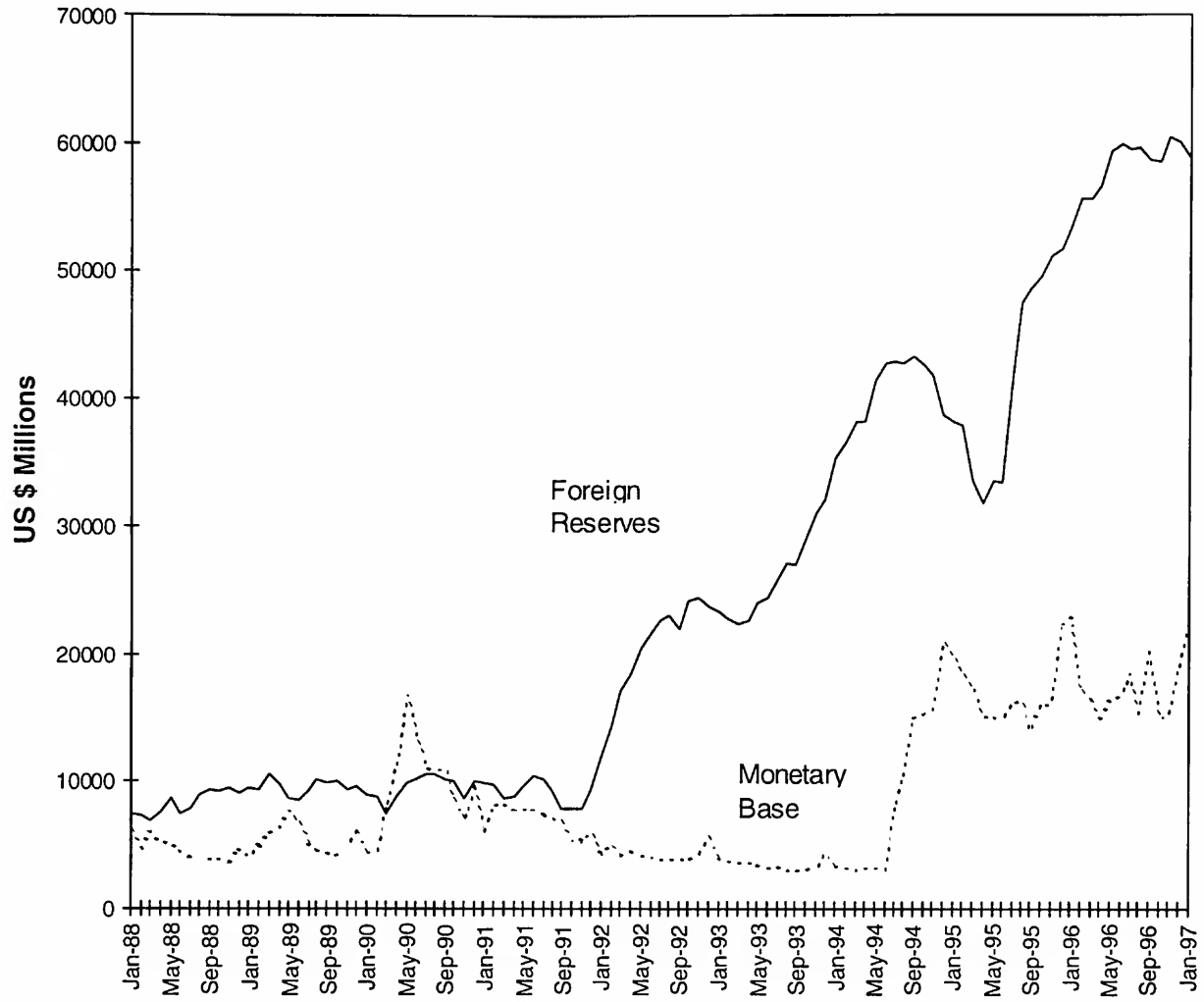
Source: Considera (1996).

Evolution of the monetary base and its conditioning factors

It is interesting to note that the monetary base and most of the monetary aggregates did not follow the foreign reserves during the period being examined. In particular, it should be noted that the monetary base was kept almost constant during the critical period between January 1995 and April 1995.

When analyzing the conditioning components of the base, it is worth noting that open market operations tried to offset the negative pressure of the decline in foreign reserves. On the other hand, during the improvement of the reserves in the second half of 1996, the monetary base was kept more or less constant. This insulation from the movements of the foreign reserves, shown in Figure 5, was remarkable.

