Making the Transition from a Fixed to a Floating Exchange Rate Regime: The Case of Brazil

Lauro Vieira de Faria

Working Paper No. 53
March 2001

Lauro Vieira de Faria is an economist at the Brazilian Institute of Economics (IBRE/ FGV). He prepared this paper especially for the "Monetary and Exchange Rate Policies: Options for Egypt" conference organized by the Egyptian Center for Economic Studies on 19-20 November 2000.

Abstract

This paper evaluates macroeconomic management in Brazil from 1992 to the present, with a particular focus on exchange rate policy. It points out that while Brazil's Real Plan succeeded in halting the hyperinflation that had reached more than 2000 percent in 1993, it also caused a significant real appreciation of the exchange rate – a situation that was only made worse by the extremely high interest rates and ensuing bout of severe financial crises in the international arena. By the end of 1998, the accumulation of internal and external imbalances led the authorities to drop foreign exchange controls and allow the currency to float. In spite of some initial skepticism, the flexible rate regime cum inflation target proved to work well. Inflation was kept under control; the current account position improved significantly, real interest rates fell and GDP growth resumed.

Thus, while great challenges still lie ahead, the recent successes bestow some optimism on the well functioning of this exchange rate regime. The Brazilian case suggests that a successful transition from one foreign exchange system to another, particularly during financial crisis, does not depend only on one variable – be it fiscal or monetary. In reality, it depends on a whole set of coordinated policies aimed at resuming price stability with as little exchange rate and output volatility as possible.

ملخص

تستهدف هذه الورقة تقييم إدارة الاقتصاد الكلي في البرازيل خلال الفترة من ١٩٩٢ وحتى الوقت الحاضر، مع التركيز على سياسة سعر الصرف. وتوضح أنه بالرغم من نجاح خطة "الريال البرازيلي" في وضع حد للتضخم المفرط والذي تجاوز ٢٠٠٠ في المئة عام ١٩٩٣، إلا أنها تسببت أيضاً في ارتفاع كبير في سعر الصرف الحقيقي، وهو الوضع الذي ازداد سوءاً بمعدلات الفائدة بالغة الارتفاع وما تبعها من أزمات مالية قاسية على الساحة الدولية. وبنهاية عام ١٩٩٨، أدى تراكم الاختلالات الداخلية والخارجية إلى قيام السلطات باستبعاد القيود على سعر الصرف والسماح بتعويم العملة. وبالرغم من التحفظات الأولية، إلا أن النظام المرن لسعر الصرف مع استهداف معدل التضخم قد أثبت صلاحيته، ويتضح ذلك من نجاحه في السيطرة على معدل التضخم، وتحقيق تحسن ملحوظ في وضع الحساب الجاري، واتجاه معدلات الفائدة الحقيقية إلى الانخفاض، فضلا عن عودة إجمالي الناتج المحلي إلى النمو.

وعلى الرغم من التحديات الكبرى التي مازالت أمامنا، إلا أن النجاح الأخير قد أضفى بعضاً من التفاؤل بشأن صلاحية نظام سعر الصرف وأداؤه المناسب. وتؤكد حالة البرازيل أن نجاح التحول من نظام سعر صرف لآخر، خاصة أثناء الأزمات المالية، لا يعول على متغير واحد فحسب، سواء كان مالي أو نقدي، بل على مجموعة متكاملة من السياسات المتناسقة والتي تستهدف عودة الاستقرار للأسعار مع أقل تقلبات ممكنة في سعر الصرف وفي الإنتاج.

I. Introduction

Aiming to stop the hyperinflation that had reached more than 2000 percent in 1993, Brazil's *Real Plan* de-indexed the economy, issued a new currency and put a ceiling on the exchange rate. While the Plan was successful in achieving this goal, it caused a significant real appreciation of the exchange rate that was further aggravated by the lack of fiscal discipline in Brazil's environment of huge and volatile capital flows.

Faced with this gravely adverse effect, the country tried several different approaches to stabilize the exchange rate in the following years. After the Mexican crisis in 1995, the Central Bank attempted to prevent major exchange rate realignments by establishing an odd system of daily devaluation within a mini band. It was hoped that this would accumulate around 7.4 percent per year. However, as pointed out by many observers, this system was ill suited to eliminate past disequilibrium and avoid future problems. By the end of 1998 after both the Southeast Asian and Russian crises had taken place, internal (public) and external indebtedness had increased as fiscal and current account deficits mounted, real interest rates were extremely high and the economy was sluggish. In the same year, inflation tumbled to a mere 2 percent due to the weakness of aggregate demand and the ceiling on prices imposed by the crawling peg regime. Thus in January of 1999, the government – empowered by a successful re-election – tried to restore internal and external equilibrium with a second major move in the exchange rate policy. Since the previous attempt to increase the width of the exchange rate band had been unsuccessful, it was forced by markets to give up foreign exchange interventions and adopt a floating exchange rate regime up until now.

Acknowledging that many countries are now considering making a similar transition from a fixed to a floating regime, this paper discusses Brazil's transition experience from start to finish, covering the macroeconomic problems prior to the decision of exiting from the rigid exchange rate system, the challenges posed during the shift to the new flexible system, and the sustainability of the new regime. In particular, the study seeks to give insight on how Brazil dealt with the unique challenges posed during each of the three phases of transition, such as:

- Handling the macroeconomic imbalances that occurred between the launching of the Real Plan in July 1994 and the shift toward the flexible exchange rate regime in January 1999;

- Taking critical intermediary steps like determining the right time to exit from the pegged system, finding means to attract foreign assistance from multilateral organizations and the private sector, and assigning the roles of fiscal and monetary policies during the transition;
- Designing an inflation targeting scheme that would effectively serve as a fundamental tool to stabilize prices and exchange rate expectations;
- Evaluating the sustainability of the new regime and its contribution to new and deeper developments in fiscal, monetary and trade policies.

II. Mounting Pressures

Previous experiences with episodes of instability made it clear that the fall of inflation alone was enough to trigger a huge expansion of private demand. This was due to two reasons. First, consumers tended to increase their purchases in order to profit from what they feared may be just a temporary price squeeze. Second, because of money illusion, most investors shifted away from interest-bearing assets to consumption of durable goods as the nominal rate of interest fell with inflation. The government worried that if the surge went uncontrolled, stabilization may fail. Thus, in order to offset this surge, they implemented a tight monetary policy, coupled with an exchange rate scheme in which the new currency – the *real* – was allowed to float freely below the threshold of one dollar.

After the launching of the Real Plan (July 1994), the financial authorities put forth several restrictive measures on monetary policy. First, it was decided that the monetary base should increase by no more that R$ 9.5 billion between July 1994 and March 1995. Second, compulsory reserve requirements on demand deposits were increased to 100 percent, while those for time deposits and savings accounts were increased to 20 percent each – a rate that rose to 30 percent when inflation escalated unexpectedly from October to November of 1994. During this period of increasing inflation it was also decided that all loans extended by financial institutions would be subject to a reserve requirement of 15 percent and their maturity periods restricted to three months. Third, the Central Bank's interest rates were set at levels that assured high real returns for money market participants. Thus by the second semester of 1994, the average SELIC real interest rate (on repurchase agreements of public bonds) was 1.3 percent per month or 16.2 percent per year.

By taking these measures, the government was asserting that stabilization was there for good and that *no remedy*, even if unpleasant, would be avoided if deemed necessary for the

success of the plan. Indeed, inflation fell rapidly from 44.6 percent per month in the second quarter of 1994 to 2.5 percent in the fourth; and the acceptance of the new currency was evident from the high rate of remonetization of the economy (M1 money supply grew by 250 percent in real terms during this period). As expected, aggregate demand soared after the launching of the Plan fuelled by private expenditures. Real GDP increased by 2.8 percent yearly in the third quarter of 1994 and 6.0 percent in the fourth quarter. Monetary restrictions effectively avoided an economic overheating that could have driven inflation up again and were of key importance to the process of exchange rate appreciation. Inflows of foreign capital in search of fat dollar returns reached US$ 9.4 billion in the second quarter of 1994, but were reversed in the third quarter and reduced to barely US$ 0.8 billion in the fourth as the dollar plunged to nearly R$ 0.8, thus fuelling expectations of a currency depreciation. Together with the downfall of trade barriers, high real interest rates and real appreciation moderated price increases in both the traded and non-traded goods sectors and assured the immediate success of the Real Plan in terms of its anti-inflationary goal (Table 1).

Table 1. Real Plan Phase I: Selected Macroeconomic Variables

		Inflation (INPC) (% per month)	Overnight Interest Rate (% per month)	Exchange Rate R$ per US$ (% per month)	Annual Real GDP Growth (%)	Capital Account Balance (US$ billion)
1994	II	44.6	48.3	44.4	4.0	9.4
	III	3.7	5.0	(3.6)	2.8	(1.1)
	IV	2.5	3.8	(0.3)	6.0	0.8
1995	I	1.4	2.4	1.9	9.6	0.8
	II	2.3	3.6	0.9	9.6	5.9
	III	1.6	4.3	1.1	5.8	17.7

Sources: FGV and Andima.

It is no wonder that the country adopted this combination of strong monetary restrictions; an autonomous shift in private expenditures and currency appreciation would have worsened the external sector. Trade surpluses and current accounts balances vanished in the turn of the year and the situation became worse in 1995 as the Mexican crisis – the first of a succession of financial crises stemming from the international economy – devastated the not-yet-stable flexible exchange rate scheme.

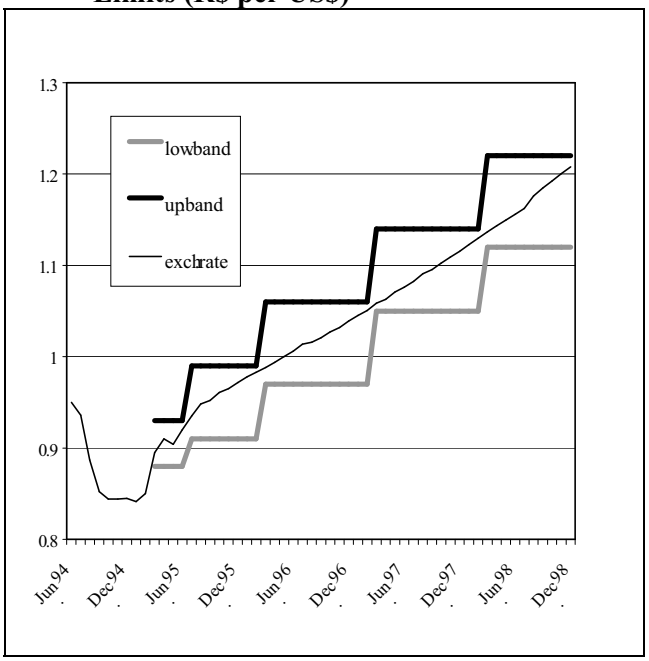
III. The Trap

The Mexican crisis of late 1994 immediately halted the progress made on lowering the interest rates and inflation. Had the authorities allowed the full working of the announced exchange rate regime, the real could have depreciated substantially in December following the loss of US$ 3.1 billion in international reserves. Instead, it became apparent that the Central Bank was targeting an informal exchange rate band of R$ 0.84-0.86 per dollar, and had no plans for any major adjustment of this variable. This was mainly due to fears of inflationary consequences and political losses, as the government realized the big electoral dividends stemming from the newly acquired monetary stability.

Nevertheless, stern measures were inevitable. The outflow of capital regained momentum in the first quarter of 1995 due to a new round of Mexican peso depreciation, financial problems in Argentina and the increase of the federal funds rate in the U.S. In March 1995, the Brazilian government announced a new package of fiscal and monetary restrictions and a new exchange rate policy under which the Central Bank would operate by means of a pre-announced exchange rate band ("larger-band") that was initially set at R$ 0.88-0.93 per dollar, implying a devaluation of 8 percent against pre-crisis level. Under this system, the monetary authorities would be allowed to intervene in the interior of the band if judged necessary. The new policy also augmented the overnight interest rate (SELIC) from 3.2 percent to 4.2 percent per month; reduced the transactions tax on external borrowings to 5 percent; and lowered the minimum maturity of external bond issues and short-term bank credit from external sources to 3 years. Finally, it declared that the federal government would delay wage payments and renegotiate all contracts in the public sector; ask Congress to speed up specific legislation to help its control of expenditures; and also start the privatization of major state enterprises, including Vale do Rio Doce.

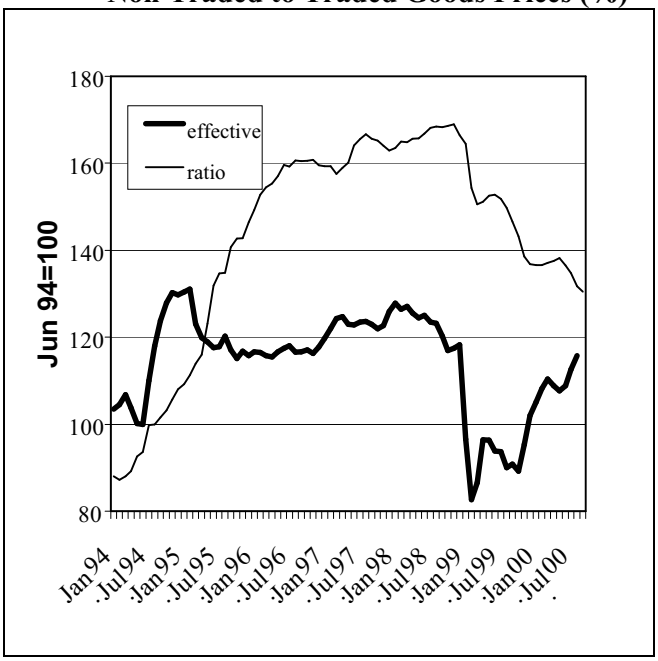
Soon afterwards, the new exchange rate regime became a simple crawling peg system with rates set daily by the Central Bank. As can be seen in Graph 1, from July 1995 to December 1999, the government forgot the "larger-band" and compelled the market to operate within a mini-band to the fourth decimal. Thereafter, the exchange rate depreciated by around 0.6 percent per month, accumulating 7.4 percent per year. By doing so, it froze the real effective exchange rate at the levels of March 1995, or aggravated the process of real appreciation started in 1994 (Graph 2).

Graph 1. Market Exchange Rate and Band Limits (R$ per US$)



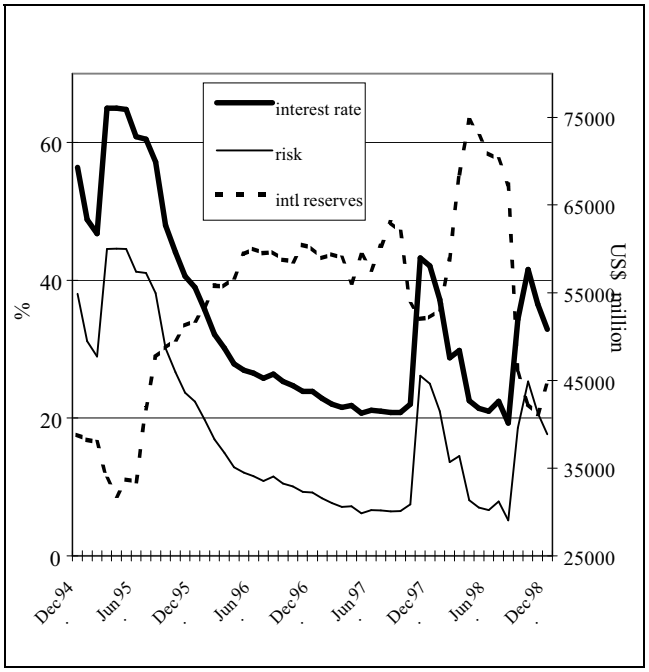
Source: FGV

Graph 2. Effective Exchange Rate and Rate of Non-Traded to Traded Goods Prices (%)



Sources: FGV and IPEA

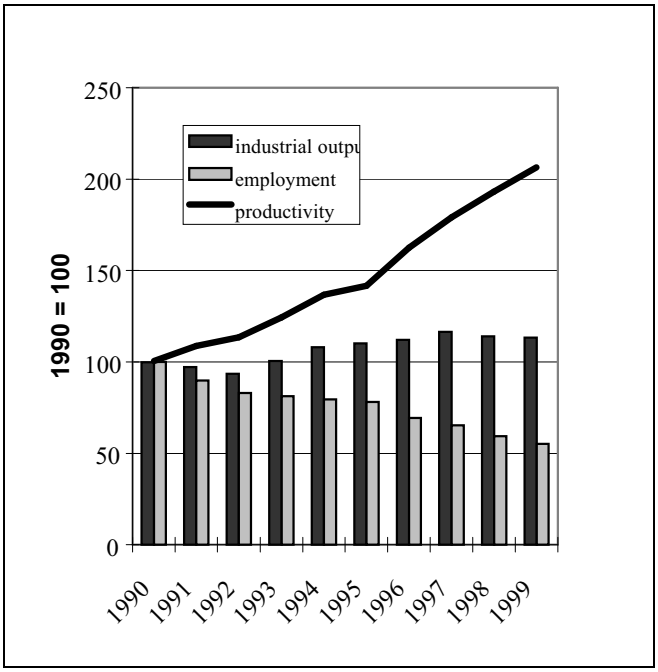
Graph 3. Domestic Interest Rate (%), Implicit Risk* and International Reserves (US$ million)



Source: IPEA.

Note: * Interest rate differential minus expected depreciation.

Graph 4. Indices of Industrial Output, Employment and Productivity (%)



Source: IBGE.

After turning to such a rigid scheme, the monetary authorities then had the easy, albeit unpleasant, task of setting the interest rates. Whenever the country experienced a dangerous loss of international reserves, they would push up interest rates until it became attractive again to financial investors. That meant paying them a risk premium in excess of risk-free interest rates (US Treasury Bonds or Bills) plus the 7.4 percent expected depreciation, and vice-versa in the case of monetary easing (Graph 3). The rule was simple, but most of the time bitter for the economy. The authorities essentially established a floor to the nominal interest rate around 19 percent per year by compounding 7.4 percent of expected depreciation with (in "normal" conditions) 5 percent of fed funds rate, 4 percent transactions costs and taxes.

Obviously, the smaller the inflation rate, the higher the real rate of interest. In 1995 and 1996, nominal and real short-term interest rates were extremely high, reflecting the battle for external credibility fought by the government. But, from mid 1996 and 1997, the Brazilian economy enjoyed better conditions. Nevertheless, they implied an abnormally high real interest rate of 16.9 percent per year in the money market as expected inflation fell to 5-7 percent. Because of high reserve requirements on bank liabilities, real interest rates on bank loans were far greater, attaining more than 100 percent per year. Considering such high rates, it is no wonder that real GDP showed a recession in the turn of 1995 and grew at only 2.7 percent in 1996 and 3.4 in 1997 (Table 2). The unemployment rate, which had long ago stabilized in the range of 4-6 percent of the workforce, reached 7.6 percent in 1998 (Graph 4).

Table 2. Real Plan Phase II: Selected Macroeconomic Variables

	Inflation (INPC) (% per month)	Annual Real Interest Rate* (%)	Annual Real GDP growth (%)	Unemployment Rate (%)
1995. II	1.5	23.6	(0.5)	4.9
1996. I	1.0	15.5	(0.3)	5.9
II	0.5	18.4	5.6	5.0
1997. I	0.5	14.6	4.6	5.8
II	0.2	25.0	1.4	5.7
1998. I	0.5	18.9	1.3	7.8
II	(0.1)	33.0	(0.8)	7.4

Source: FGV
(*) Central Bank SELIC rate; deflator INPC; averages per period.