Figure 5
Brazil: Monetary Base and Foreign Reserves
(1988-1996) (US$ million)

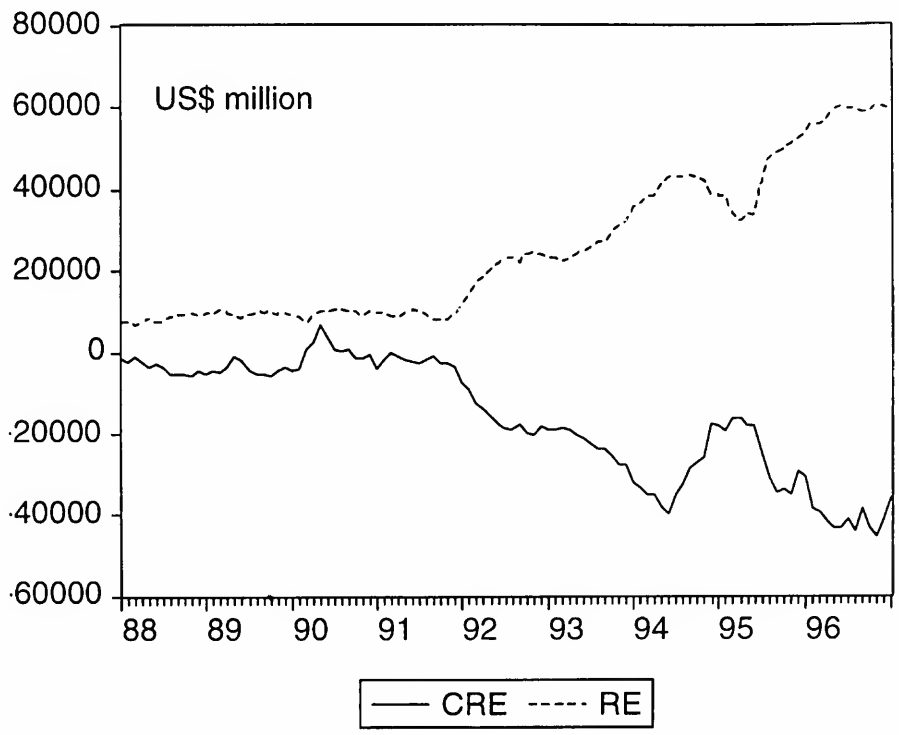


Source: Authors' elaboration based on data published in *Boletim do anco Central do Brasil*, several issues.

What is noticeable is the absence of co-movement between the two series confirming the *discretionary* character of the Brazilian monetary policy.[14] This monetary policy is consistent with the high inflow of foreign capital needed to finance imports.

14 It should be noted, however, that the second half of 1994 was marked by the monetization phenomenon. The change in portfolio of agents should bear very little relation to the foreign reserves.

Figure 6
Brazil: Domestic Credit and Foreign Reserves
(1988-1996) (US$ million)



Source: Authors' elaboration based on data published in *Boletim do Banco Central do Brasil*, several issues.

When examining the evolution of domestic credit (CRE) and foreign reserves (RE), the nature of the open market policy towards sterilization becomes clear.

It is worth investigating the long term properties of these time series, proceeding to a cointegration analysis of domestic credit and foreign reserves. For estimation purposes, the variables are measured in current dollars by their end of period balances and are taken on a monthly basis from reports of the Brazilian Central Bank.

Estimation is carried out for the period 1988:M1 to 1997:M1. From Table 1, all variables apparently yield an I(1) process under both the ADF and the Phillips-Perron tests. The results of the Johansen (1988) procedure are presented below and suggest that at least one cointegrating vector is present.[15]

Normalised Eigenvector: $CRE = -0.304248\ RE_{-1}$ Log likelihood -1746.589

(0.25139)

15 The test assumption implied no deterministic trend in the data, with lags 1 to 6, and no constant term.

According to the results below (Table 4), the non-existence of cointegration is rejected at 5%.[16]

This analysis strongly confirms the scope and nature of the sterilization policy. A long-term relationship between domestic credit and foreign reserves can be seen from the analysis. This suggests that monetary policy has been possible during this period, even in recent times.

Table 4
Unit Roots Tests

	CRE	RE	Residual cointegration
I(0)			
PP	-0.8637	0.4667	-9.6239
ADF	-1.0626	0.2495	-5.7732
I(1)			
PP	-8.8155	-6.7343	
ADF	-4.1249	-4.1610	

The critical values for 5% and 1% levels of significance are –2.88 and –3.49, respectively.

Interest rates

Since the beginning of the *Real Plan*, the government implemented restrictive monetary measures have centered on: (a) a high interest rate policy, and, (b) high reserves requirement imposed upon the banking system designed, according to the government point of view, to stimulate savings and to restrain consumer credit.[17] Despite the official explanation, the relationship between interest rates and expectation of devaluation is well-known. In fact, an interest rate band corresponds to the exchange rate band.[18] The policy of keeping the exchange rate close to the lower range of the band would correspond to an interest rate near

16 The likelihood ratio for the existence of at least one cointegrating vector was 13.61, against critical values of 12.53 (5%) and 16.31 (1%). The statistics for at least two cointegrating vectors was 3.10 against critical values of 3.84 (5%) and 6.51 (1%). Table 1 confirms the stationarity of the residuals of the cointegration equation.