Concerning fiscal policy, the expansion that took place in 1995 and 1996 obviously undermined the economic scene. The reasons that explain such disastrous performance are well known: first, given that real interest rates had skyrocketed, payments of interest on the public debt mounted from 2.5 percent of the GDP in 1993 to 3.8 percent in 1994 and 5.3 percent in 1995. Secondly, many beneficial rules allow automatic expenditure increases in the public sector. During hyperinflation, the government used to control them by simply delaying monetary adjustments intended to preserve their real values.[1] After price stabilization, such expenditures rose irrevocably. Third, the federal government made a contribution of its own in 1995 by augmenting minimum wages, along with other wages of certain categories and pensions by 40 percent. Fourth, the 1995 budget overestimated the rate of inflation, allowing the government to expand outlays ahead of tax receipts. This mix of political laxity, forecasting errors and institutional weaknesses squandered the primary surplus of the consolidated public sector from 5.1 percent of the GDP in 1994 to a deficit of 0.4 percent in 1995. The operational fiscal deficit (which includes the real interest bill) mounted from -1.3 percent (surplus) of the GDP to 4.9 percent, respectively. The dynamics of the net public debt worsened, as it also had to accommodate Central Bank interventions to sterilize the inflow of foreign capital brought by high interest rates. In spite of increasing privatization receipts, it grew from 28.1 percent of the GDP in 1994 to 34.4 percent in 1996 (Table 3).

Table 3. Indicators of Fiscal Performance*(% of GDP)

Period	PSBR**		Real Interest Payments	Net Public Debt
	Operational	Primary		
1993	(0.2)	(2.7)	2.5	32.0
1994	(1.3)	(5.1)	3.8	28.1
1995	4.9	(0.4)	5.3	29.9
1996	3.7	0.1	3.6	34.4
1997	4.3	0.9	3.4	33.9
1998	7.5	0.0	7.5	43.4
1999	3.2	(3.1)	6.3	49.7
2000f	0.2	(3.3)	3.5	48.5

Source: BCB.
Note: * in 12 months.
** Public Sector Borrowing Requirements.

[1] See Cardoso (1998) for a comprehensive account of such mechanism of expenditures control in Brazil during most of the hyperinflation period. See also Giambiagi and Além (1999) on most important and recent fiscal issues.

In theory, fiscal policy could have worked to neutralize the negative effects on economic activity caused by the interest rate hike and exchange rate appreciation. Tight monetary policy could have been geared to external equilibrium while fiscal expansion preserved the objective of full employment. But the move was frail: real interest rates imposed by the monetary-exchange rate policy mix were inconsistent over time with public debt stability. And real exchange rate was inconsistent with full employment, given the goal of sustained external liability. Thus, as can be observed, the current account deficit reached US$ 33 billion in 1997 (or 4.1 percent of GDP) and the ratio of net external liability to exports reached 4.3, putting the country's external position in a clearly strained situation (Tables 4 and 5).

Table 4. Indicators of External Sector Performance (US$ billion)

Period	Exports	Imports	Capital Income	Current Account Deficit	% of GDP
1994	43.5	33.1	8.5	1.7	0.3
1995	46.5	49.7	10.8	18.0	2.5
1996	47.7	53.1	12.2	24.3	3.1
1997	53.0	61.3	16.0	33.0	4.1
1998	51.1	57.6	19.1	33.6	4.3
1999	48.1	49.2	19.2	24.4	4.2
2000	54.5	55.0	20.0	25.0	4.1
Growth (%)	3.8	8.9	15.3	56.5	54.6

Source: FGV

Table 5. Indicators of External Sector Risk

Period	Net External Liabilities*	Capital Income Sent Abroad		Short-Term External Debt
	(ratio to exports)	% of exports	% of NEL*	(% of Reserves)
1994	3.7	19.5	5.6	78.6
1995	3.6	23.3	6.5	58.3
1996	4.0	25.6	6.8	64.1
1997	4.3	30.2	7.6	71.5
1998	5.1	37.5	7.8	60.6
1999	6.0	40.0	7.0	77.2
2000f	5.6	36.4	6.7	94.7
Avg.	4.6	30.3	6.7	72.1

Source: BCB.

Note: * Net External Liabilities (NEL) = average of (t) and (t-1).

As markets became aware of these inconsistencies, the room for fiscal expansion became null. By rejecting devaluation, full employment and current account balance had to be postponed until increases in productivity and savings lifted the internal and external scenario. A mild crisis later prompted other miscellaneous countermeasures by the Central Bank such as sales of dollar-denominated bonds, the easing of capital inflow restrictions, the assumption of long positions in futures markets, etc. And while the Asian crisis and Russian default later required even stronger tools, it was, ironically, a domestic (Minas Gerais state) moratorium that brought the final blow to the macroeconomic policy mix.

IV. A Macroeconomic Model

The trap suggested above can be better understood with the aid of a simple IS-LM model in the Mundell-Fleming tradition. If the following equations describe internal equilibrium in the goods and money markets and external (balance of payments) equilibrium, then the IS curve is given by:

$$y = y\,(g, r, e; p, \pi) \qquad (1)$$

where y represents real GDP, g is a parameter of autonomous expenditures (private and public), r is the real interest rate and e is the real exchange rate, defined as the ratio of domestic to foreign prices. Partial derivatives of y are positives regarding g and negative with respect to r and e. We take the price level p and expected inflation π as given.

Money market equilibrium requires that real income y is positively related to the real money stock and to the nominal interest rate so that we can write the LM schedule as:

$$m = l\,(y, r) \qquad (2)$$

Balance of payments equilibrium requires that current account deficits be matched by capital account surpluses of equal amounts thus implying positive relationships between real income and real interest rate and between the latter and the real exchange rate. We assume less than perfect capital mobility which means that a country can attract larger amounts of foreign capital by raising the domestic interest rate above the external (risk-free) interest rate plus the country's risk premium and the expected exchange rate depreciation (respectively, i^*, ρ and ε below). Together they make up for the opportunity

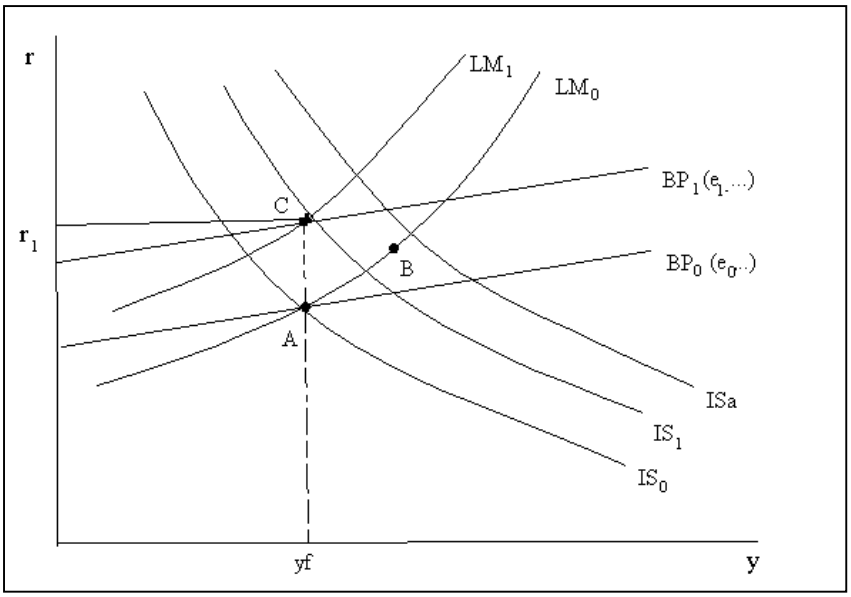
cost of investing abroad. Doing so, it can finance an increase in the current account deficit by matching a correspondent increase in the capital account surplus. Thus, the BP curve is written as:

$$B\ (y, e, r; i^*, \rho, \varepsilon) = 0 \qquad (3)$$

The model has three equations, three unknowns (y, r and e) and seven parameters (g, m, p, π., i*, ρ and ε). Provided that interest rate-elasticity of income for the purpose of external balance is greater than its counterpart for money market equilibrium and that exchange rate-elasticity of income for the former is smaller than the same variable for goods market equilibrium, the system conveys conventional results.[2] That is to say that it demonstrates that expansionary monetary policy increases output and decreases (devalues) the real exchange rate and the (real) interest rate. Expansionary fiscal policy raises the real interest rate, output and real exchange rate. The higher the degree of capital mobility under flexible exchange rate regimes, the weaker the effects of fiscal policy on output and interest rates and the stronger the effect of monetary policy; and vice versa in the case of fixed exchange rates.

Figure 1 illustrates the first phase of the Real Plan with high capital mobility and flexible exchange rates below the limit of one real per dollar.

Figure 1. First Phase of the Real Plan: Capital Mobility and a Flexible Exchange Rate

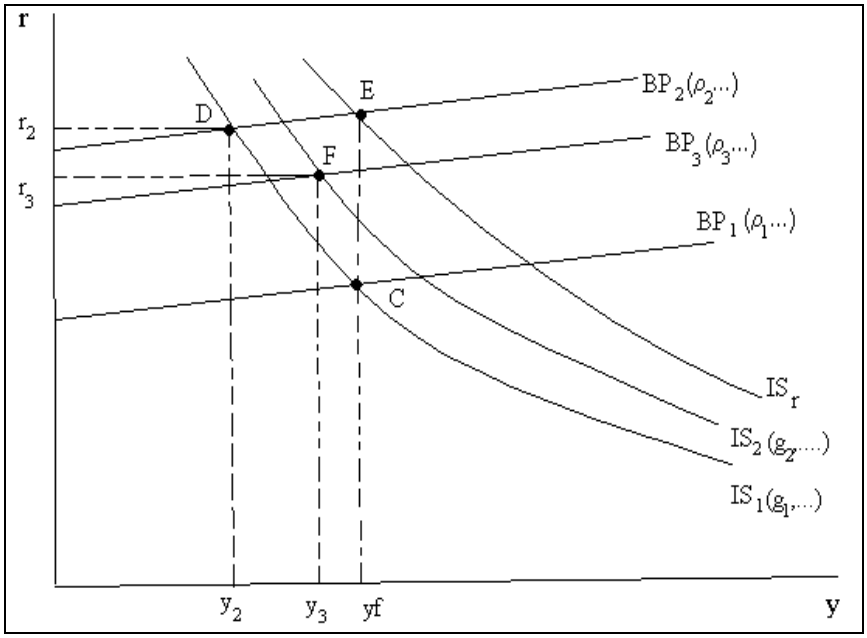


[2] With the assumptions that: (i) money market adjusts instantaneously; (ii) output increases with excess demand for goods and the balance of payments is always in equilibrium with flexible rates; and (iii) the system is locally stable.

Point A is the initial equilibrium and point B is to be avoided because it represents the forecasted situation of overheating caused by the surge in private demand due to price stabilization (IS_0 shifting to ISa). Tight monetary policy (LM_0 moving upward to LM_1) eventually set the economy at point C, where it enjoyed full employment (yf) at a cost of higher real interest and real exchange rate (BP curve shifts upward as currency appreciates).

In March 1995, three months after the Mexican crisis, as the country's risk premium soared, the government was finally compelled to raise interest rates. It also decided to establish a new exchange rate regime, which, as we have seen, was of a crawling peg type, virtually fixing the real exchange rate at past levels. The Brazilian economy moved accordingly to a point like D in Figure 2, where extremely high real interest rates successfully prevented the loss of central bank reserves and major currency devaluation. However, this came at a cost of recession and of mounting fiscal imbalances (we omit in this figure the LM curve because its is endogenously determined in the case of fixed exchange rates). The government tried to offset the deflationary effects of the interest rate hike on economic activity by launching (or simply by allowing institutional trends toward) an expansionary fiscal policy that could move the economy to E. But the initiative was bound to fail: the strength of the monetary-exchange rate mix rapidly boosted public and external indebtedness, thus spreading fears of impending macroeconomic instability. As investors urged the government to regain control over the budget and market pressures eased, the economy eventually settled at point F with less than full employment. Fiscal expansion should have been greater than it was to avoid such slow growth (quasi) equilibrium. Nevertheless, if it had been, financial markets wouldn't have accepted it at "normal" levels of risk and expected depreciation. BP schedule would have shifted upwards and the situation regarding output remained roughly the same as at point F. Interest rates, however, would have been even higher than at E.

Figure 2. Second Phase of the Real Plan: High Interest Rates and a Crawling Peg



In theory, the way out of the trap was straightforward. It required a complete reversal of the policy mix. Currency devaluation would have improved the balance of payments either by stimulating net exports or attracting foreign investment. Fiscal tightening was necessary in order to switch domestic expenditures away from the external sector, stabilize the ratio of public debt to GDP and regain investors' confidence. Fiscal tightening could also have helped regain confidence by reducing the real values of public expenditures and public debt denominated in real while increasing the price level. Both would have allowed a sharp decline in real interest rates. In terms of Figure 2, the IS_2 curve (aggregate demand) would have shifted to the right, because net exports stimulus on demand could have more than offset the deflationary impact of fiscal tightening. Accordingly, BP_3 curve would have shifted downward following the devaluation and full employment equilibrium would have been regained with lower real interest rates.

Nevertheless, two dilemmas remained: how could Brazil accomplish a major devaluation without fuelling inflation and financial distress? And what was the best exchange rate regime under those circumstances? Critics were keen to point out the troubles caused by the macroeconomic policy mix of 1995-98, but were in disagreement on the amount of overvaluation and what dynamics would be brought by any departure from the existing

arrangements. All they could say was that, yes, a maxi-devaluation would be hard to manage, but troubles could be minimized if certain conditions were met like a calm international scenario, tight fiscal stance, large output gap, low degree of wage indexation, sound banking system and great availability of international financial support. Fiscal policy apart, some of these conditions were apparently in place between mid 1995 and mid 1997 (Table 2 and Graph 3), but it was taken for granted.

Critics were also divided over the issue of the new exchange rate regime. There were three main groups[3]: the first supported mild changes in the crawling peg regime then at work. They wanted a gradual increase in the width of the "mini band" so that after a period of 2 or 3 years, the foreign exchange market would operate freely within the "larger band" with an average margin of 10-15 percent. This proposal effectively saw no major currency overvaluation and placed greater weight on inflation concerns after any realignment.

The second group supported a middle of the road proposal that simply called for an increase in the rate of crawl for a period of around one-year until a real depreciation of some 15 percent was accomplished after which the currency could be fixed against the dollar. Such an alternative had the obvious problems of pushing up interest rates and expected depreciation, therefore risking the loss of reserves and recession. To avoid these shortcomings, this group insisted upon a clear tightening of the fiscal policy.

The third group of critics saw no option other than floating the currency, either within a large band or freely, with the option of transitory interventions from the Central Bank. They thought intermediary exchange rate schemes, like the Brazilian soft peg, were ill suited to promote internal and external balances in the new international financial environment characterized by huge and volatile capital flows and liberalized capital accounts.

V. Answers and Hopes

Naturally, government officials and allied economists exploited these disagreements in favor of their policies. They argued that, as fiscal tightening was coming, there would be no need for exchange rate realignment. They also constantly brought up the inflation, recession and financial distress suffered in Mexico as a result of the country's attempts to manage a controlled devaluation. Hence, for three years, although everybody in Brazil agreed that the

[3] Currency board defenders were few at that time, given the evidences of large currency overvaluation.

budget deficit must be cut, fewer people accepted the need for monetary easing and only a few supported a major currency realignment. The main counter arguments put forward by the financial authorities and allied economists can be summarized into four main arguments, which are outlined and commented on below:

1. The Neutrality Argument: "Currency devaluation has no lasting effect on output or trade and therefore just fuels inflation"

The main argument in this case was that nominal changes would affect real variables only in the short run. In the long run, as the latter are determined by the set of Walras' general equilibrium equations that have just relative prices as arguments, nominal changes affect only monetary prices. Therefore, the real exchange rate is in equilibrium or moving towards equilibrium (in deficit situations, by nominal depreciation and/or a fall in prices).

Of course, this argument was based on a mechanistic model of reality, not reality itself. It's hard to believe that after prompting real economic effects in the short run, nominal changes would become impotent in the long run. Moreover, as nobody knows for sure *how long* the long run is, one has to consider that proper policy action could speed up an adjustment already set in motion by markets themselves. Finally, empirical evidence shows that when coupled with adequate fiscal and monetary policies, currency devaluation does work, i.e., that it has little effect on prices and long-term positive impacts on output, current account and employment. One needs only remember the cases of England and Italy (1992-93), United States (1994-95), Canada (1991-95) and Brazil itself (1995-98) where core inflation had consistently run below the currency's rate of crawl.

2. The Denial Argument: "There was no currency overvaluation at all. Therefore, there wasn't any need to promote a major exchange rate movement"[4]

Authorities were right in debating the accuracy of several estimates of the real exchange rate overvaluation. Naturally, base periods are a matter of judgment, as well as the price indices, and the weights of different foreign currencies determined for the sake of effective exchange rate calculations. But the question was more of reasonable estimate and analysis than of precise science. At the end of 1997, when measured by wholesale price indices, the real effective exchange rate showed an appreciation of 25.8 percent with respect to July 1994. However, when measured by the ratio of non-traded to traded goods prices, the appreciation

[4] For deeper insights on of some of these issues, see Dornbusch and Werner (1994) and Delfim Netto (1997).

was much higher (Graph 2). In addition, from a situation of equilibrium in 1990-94, current account deficits increased to more than 4 percent of GDP, even during periods of slow economic growth and unemployment. To avoid an external sector disaster, the government had not only needed to impose prohibitive real interest rates, but also to call back a number of import restrictions. Of course, these factors didn't prove scientifically the overvaluation hypothesis but they raised a strong suspicion in its direction.

3. The Productivity Argument: "Currency appreciation was the natural counterpart of a 'wealth effect' propelled by price stability and by productivity gains due to structural reforms"

Again, the authorities were right to point out that the processes of monetary stabilization following hyperinflation tend to appreciate the currency. But this is not for good. In most cases, the aftermath was troublesome and hence did not justify accommodation. As for productivity, industrial output per worker increased sharply throughout the 1990s as companies struggled to survive in an environment marked by high real interest rates, slow economic growth, trade liberalization and exchange rate appreciation. Industrial production was eventually revived, but at the cost of rising unemployment, restructuring, downsizing and transfer of ownership (Graph 4). Therefore, because it was not known how this extra income was redistributed and how prices were affected, industrial labor productivity was a misleading guide to justify the "wealth effect" claims and the process of exchange rate appreciation. In fact, total factor productivity was the main variable for the purpose of assessing the role of structural reforms and the absorption of technical progress in economic growth. Estimates of the contribution of total factor productivity to the growth of per capita income in Brazil during the 1990s diverge sharply in size and importance. [5]

Nevertheless, elsewhere in the economy, there were signals of a different outlook. The growth of real GDP during 1994-98 was slightly above that of the 1980s (3.0 percent and 2.4 percent, respectively). Brazil's share in world economy exports fell from 1.12 percent in 1983-93 to 0.9 percent in 1994-98. Manufactured exports had a worse performance, increasing only 4.2 percent per year from 1994-98, in comparison to 7.6 percent from 1983-

[5] Total factor productivity calculations pose many technical problems in Brazil. For further information, see Bonelli (1998).

93.[6] Therefore, the slow pace of the economy and of exports (particularly of manufactured goods) ran counter to the alleged links between productivity, wealth and the exchange rate.