17 See Malan (1995, p. 30).

18 Assuming perfect capital mobility, the relationship between the interest rate and the expected devaluation rate, according to the International Fisher effect, can be expressed as: $i - i^* = \frac{\overline{E}_t^e - E_{t-1}}{E_{t-1}}$, where i is the domestic rate, i^* the foreign interest rate, and $\overline{E}^e$ is the expected exchange rate which is considered independent of the current exchange rate. Abandoning the time index it follows that: $i - i^* = \frac{\overline{E}^e}{E} - 1$

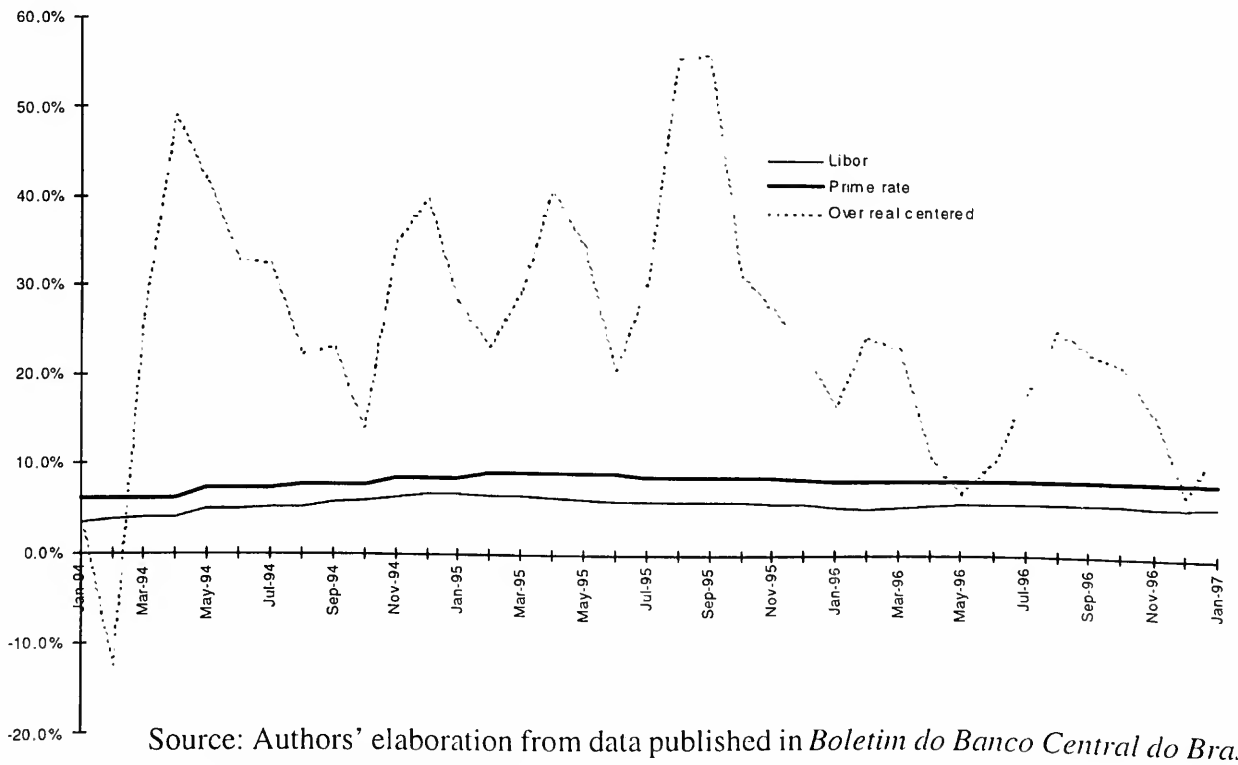
the upper range. For a clear picture of the evolution of real interest rates in Brazil, compared to the Libor, during the recent period, examine, for instance, Figure 7. The upward movement that accompanied the adoption of the *Real Plan* is most noticeable.

The interest rate declined surprisingly from December 1994 to January 1995, considering the 'credibility effect' provoked by the Mexican crisis. However, it started rising again from January 1995 to March 1995, but only slightly. It may reflect an underestimation by the monetary authorities of capital outflows. In April of the same year, the interest rate declined slightly, due, probably, to the devaluation of the exchange rate, but in June it jumped again. The so-called (and aptly named!) *tequila effect* may have reached the Brazilian economy in the second half of 1995.

Internal disequilibrium

The public deficit in Brazil has been systematic, as can be seen by an examination of the data displayed in Table 5, below. The improvement in the public accounts occurred during President Collor's term of office, due to a reduction in public services and the number of civil servants. The pattern of the operational deficit, however, returns to the previous values. The situation is not very bad in terms of comparative international standards if we look at the relation of debt to GDP. It can, however, very easily get worse, depending on the behavior of interest rates, and on the rate of economic growth.

Figure 7
Brazil: Real Interest Rates: Over, Libor and Prime Rates
(Jan 94-Jan 97)



Source: Authors' elaboration from data published in *Boletim do Banco Central do Brasil* and from IPEA's data base.

Table 5
Brazil: Public Budget (% of GDP)
(1986-1997)

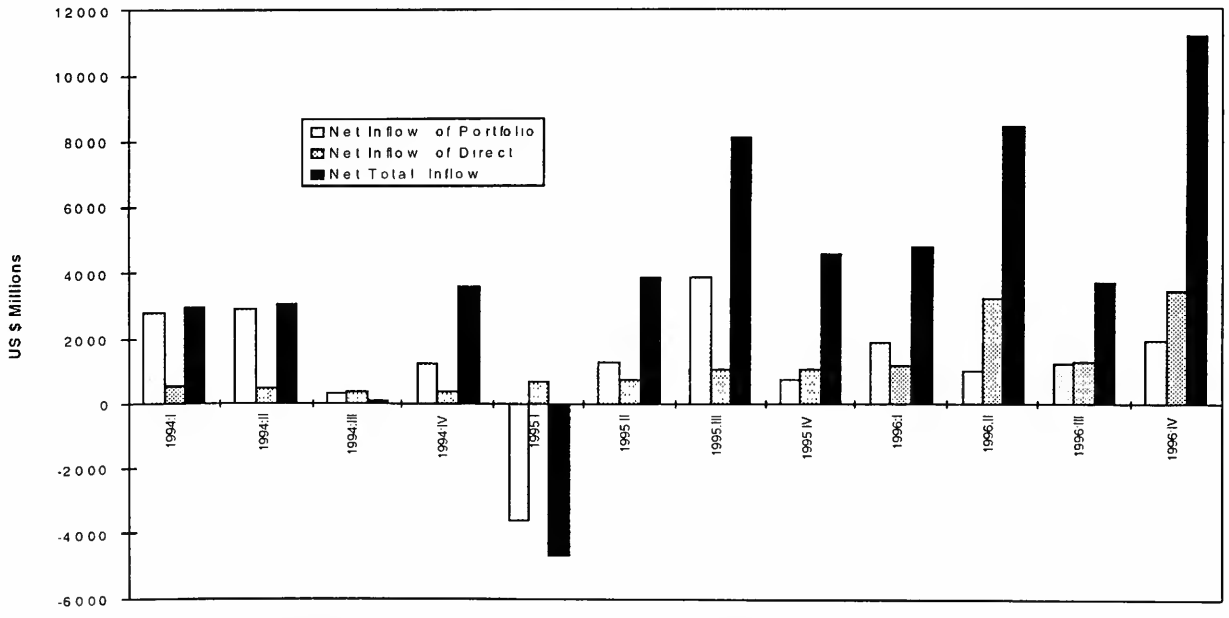
	Primary Budget		Operational Budget		Public Debt
	Total	Federal	Total	Federal	
1986	0.1	0.5	-3.9	-1.4	
1987	-2.7	-2.1	-5.5	-3.1	
1988	-0.4	-1.6	-5.0	-3.7	
1989	-0.3	-0.8	-7.3	-4.3	
1990	2.4	1.6	1.6	2.8	
1991	3.0	0.8	1.5	0.3	43.5
1992	2.3	1.3	-2.2	-0.8	42.8
1993	2.6	1.4	0.3	0	36.4
1994	4.3	3.0	0.5	1.6	28.5
1995	0.3	0.6	-4.8	-1.6	31.7
1996	-0.7	0.4	-3.9	-1.7	35.1
1997			-3.3	-1.2	41.5

Source: Dornbusch (1997), using data from Central Bank, Ministry of Finance, and Garantia.

Vulnerability to financial capital

The appreciation of the exchange rate that led to the growing trade and current balance deficits made the Brazilian plan heavily dependent on the inflow of capital. The exchange rate level was then sustained by the inflow of foreign capital (see Figure 8).

Figure 8
Brazil: Capital Inflow (US$ million)
(1994-1996)



Source: Authors' elaboration from data published in *Boletim do Banco Central do Brasil*, several issues.