4. The BOP Equilibrium Argument: "What matters for exchange rate management is balance of payments equilibrium, with Brazil enjoys. Current account deficits were caused by the lack of domestic savings"

Conventional ratios for the assessment of external sector risk were mounting. Current account deficit reached 4.3 percent of GDP in 1998, coming from a situation of equilibrium in 1994. The ratio of net external liability to exports increased from 3.7 in 1994 to 5.1 percent in 1998. The ratio of net capital income sent abroad to exports grew from 19.5 percent to 37.5 percent in the same period. Furthermore, the rate of return on foreign capital (yearly average) exceeded the rate of growth of exports by a margin of 3 percent per year, implying that external liabilities were being accumulated at a dangerous rate.

It is no wonder that for most of the period of 1994-98, balance of payments equilibrium was based on slow output growth and capital inflows that were dependent upon very high real interest rates. To call this situation "normal" was obviously nonsense. Moreover, the costs and benefits of international capital flows and the difficulties they pose for sound macroeconomic management were long recognized by independent economists.[7] In particular, given their volatility and massive amounts, the room for pegged exchange rate regimes became smaller than in past decades. In developing countries it came to be virtually null. As for domestic savings, it was divided between private and governmental savings. The former depended on political will, but was being badly hurt by the impact of high real interest rate on the public debt. The latter had similar problems in an environment of sluggish output growth and overvalued currency. Savings seem to follow the growth of income rather than precede it.[8] Currency overvaluation, by reducing output growth and net exports, tends to depress them.

[6] Sometimes, the productivity argument had a lighter version. The exchange rate problem would be solved gradually as productivity growth would bring down costs thus promoting exports and substituting imports.
[7] Effective capital controls can be a hard task. See Cardoso and Goldfajn (1998).
[8] See Yokota et al. (2000) for Granger causality tests between savings and income growth in Brazil.

VI. International Crisis and the Final Blow

By mid 1997, in spite of the well-known problems with the fiscal and external markets, the probability of a speculative attack against the real seemed small. The currency depreciated slightly in real terms as inflation dropped below the rate of crawl. The supply of medium- and long-term external capital was consistent with the downfall of real interest rates, which helped to reduce the operational fiscal deficit to 3.5 percent of the GDP. Industrial output had recovered and was growing at 5.8 percent. In short, gradualism seemed to pay.

This calmer scenario received a blast at the end of the year when Asian currencies and bourses collapsed and capital flight spread throughout the Third World. In two months (October and November), international reserve losses amounted to US$ 9.9 billion (16 percent of the total stock) and the Brazilian government had no other option but to raise interest rates again. Overnight interest rates controlled by the Central Bank were raised to 3 percent per month (42.5 percent per year) in November, imposing a prohibitive real interest rate of more than 35 percent. The Central Bank also announced a restrictive fiscal package comprised of some 51 measures, the most important of which being the freeze of public servant wages and cut of some of their benefits, the dismissal of 33,000 non-stable personnel, deep reductions in current expenditures and investments, a 10 percent increase in the income tax rate, a 50 percent cut in all regional and industrial subsidies and forced restructuring of state and municipal debts with the Union. In total, the “Package 51” was due to produce a fiscal adjustment of R$ 20 billion or around 2.5 percent of GDP to finance the projected increase in the interest bill. Expectations of another year of reasonable economic growth (1998) vanished.

At that time, macroeconomic inconsistencies couldn’t be hidden anymore and criticism began to climb. More people began to realize that although high real interest rates could improve the balance of payments and that the exchange rate anchor eliminated the chance of inflation, they jeopardized fiscal consolidation efforts, employment and economic growth. Nevertheless, the government decided to wait for an improvement in the external sector and, in the mean time, campaign to win the upcoming presidential election to be held in October of 1998. To achieve this goal, inflation control and exchange rate stability were of paramount importance.

As expected, Package 51 was a failure. Several measures were postponed, forgotten or refused – notably, the pompous announcement of 30,000 dismissals in the Executive branch. Reflecting electoral pressures, the annual ratio of public wages and pensions to GDP grew by 8.8 percent from the 1997 figures, while other current federal expenditures and investments increased by 9.5 percent, and total federal expenditures (except interest payments) grew by 8.5 percent in relation to 1997. These increases in expenditures almost offset the sharp increase in federal tax receipts and contributions, whose ratio to GDP grew by 10.3 percent. Since the states and municipalities behaved no better, the primary deficit of the consolidated public sector decreased by less than 1 percent of GDP in 1998. On the other hand, the real interest bill more than doubled, jumping from 3.4 percent of GDP in 1997 to 7.5 percent in 1998, leading to an increase in the same value to the operational fiscal deficit (Table 3). In turn, this reflected the extremely tight monetary conditions that prevailed throughout the year.

Unexpectedly, the financial authorities regained some control of the situation in the first half of 1998. Markets seemed appeased by the government's rapid and orthodox response to the Asian crisis. Moreover, in spite of the rise in unemployment, opinion polls showed good perspectives for President Fernando Henrique Cardoso's re-election, and hence for the maintenance of existing financial and structural policies. On the external front, the international financial community succeeded in limiting the damage of the Asian crisis so that dominant economies like those of the United States, European Union and China stayed well despite the turmoil. As a result, money once again began to pour in, increasing international reserves from US$ 52 billion in December 1997 to US$ 76 billion in April 1998 (Graph 3). The containment of the Asian crisis also led the Central Bank to reduce its overnight rate from 3 percent per month in November 1997 to 1.7 percent (22.4 percent yearly) in April 1998.

Unfortunately, the calm was illusory, and broke suddenly in September 1998 when the Russian moratorium showed everybody the obvious fact that highly indebted governments can be tempted to default. Brazil wasn't Russia, but public finances were in disarray: real interest rates beat world records; the ratio of net public debt to GDP reached 40 percent in mid 1998, showing an average increase of 13.1 percent per year from 1994-98; its term structure was short run and a significant part (17.2 percent) was denominated in dollars. The government performance in implementing the fiscal package was also poor. In addition, the

Central Bank contributed to the crisis by recklessly lowering its overnight rate to 19.5 percent per year in July and August, a level below the threshold implied by the exchange rate consistency rule and running counter to market expectations. The fall in the price of Brazilian sovereign bonds floated abroad implied a country risk (given by the margin between the yields of these bonds and those of the US government bonds) or nearly 6 percent, which, if added to the expected depreciation of the real, as well at to taxes on foreign investors and the U.S. federal funds rate of 5.5 percent (the "risk-free" rate), pointed to a threshold of 21 percent per year for the domestic interest rate. Any rate below this level would be dangerous, as it would discourage inflows of external investment and propel outflows of domestic capital. However, government officials seemed to believe that the crisis could be cushioned without raising interest rates again by selling indexed bonds and creating incentives for short-term capital inflows.[9] But they didn't work, and the result was massive capital flight. In less than two months, international reserves fell rapidly from US$ 69 billion (July) to US$ 45 billion (September). On September10th, the Central Bank raised its overnight interest rate again to 40 percent per year, and in late September – in a last attempt to avoid a currency collapse and a debt moratorium – the government sought help from the IMF.

As usual, the IMF agreed to bailout Brazil, but required the adoption of a restrictive fiscal policy. It coordinated a financial package amounting to US$ 41.5 billion, the bulk of which came from multilateral sources like the IMF itself, the World Bank and the Inter American Development Bank. The package called the "Contingent Credit Lines" was originally designed by the IMF in April 1999 to insulate countries with good records in market reforms from negative shocks originated abroad. It aimed to cushion the loss of reserves until a reversal of confidence allowed money to pour in again. The government accepted the deal and in November announced a Fiscal Program for Stabilization, whose objective was to stabilize the ratio of net public debt to GDP at 44 percent. To do so, it agreed to implement a set of measures to yield a primary fiscal surplus for the consolidated public sector of 2.6 percent of GDP in 1999, and 2.8 percent in 2000 and 2001. The most important measures were increases in the financial transactions tax; increases in mandatory social security contributions from firms, retired and active government employees; sharp cuts in current

[9] Of course, at this time, political concern was at its zenith, as the election was nearing.

expenditures (other than wages and pensions) at the federal level; cuts in investments by government owned enterprises; and the increase of federal receipts not legally tied to specific expenditures from 40 percent to 60 percent. Fiscal effort amounted to R$ 28 billion in 1999. As for the exchange rate, amazingly, government officials succeeded to convince the IMF of the feasibility of existing arrangements despite some pressures to speed up the rate of crawl.[10]

During November, the markets seemed less nervous as President Cardoso was re-elected and publicly assumed responsibility for the stabilization program. Reserve losses were reduced and the Central Bank dropped the overnight interest rate to 33 percent per year. But once again, instability took hold. Not only did Congress resist approving most measures of the fiscal program, but the release of fiscal figures showing an annualized operational fiscal deficit of more than 8 percent of the GDP in October made the facts clear. Industrial production collapsed in October, falling 9 percent in relation to the same month of 1998 and unemployment climbed to 8 percent of the workforce. Central Bank reserves went down again, reaching US$35.7 billion in December (excluding drawings from the IMF and BIS) and the monetary authorities decided to halt the process of interest rate decline.

The final blow to the exchange rate peg came in early January 1999 when Itamar Franco, governor of an important Brazilian state (Minas Gerais) and former President of the Republic, declared a moratorium on his state's obligation to the federal government. Soon other state governors threatened to do the same and, despite minimal effects such actions would have had on federal government finances, the mere pronunciation of the word was anathema. Within a few days, as the loss of international reserves climbed to US$ 6 billion, the President dismissed the Central Bank governor. On January 13th, the newly appointed governor tried to manage a controlled devaluation of 8 percent and to increase the width of the band,[11] but markets continued to short sell the real and buy foreign exchange in massive amounts. This arrangement could last but a few days before risking a complete drain of reserves. Indeed, on January 15th, the government decided to freely float the real.

[10] See Franco (2000), p. 73.
[11] The new system was called "endogenous diagonal band", meaning it would be adjusted each three days.

VII. The Aftermath

Because they occurred amid a deep confidence crisis, the maxi-devaluation and the currency free float needed another set of macroeconomic tools for their well functioning.