The evidence of Calvo *et alii* (1993) showed that the inflow of capital into emerging markets in the 1990s was motivated mostly by the relatively low interest rates in industrialized economies rather than by broadly based economic reform in emerging markets. In other words, it was mainly due to external factors and not to the attractive performance of these economies. This sets an important limit to the programs. And in the case of Brazil, the inflow of capital is to be largely explained by the high level of interest rates (rather than by reference to some other features of the economy at that time).

On the other hand, the relationship between the volatility of foreign capital flows and the nature of the capital is far from obvious, as can be seen in Table 6.

Table 6
Averages and Coefficients of Variation of Monthly Private Capital Flows
(1988-1995)

	Net Direct Investment	Equity Securities and Special Funds	Debt Securities and Loans
1988-95			
Average	60	195	247
Standard Deviation	143	534	642
Coefficient of Variation	200	300	300
1991-95			
Average	60	308	447
Standard Deviation	152	651	507
Coefficient of Variation	300	200	100

Source: Cardoso (1996) , mimeo.

The data on the heavy private inflow of capital into the Brazilian economy challenges the notion that direct investment is stable and represents a measure of permanency in comparison to portfolio capital movements. As the evidence shows, the coefficient of variation points to the relative instability of direct investment compared to equity. This evidence is quite striking and seems to corroborate evidence that has been obtained by Classens, Dooley and Warner (1996), whose study examines the volatility of net capital flows into Brazil in the period 1975-91. Their conclusion was that short-term capital was less volatile than long-term investment, which is a remarkable challenge to conventional wisdom.

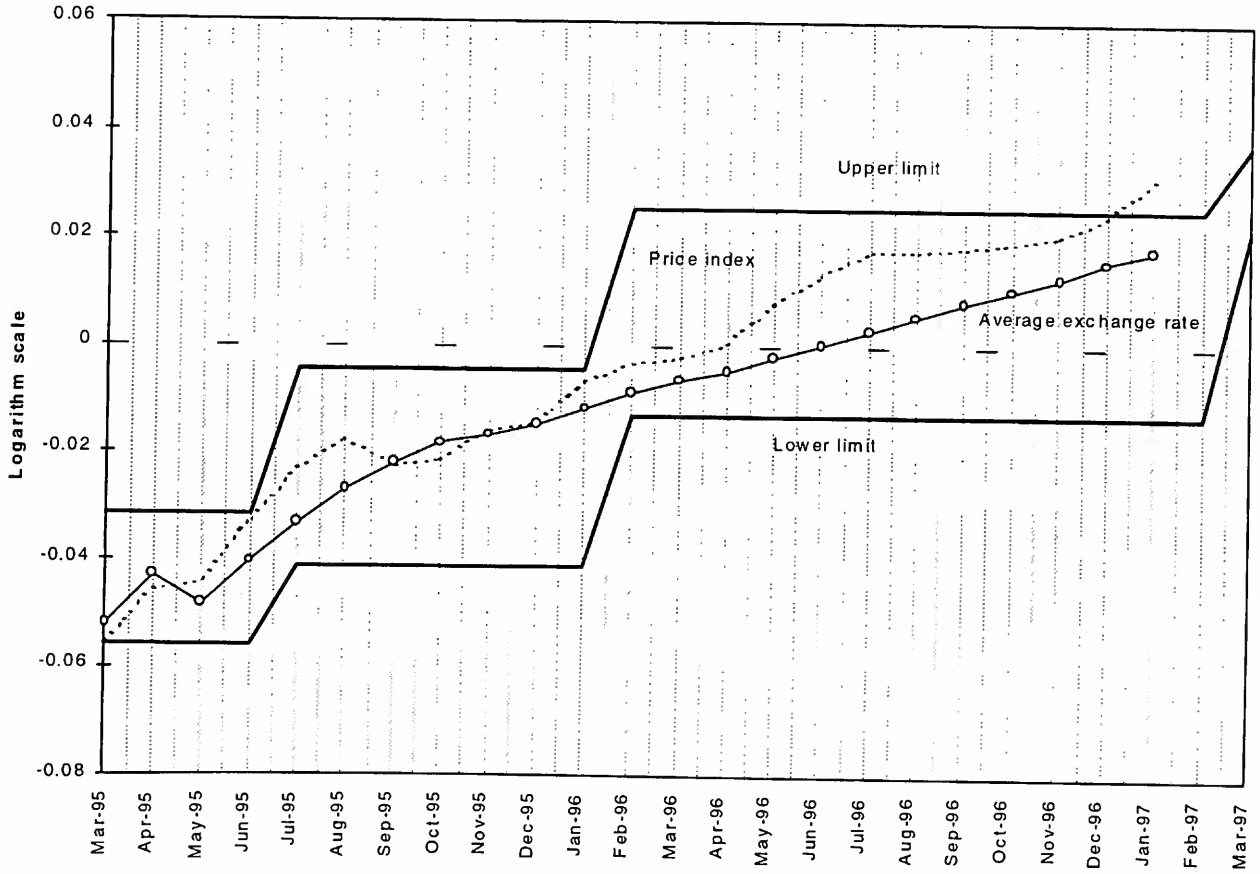
The importance of this evidence should not be downplayed since the stabilization scheme implemented in Brazil relies heavily on foreign capital inflows, as stated before. Volatility of foreign capital sets strong limits on monetary and fiscal policy and threatens the sustainability of the program.