Stronger fiscal tightening was of major importance, as no exchange rate regime is stable without sustainable budgetary policies, but international assistance was urgently needed. Capital continued to fly out of the country and the public debt escalated 11 percentage points to over 53 percent of the GDP (because of dollar indexed bonds), triggering fears of a Brazilian sovereign moratorium. More than anything, the situation required changes in the original IMF package. Larger sums of money should have been immediately made available and fiscal targets should have been more restrictive than before.

On the other hand, monetary policy had two main tasks: First, was the urgent need to raise interest rates in order to fight a dangerous overshooting of the exchange rate. The stress caused by the whole chain of events – starting from the unsuccessful attempt to exit the crawling peg regime up until the final decision to float the currency – led the dollar to climb to R$ 2.2 in February (+83.3 percent over December), a value that seemed to many people clearly beyond any reasonable level given by the fundamentals. Despite this overshooting, the country kept losing reserves, which dropped from US$ 35.2 billion in January to US$ 32.8 billion in March. This process was further fuelled by speculations of huge financial disturbances and the political vacuum created by the fall of the Central Bank governor in February. The newly appointed governor, Dr. Arminio Fraga, took office in March and immediately called upon the Committee on Monetary Policy (COPOM) to agree to abandon the system of interest rate band (TBC and TBAN); raise the SELIC overnight rate from 36 percent to 45 percent in order to adjust the Central Bank to market expectations and hence to stabilize the currency; use a scheme of bias (similar to the Fed's) on interest rates and immediately establish a downward bias which grants the Central Bank the power to lower interest rates anytime before the following COPOM meeting; and to set price stability as the primary goal of the Central Bank. He also embarked on a "road show" abroad to calm down investors, governments and multilateral organizations that were worried about the stern policies to be followed by Brazilian financial authorities.

The other task was the reversal of monetary policy goals. Within the crawling peg system, monetary policy was geared to external equilibrium with the exchange rate providing the nominal anchor for the economy. Under the new system, monetary policy would need to be

geared to price stability with the exchange rate focused on achieving balance of payments equilibrium. Thus, monetary policy would provide the new nominal anchor for the economy, a task unsuitable to the exchange rate, as fluctuations could be large under the flexible currency regime. Of two routed available to reach this goal – monetary and inflation targeting – the government chose the latter and announced that a complete framework would be delivered in July 1999. This was the right choice, as money demand turned out to be completely unstable due to the multiplicity of shocks that hit the economy and thus unreliable as an instrument of inflation forecasting.

Indeed, the new IMF deal and the announcement of the inflation-targeting framework were able to calm down the markets and regain some stability over the nominal exchange rate, which fell to R$1.68 per dollar in May, allowing a corresponding decrease in the SELIC rate to 32 percent at the same month. Moreover, Brazilian corporate borrowers regained access to foreign capital markets with small issues of notes and commercial paper as confidence rebuilt. The IMF package prescribed limited amounts of sterilized intervention to achieve balance of payments goals. Conversely, non-sterilized interventions were only occasionally accepted to avoid the occurrence of disorderly market conditions. The package also forbade the Central Bank to operate in the foreign exchange futures market and limited the share of the short-term debt in the public external debt.

Meanwhile, the government succeeded in implementing the fiscal package that was at the core of the IMF program. Prior to the approval of the stand-by arrangement, it had enacted the constitutional amendment on social security reform and an increase in the COFINS – an earmarked contribution based on enterprise turnover. Congress approved the raise in social security contribution on active and retired civil servants in January, together with increases in the social contribution on profits (CSLL) and the approval of the financial transactions tax (CPMF) by end-March. Coupled with tight cash management to keep current expenditures and wages below the real levels of 1998, these measures were intended to accomplish primary fiscal surpluses for the consolidated public sector of 3.1 percent of GDP in 1999, 3.25 percent of GDP in 2000, and 3.35 percent of GDP in 2001. The intention was to steadily reduce the ratio of public debt to GDP to around 50 percent by the end of 1999, and to 46 percent by the end of 2001.The pursuit of this objective would also be assisted by the decline of real interest rates expected to result from the strengthened fiscal adjustment and the move to the floating exchange

rate regime. To help the federal government improve the primary balance, the investment program of federal enterprises was set at about 0.9 percent of GDP while the consolidated primary surplus of the states and municipalities was set at 0.4 percent of GDP. Also at this time, a draft of the proposed Fiscal Responsibility Law was sent to Congress establishing responsibilities and penalties for government officials and public sector managers that do not comply with the law.

Fiscal targets were met both in 1999 and 2000, facilitated by the rebound in economic activity that began in mid 1999. The primary fiscal surplus reached 3.1 percent of GDP in 1999 and (projected) 3.3 percent in 2000. Furthermore, although the nominal balance was 9.5 percent of GDP in 1999, it was expected to be reduced to 4 percent of GDP in 2000 (Graph 5).

As for monetary policy, the Central Bank established a formal inflation-targeting framework. A Research Department was created to develop the macroeconomic models needed to forecast inflation on the basis of its relationship to key variables such as interest rates, exchange rates and the output gap.[12] The targets were set in terms of the annual growth rates of IPCA (Amplified Consumer Price Index) and calculated by IBGE (a government agency). For 1999, 2000 and 2001, the National Monetary Council set the numbers at 8 percent, 6 percent and 4 percent, respectively, with tolerance intervals of +/-2 percent per a proposal issued by the Minister of Finance. Another significant change was that the Central Bank was given operational independence to achieve these targets. Under the new system, if the target was not met, the Central Bank governor was required to issue an open letter to the Finance Minister explaining the causes of the breach, the countermeasures to be adopted to curb it and the period of time that will be necessary to achieve such effect. The system also required the Central Bank to issue a quarterly inflation report that explained monetary policy developments and results and the expectations for inflation.

Day to day management of interest rates and the public debt were also important. When the exchange rate was overshot shortly after the exit from the pegged regime, nobody could expect at what level prices would stabilize. It was reported, for instance, that during the Central Bank bills auction of March 3rd, 1999, interest rate bids varied from 30 percent to 247 percent per year. In order to cope with this extreme uncertainty, the Bank devised the successful strategy of selling bonds and bills of different maturities and return clauses in order to suit investors with

[12] See the Appendix for an overview of such models and parallel works done by model builders.

divergent views, achieve an adequate pricing for interest rates and calm down the markets during major turbulences. For example, in the first three months of 1999, the sales of bills indexed to the overnight interest rates were important to keep investors interested in the domestic financial markets, avoid a massive capital flight and hence reduce the pressure on the exchange rate. Accordingly, the share of these bills in the domestic federal debt rose from 57.2 percent in February 1999 to 67.3 percent in April 1999. From this month on, it has declined steadily and nowadays (October, 2000) is 48 percent. As uncertainty regarding the inflation and exchange rate receded, the monetary authority increased the share of non-indexed (pre-determined return) bonds and bills in the whole portfolio from just 1.2 percent of the total public debt in March 1999 to 16 percent in October 2000.

Finally, non-sterilized foreign exchange interventions executed by selling dollar-indexed bonds were also important, as they provided hedge positions to market participants during the periods of major perceived risks affecting both the inflation and the external sector scenarios. Such periods of perceived risk took place particularly in the third quarter of 1999, when the Central Bank increased the share of dollar- indexed bonds in the hands of the public from 24 percent of the total federal debt to 26.7 percent (amounting to US$ 3.8 billion), and in the second quarter of 2000, when the shares increased from 20.3 percent to 21.1 percent (US$ 1.2 billion).

Despite considerable uncertainty, the new floating exchange rate showed a low pass through to inflation. By March of 1999, the overshooting of the exchange rate was tamed. In fact, the nominal exchange rate has fluctuated within the range of R$ 1.7 to R$ 2.0 ever since. In December 1999, for instance, the price of the dollar was raised by 56 percent as compared to the same month of 1998. However, in the same period, inflation reached only 8.9 percent, thus ending the year within the targeted interval of 6-10 percent (Table 6). In 2000, inflation forecasts were in the range of 5-6 percent in spite of increasing oil prices and agricultural crop setbacks. Monetary policy reforms – along with the inflation targeting framework put in place, successful day to day management of interest rates, and strengthened fiscal adjustment – were instrumental in preventing the recurrence of an inflationary spiral and ensuring a rapid deceleration of the rate of inflation, following the initial impact on the prices of tradable goods. Other unexpected contributors to disinflation were the weak domestic demand, the absence of automatic indexation rules, the positive supply shock stemming from agricultural prices and the relatively low degree of external openness of the Brazilian economy (exports plus imports amounted to

only 18 percent of the GDP).[13] Finally, the relatively calm external scenario, with high economic growth in industrial countries and clear recovery in developing ones, was also of noticed importance.

Economic activity weakened during the second half of 1998 and showed a further decrease in the first half of 1999 as domestic demand fell, only partly offset by a recovery of net exports. Since the second quarter of 1999, however, it became apparent that the strong recession forecasted by many economists wouldn't materialize. Furthermore, with few swings, inflationary expectations and real interest rates declined steadily as confidence rebounded and external financing was eased, thus fulfilling the hopes of devaluation supporters. As can be seen in Graph 6, the Central Bank rate (SELIC) averaged 17.1 percent in real terms between March and December 1999 and fell to 11.5 percent in 2000, against more than 20 percent in the previous three years. Accordingly, the economic path reversed with a gradual recovery beginning in the second half of 1999 and gathering momentum in 2000. Unexpectedly, instead of a recession, real GDP increased by 0.9 percent in 1999 and was expected to rise another 4 percent in 2000. The unemployment rate stabilized at 7.6 percent of the workforce in 1999 and 2000, but this result was due to an increase in the supply of labor rather than to a decrease in the rate of employment. In industry, this rate has been rising by 1.4 percent (July 2000) after 10 years of continuous decline.