Target bands and the credibility issue

To a great extent, the Brazilian stabilization program relies on the sustainability of the appreciated exchange rate. In this case, it is important to analyze the system of target bands. It can be summed up by Figure 9 (shown below). As can be observed, the average exchange rate is close to the middle of the band, and the limits of the band have been moving. Two aspects are clear: the relationship between the adjustment of the band and the price index, indicating that the band tends to preserve PPP; and the tendency towards the enlargement of the band from the second half of 1995 onwards.

As mentioned before, the band and its adjustment may not be credible. Moving bands may become destabilizing.

Figure 9
Brazil: Exchange Rate and Target Band
(1995-1997)



Source: *Boletim do Banco Central do Brasil* (several issues).

A simple way to test the credibility of a target band has been proposed by Svensson (1991). His experiment is based on the assumption that the differential of interest rates (internal and external) should reflect the expectation of economic agents concerning the devaluation of exchange rates. If the agents believe in the exchange rate band, that is, if the exchange rate band is 'credible', the expected exchange rate should be restricted to the band. In this case it is easy to show that:

$$\underline{s} \leq E[s(t+\tau)] \leq \bar{s}$$

where [$\underline{s}$, $\bar{s}$] corresponds to the lower and higher limit of the exchange rates, and $(t + \tau)$ stands for the time period. It follows that the rate of devaluation has to be in the interval:

$$[\underline{s}/s(t),\ \bar{s}\ /s(t)]$$

The corresponding interval for the interest rate (r) becomes:

$$r_{max} = [(1+r^*)\bar{s}/s(t)] - 1 \qquad r_{min} = [(1+r^*)\underline{s}/s(t)] - 1$$

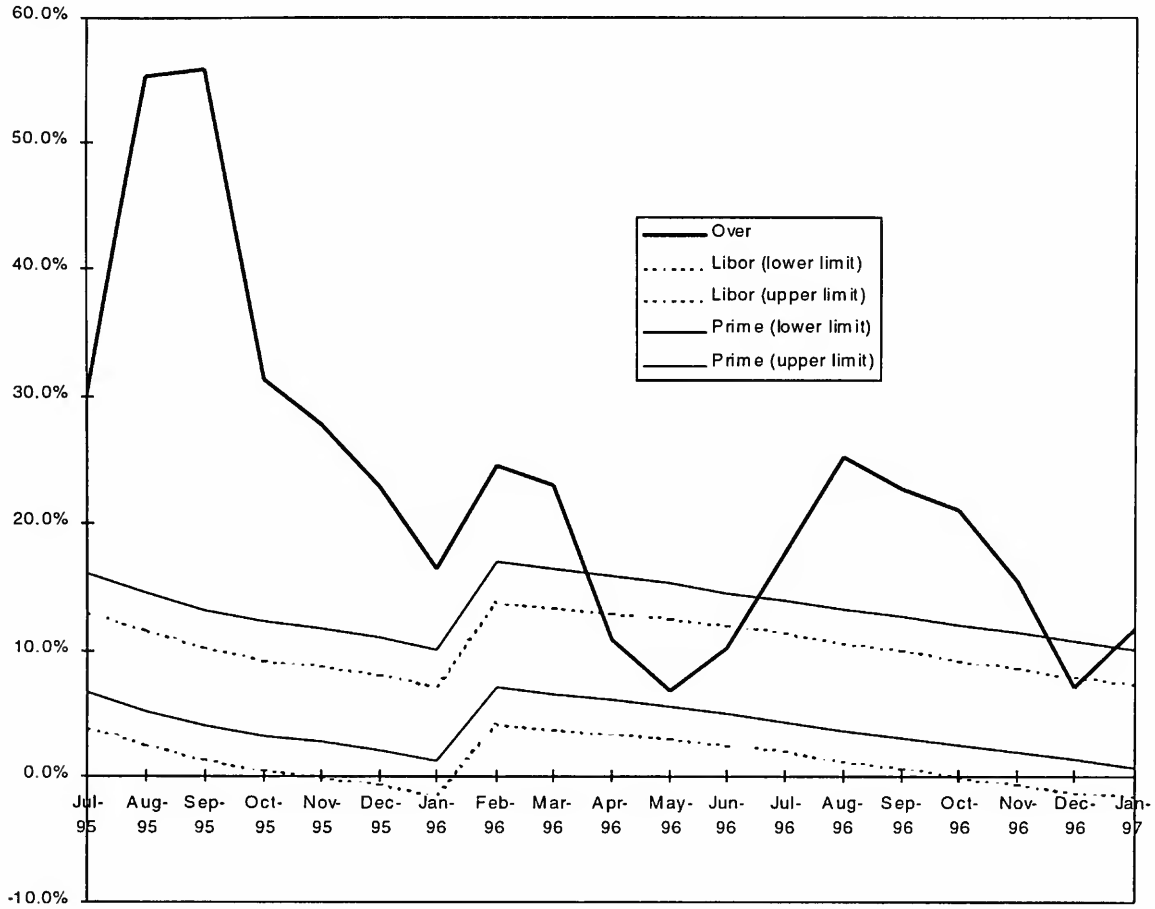
where the * above a variable denotes its foreign, rather than domestic, level.