Table 6. Exchange Rate Depreciation, Inflation and Output

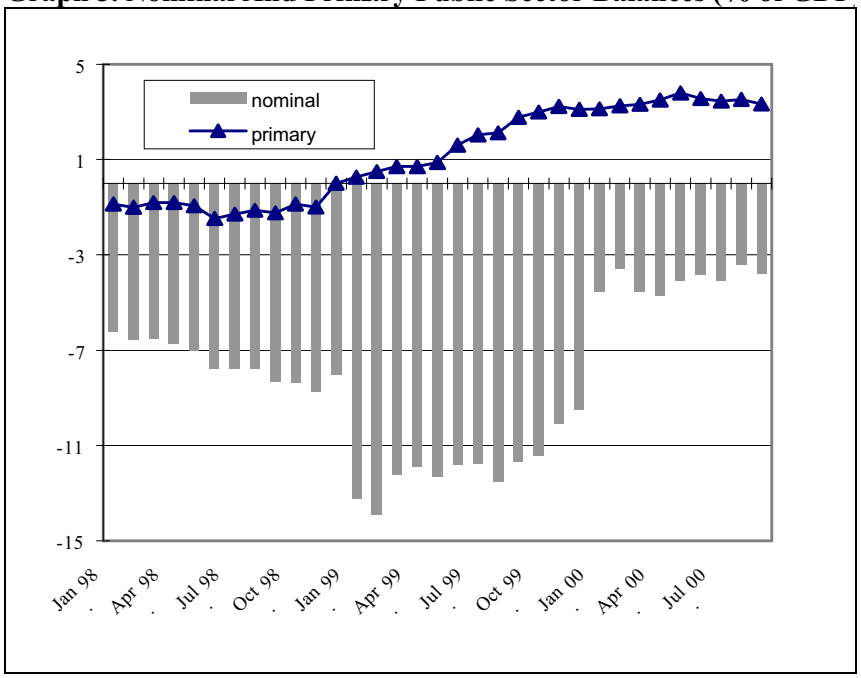
	Exchange Rate BR$ per US$ (% per quarter)	Inflation (IPCA) (% per quarter)	Real GDP (%)	Industrial Output (%)
1998 IV	2.1	0.2	(1.8)	(6.7)
1999 I	57.4	2.9	0.4	(5.4)
II	(6.9)	1.1	(0.1)	(3.9)
III	7.5	2.0	0.3	(2.3)
IV	(2.9)	2.8	3.9	5.3
2000 I	(5.5)	1.0	3.8	8.0
II	3.8	0.7	3.9	5.4
III	1.7	3.2	na.	na.
accumul.	55.7	14.5	-	-

Sources: FGV and IBGE.

Note: na = non available.

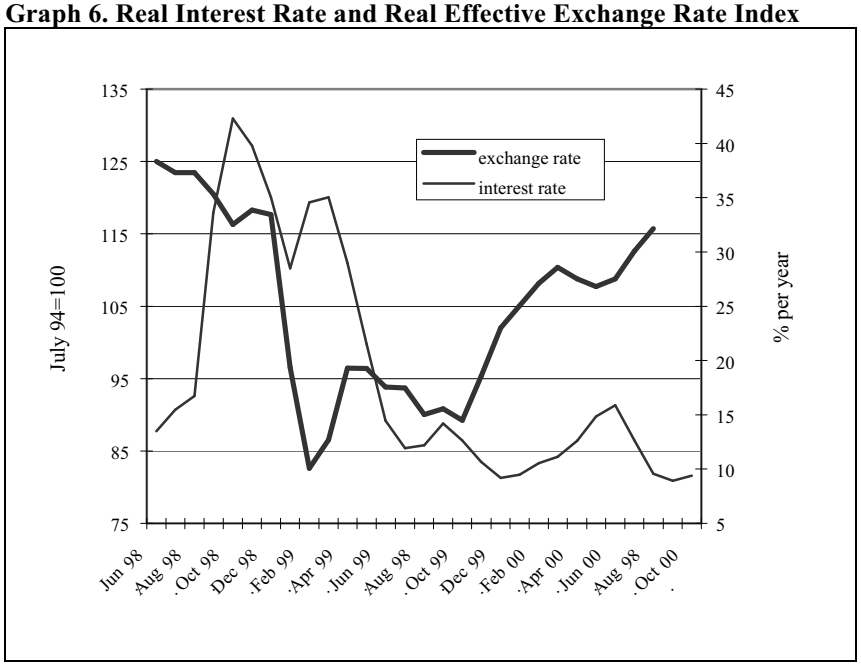
[13] Carneiro (2000) discusses some of the difficulties of inflation forecasting and the risks ahead.

Graph 5. Nominal And Primary Public Sector Balances (% of GDP



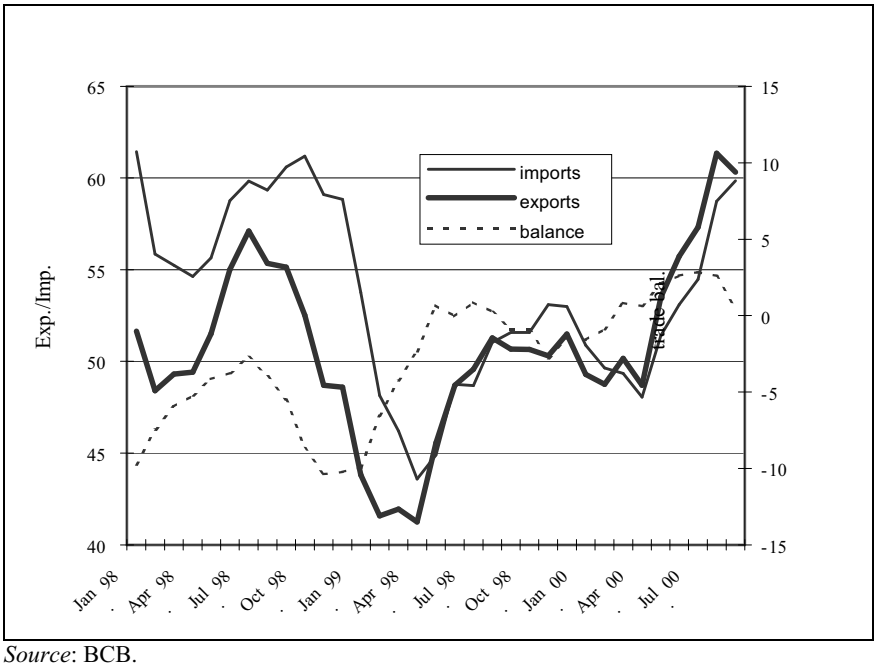
Source: BCB.

Graph 6. Real Interest Rate and Real Effective Exchange Rate Index



Source: IPEA.

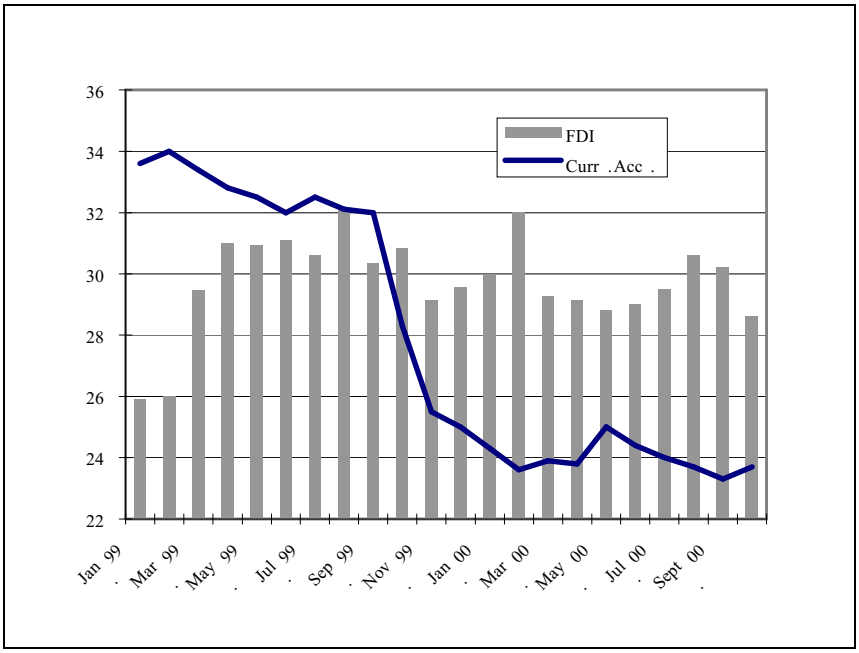
Graph 7. Exports, Imports and Trade Balance* (US$ billion)



Source: BCB.
Note: *quarterly analysed.

Although the depreciation of the real provided a boost in Brazil's competitiveness (Graph 7), the trade balance improved less than expected due to the deterioration in the terms of trade that started some months before. Oil prices rose and export prices, especially agricultural commodities, weakened. Export volumes strengthened progressively over the year, rising by 7.7 percent during 1999 and by 14.4 percent in 2000 (to September). Import volumes fell by 15.1 percent in 1999, despite a positive growth of output and of the oil shock. In 2000, import values rose 13.5 percent, but were offset by exports that increased by 18.2 percent. On the whole, the trade deficit declined from US$6.6 billion in 1998 to US$1.2 billion in 1999 and is expected to be around US$ 0.5 billion in 2000 (Graph 7). The improvement in the external trade account in 1999 was accompanied by a declining deficit in the services account, so that the current account narrowed from US$33.6 billion in 1998 to US$24.4 billion (4.4 percent of GDP) in 1999 and a projected US$ 25 billion in 2000. These deficits were more than fully financed by net foreign direct investment (FDI), which rose to record levels of US$30 billion (5.4 percent of GDP) in 1999 and a projected US$ 27 billion in 2000, as Brazilian capital assets became cheaper after the devaluation (Graph 8). Following a sizeable (over US$10 billion) deficit in the first quarter of 1999, the balance of payments remained in approximate equilibrium during the rest of 1999 and 2000.