Using exchange rate data from Brazil, two real interest rate bands were built, based respectively on the monthly series of Libor and Prime Rate.

The observations of the monthly real overnight rates show that they do not fall in either interest bands. The deviation of the rate of interest from the limits of the band is particularly serious in the aftermath of the Mexican crisis. The test seems to indicate that the band became more credible during 1996, especially in the first semester.

This test assumes that there is perfect capital mobility but points to the existence of a risk premium, which seems, however, to question the credibility of the band. As Cardoso (1996) shows, most of the data on covered interest parity indicates that, during the majority of the period examined, the interest rate differential exceeds the expected exchange rate devaluation.

Figure 10
Interest Rate Bands (Svensson test)
(1995-1996)



Source: Authors' elaboration using data published by *Conjuntura Econômica* (several issues), and Brazil's Central Bank data base.

The spillover from the Mexican crisis is concerned did not last long in relation to its effects on the inflow of foreign currency. Figure 8, presenting recent monthly data on the net foreign capital inflow into Brazil, shows that during the second quarter of 1995, a more favorable picture developed on the international scene, and the country was able to attract huge amounts of foreign capital, compensating for the increasing deficits in visible trade and on the current account balance. The reserves (excluding gold and SDRs) reached the huge figure of US$ 51 billion by the end of 1995, much higher than they were prior to the Mexican crisis. However, it is well-known that there is a cost for building up reserves.[19]

19 Quoting Brazil's Finance Minister:"*There is a cost for building up reserves, but we wanted to make clear that a crisis such as Mexico's peso collapse was not going to happen in Brazil...We don't envisage the need to continue the reserve build up from now on.*"(*Business Week*, February 26, 1996)

Perspectives of sustainability of the program

The boom-recession pattern of the Brazilian stabilization program is clearly shown in Figure 2. The fall in the quarterly growth rate of GDP during the recent period is quite clear. As far as gross fixed capital formation is concerned, the expected annual average percentage change presents a decrease from 13.5% in 1995 and is expected to fall by 6% in the next two years (1996 and early 1997), which contradicts several optimistic analysts.[20]

The amount of the debt, and the growing debt to GNP ratio are, obviously, related to the maintenance of the differential between domestic and foreign interest rates (which reinforces the quantity of foreign reserves considered safe to back the nominal exchange rate anchor).

From our point of view, the picture that comes out of the data presented points towards a disequilibrium in the fundamentals. The rate of interest is too high, and/or the exchange rate is too low. The real 'duals', so to speak, of these nominal disequilibria are the public deficit, the negative trade balance and growing unemployment: in other words, low internal savings and recession.

The growth of the public debt is obviously connected with the high interest rate policy and the sterilization operations undertaken by the monetary authorities to sustain the tight monetary policy. Table 5 well illustrates this point.

The absolute quantity of the debt and the growing debt to GNP ratio are also related to the maintenance of the unsustainable differential between domestic and external interest rates, a device to bolster the quantity of foreign reserves considered safe to back the exchange rate anchor. We cannot forget to add the public external debt, which amounts to around US$ 120 billion, to the internal debt. Added together, the two are worth more than US$ 230 billion at the present point in time.

5 Concluding remarks

According to Dornbusch's analysis of the recent stage of the Brazilian disinflation program:

> *"Brazil's stabilization to date has been a consumption drive and most popular experience: real wages were raised dramatically, the real*

20 These figures are official estimates by the Brazilian institute of Geography and Statistics (IBGE).

> *exchange rate was allowed to appreciate significantly. The public celebrates the end of inflation, but in fact they are celebrating a large rise in real incomes which they associate with the end of inflation rather than with potentially unsustainable real wages and real exchange rate."*(Dornbusch, 1997, p. 19)

There are strong forces in the system that resist the necessary reforms required to bring equilibrium to the fiscal budget. In this case inflation will inevitably return as a result of the imbalances of the system. In the short term, we can visualize an accumulation of trade deficits. Credibility crisis and flight of capital would then set the scenario for a maxi-devaluation. The public deficit would push up the money supply, given the high interest rates. The vicious circle of inflation, followed by monetary accommodation, could then easily be reestablished.

Dornbusch's (1997) paper has a suggestive title: "Brazil's Incomplete Stabilization Reform." As a matter of fact, in 1994, together with Werner, he wrote an article that became famous because they were among very few analysts to predict the Mexican crisis of December 1994. Although Dornbusch does not believe that Brazil faces the risk of a Mexican style collapse, since, in his view, "*there is no single point of acute vulnerability and there is a maximum flexibility on the part of policy makers*" (*op. cit.* p. 17), he also suggests that "*Brazil will be able to hold on to the stabilization, proceed along with moderate reform and much financing... The point is that hanging on cannot last forever.*"(*op. cit.* p. 17).

Summing up:

The main characteristic of the Brazilian recent stabilization experiment was the reliance on the exchange rate as a nominal anchor. As far as ERBSP is concerned, an acceptable proposition is related to the impossibility for a country, under conditions of capital mobility, to continuously control its money supply. This has been registered in the economic literature as the "*impossibility theorem*" In the case of Brazil, discretionary policy has been relatively successful in controlling the money supply at the cost of high interest rates and growing public debt. Its main lesson, however, is the danger of attempting to rely in practice on a tool that can never function reliably.

Another important limitation of ERBSP is the vulnerability of the economy to external shocks. The fairly general evidence seems to point towards a strong vulnerability to upsets from external shocks even with target band regimes. In the case of Brazil the presence of the external shocks is evident.

This is an important point. Once the economy follows a fixed exchange rate rule or a narrow band arrangement, it becomes more vulnerable to external shocks than when it follows a floating regime. Since this is the case, the time inconsistency problem rears its head and credibility becomes a fundamental requirement for the system if it is to survive.

In addition, a complicating aspect of ERBSP is the fact that nominal anchorage of the exchange rate tends to bring with it a growing disequilibrium of the visible trade balance. Price stabilization is easy to reach at the cost of a growing distortion of relative prices. This is a characteristic shared by all stabilization programs based on exchange rate anchors and it is supported by the data used while examining the Brazilian case. Relative price distortion exacerbates the problems that these economies have to face and increases the possibility of time inconsistent behavior by policymakers. At this point of the discussion, another conclusion should be introduced: it is impossible to maintain continuously overvalued exchange rates, and thus fixed overvalued exchange rates lose credibility sooner or later, becoming vulnerable to speculative attacks.

In practice, these two dilemmas present themselves to Brazil: discretionary policy with fixed exchange rates leads to disaster, and overvalued exchange rates lead to credibility crises. Furthermore, these two situations tend in practice to reinforce each other.

Corrective devaluation to restore equilibria in relative prices, taking into account the degree of openness of the economy, and the productivity of the tradable versus nontradable sectors seems to be, in theory, the appropriate policy choice. In this sense, an exchange rate regime based on flexible target zones seems to be an advantage. It gives to countries a greater autonomy over policy making, at the same time as it exerts a stabilizing effect on volatile exchange markets. But, this is only true if markets are confident that the edges of the target zones will be defended successfully. Brazilian exchange rate policy points in this direction. In order not to make a naive conclusion, it is worth mentioning that if markets can figure out the fragility of the band edges, speculative attacks occur, and a target zone regime loses much of its stabilizing power. Actually, it may even become destabilizing in an international scenario in which great uncertainty prevails.[21]

Additionally, it is important to introduce the proposition that the vulnerability of the emerging economies, especially in the 1990s, has been largely associated with capital mobility. In most

21 According to Obstfeld (1995) this was the situation behind the Spanish peseta's crash in March 1995.

cases, speculative crises are associated with a conjunction of external and internal causes. The example of Mexico (which we have not examined here) is very enlightening. The recent collapse of the South-East Asian currencies is a further exemplification of what can happen when external and internal factors are ripe for a speculative crisis.

It is interesting to emphasize the essence of the speculative crises that have been the subject of analysis by theorists with different backgrounds and related to different schools of thought. They are not crises of 'fundamentals' only, but have been crises associated with self-fulfilling expectations. This interpretation supports Calvo's (1995) and Calvo and Mendoza's (1996a and b) insight that international capital mobility with costly information tends to lead to 'herd behavior' This behavior is often associated with self-fulfilling expectations in the sense that is not based on 'fundamental forces' It is interesting that what has been referred to as 'herd behavior' resembles what Keynes described simply as 'conventional behavior' in the face of uncertainty· both types of behavior imply that irrational fluctuations in expectations are at work.[22]

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