Graph 8. Current Account Deficit and FDI (US$ million)



Source: BCB.
Note: Accumulated over 12 months.

VIII. Looking Forward

In sum, exchange rate depreciation worked well despite the extremely poor management shortly after the exit from the crawling peg system. Inflation was little affected, interest rates and the exchange rate declined sharply after the initial overshooting, output recovered after a few months and the balance of payments improved as well. Nevertheless, four issues are crucial for the future of the flexible exchange rate regime in Brazil.

First, Central Bank reform should be a priority. Fiscal adjustment has gone well in Brazil, but given the remaining areas of potential budgetary imbalances (social security expenditures, hidden entitlements on public funds, etc), inter-temporal consistency requires a more independent Central Bank, which is not the case yet. The present scheme, combining a flexible exchange rate with inflation targeting, is a clear improvement over the past, but it is not enough. For the Central Bank to watch over price stability, regardless of political forces in power, its degree of independence must be enhanced. Indeed, Central Bank reform must provide fixed mandates for the Board of Governors (now they can be dismissed *ad nutum* by the President of the Republic). It should also revise the role of the National Monetary Council (CMN) in the process of inflation targeting (particularly in terms of the dominance of the Finance Minister within the CMN); deepen the details of correspondent

rules and regulations; and provide a proper structure of incentives and penalties for the achievement of these targets.

Second, the authorities must also improve the liquidity and competitive conditions of the foreign exchange market and reduce the stock of dollar-indexed bonds in order to allow a higher degree of exchange rate flexibility. The present regime, by its own nature, is more volatile than the former, which can be harmful to trade and to the generation of income. In other countries, this fact has led central banks to intervene occasionally in foreign exchange markets by trading foreign currencies and bonds in order to prevent the occurrence of unexpected fluctuations. However, in Brazil, such interventions have happened frequently. One reason is foreign exchange market imperfections, particularly, the market's restrained liquidity in stress situations. The other is the impact on the budget stemming from the large stock of government debt indexed to the dollar, currently around US$ 100 billion, net of international reserves. Of course, by doing so, authorities lower the effectiveness of the exchange rate as a means of accomplishing an adequate balance between demand and supply of foreign exchange. More importantly, by using interest rates to influence the external value of the currency, they risk creating a concealed target zone/crawling bands system, which in present circumstances is the worst option for a country like Brazil. Until now, the present "dirtiness" of the exchange rate regime has been successful in the sense that it has worked in favor of the stability of prices and of economic growth. However, for the future, it is advisable to pursue policies such that the foreign exchange market can gradually run on its own feet.

Third, increasing the focus of the Central Bank on inflation targets requires appropriate flexibility in the management of interest rates. To this end, some steps have already been taken, such as the elimination of the existing band for rediscount rates (TBC and TBAN); the linking of the latter to the SELIC overnight market rate; the increase in bank liquidity by eliminating the compulsory reserve requirements on time deposits and lowering those on sight deposits to 45 percent; the drop in the stock of Central Bank securities in the market (they represented just 17.2 percent of total federal debt outstanding in late September) and the offering of fixed rate securities with medium and long term maturities. But the average duration of the public debt in bonds and bills has continued to be small (5.1 in late September) while the share of dollar indexed bonds has remained large in the whole

portfolio (20 percent). These weaknesses are compounded by the transitory difficulty of quantifying the prospective impacts of interest rates, exchange rates, taxes and autonomous price shocks on money demand and, hence, on the inflation outlook.

Fourth, external sector vulnerabilities, albeit diminished, have continued. The trade deficit is lower than before, but the sizeable surpluses forecasted by many people have stayed beyond reach. Net capital income sent abroad has reached 36 percent of exports, current account deficit is at 4.1 percent of GDP and the ratio of net external liabilities to exports has reached 5.3 and 0.5 to GDP. In short, dependency of the Brazilian economy on external capital inflows remains large and may create excess volatility on the exchange rate in certain situations. However, there are some reasons for optimism, considering the improvement of the fiscal stance, the working of the flexible exchange rate regime itself and the huge inflow of foreign direct investments that have financed the whole of the current account deficit. Yet, it should be noted that although they do perform necessary conditions for exchange rate stability, neither of them have prevented major currency and financial crises elsewhere, as we saw in Mexico, Southeast Asia and Argentina. Therefore, it's not enough that monetary and fiscal policies are geared to price stability and the exchange rate, to overall balance of payments equilibrium. Sustainability of the current account position is also important and requires additional policies such as tax reform for enhancing competitiveness and a strategic trade policy for export promotion and import substitution.

IX. Concluding Remarks

The recent Brazilian experience with exchange rate policy shows with clarity some well-known stylized facts. First, an exchange rate system is sustainable in the medium and long run only if it sets reasonable levels of real interest rates, real exchange rates and economic growth perspectives. In other words, if it provides internal and external equilibrium. Brazil's crawling peg regime established in March 1995 didn't provide them. When interest rates hit world record levels, the financial position of the public sector was impaired, currency overvaluation brought in current account deficits and deepened the accumulation of external liabilities, unemployment rose and output growth slowed. After the Asian and Russian crises it became an easy target for exchange rate speculators on the downward side.

Secondly, the Brazilian experience supported the argument that, nowadays, because of huge and volatile capital flows, middle of the road exchange rate schemes are less sustainable than believed before. Indeed, it's difficult to fix the external value of national monies in an environment where an increasing number of countries are either freely floating their currencies, adhering to monetary unions, or undergoing currency board schemes based on stronger currencies. Nevertheless, one has to weigh carefully the pros and cons of any particular regime. For instance, neither the recent Ecuadorian dollarization scheme nor the Argentinean convertibility scheme would serve the Brazilian economy well. Brazil has never had the type of inflation problem, or financial and trade structures that could justify such options. Fortunately, in spite of some initial skepticism, the present flexible rate regime cum inflation target is working well. The challenges ahead are great, but the recent successes bestow some optimism on the well functioning of the flexible exchange rate regime.

Third, dynamics is important. Currency bubbles are slow to develop but rapid to burst. Having envisaged problems in the exchange rate regime, the sooner the correction the better the results. Brazil enjoyed reasonable conditions to exit the pegged system on behalf of more flexible exchange rates between mid 1996 and mid 1997 when capital inflows regained momentum, inflation was under control, budget deficit started to decline and the economy was recovering from recession.[14] Unfortunately, the government stuck to its prevailing policy, postponed long needed adjustments and the opportunity was lost. The exit occurred amid a huge balance of payments crisis and devaluation was followed by a dangerous overshooting that required stronger efforts on macroeconomics fundamentals to prevent a complete disaster. The lesson seems clear: the entrance in a rigid exchange rate scheme is easier than its exit.

Fourth, in the Brazilian case, the move to floating exchange rates required sustainable fiscal policies (without which no exchange rate policy regime can be successful) and a new nominal anchor achievable either through inflation or monetary targeting. Brazil chose the former. Given the complexity of setting such targets and communicating them to society, they need new institutional arrangements and procedures as far as monetary policy is concerned. In many countries, and Brazil was no different, this new framework often simply does not exist at the moment of turnaround because it happens during emergencies dictated

[14] Regarding the exit, Brazil did the opposite as proposed by Eichengreen, Masson and others (1998).

by financial or balance of payments crisis. However, once changes have been made, the task of building these new institutions is of utmost importance to the sustainability of the new currency regime.

Fifth, the Brazilian case suggests that a successful transition from one foreign exchange system to another, particularly in a crisis circumstance, is not a one variable work – for either fiscal or monetary variables. In reality, it depends on a whole set of consistent events and coordinated policies, all of them directed to the objectives of re-achieving price stability with as little exchange rate and output volatility as possible.

References

Bogdansky, Joel, Alexandre Tombini and Sérgio R.C. Werlang, (1999), "Implementing Inflation Targeting in Brazil", *Working Paper* No.1, Central Bank of Brazil.

Bonelli, Regis (1998), "Ganhos de Produtividade e Eficiência: Novas Evidências para a Economia Brasileira", *Discussion Paper* No. 557, IPEA-Rio.

Cardoso, Eliana (1997), "Quem paga o imposto inflacionário?", Conjuntura Econômica, FGV, Vol. 51, No.8, pp. 127-128.

Cardoso, Eliana and Ilan Golfajn (1998), "Capital Flows to Brazil: The Endogeneity of Capital Controls", *International Monetary Fund Staff Papers* Vol. 45, No.1, pp. 161-202.

Cardoso, Eliana (1998), "Virtual Deficits and the Patinkin Effect", *International Monetary Fund Staff Papers* Vol. 45, No. 4, pp. 619-650.

Carneiro, Dionísio Dias (2000), "Inflation Targeting in Brazil: What Difference does a Year Make?", *Discussion Paper* No. 0429, Department of Economics, PUC-Rio.

Delfim Netto, Antônio (1997), "Inflação, Câmbio e Crescimento", Conjuntura Econômica, FGV, Vol. 51, No.11, Especial Supplement, pp. 33-41.

Dornbusch, Rudiger and Stanley Fisher (1976), *Macroeconomics*, McGraw-Hill Kogakusha Ltd., Tokyo.

Dornbusch, Rudiger (1980), *Open Economy Macroeconomics,* Basic Books, N.Y.

Dornbusch, Rudiger and Alejandro Werner (1994), "Mexico: Stabilization, Reform and no Growth", *Brooking Papers on Economic Activity*, 1.

Eichengreen, Barry, Paul Masson and others (1998), "Exit Strategies: Policy Options for Countries Seeking Exchange rate Flexibility", *International Monetary Fund Occasional Paper*, No.168.

Faria, Lauro Vieira de (1994), "On Central Bank Independence for Brazil", in Langoni, Carlos, James Ferrer Jr.and Marcio Ronci (eds*.), The Quest for Monetary Stability*, Getulio Vargas Foundation and The George Washington University, pp.179-189.

Faria, Lauro Vieira de (1997), "Lições Esquecidas", Conjuntura Econômica, FGV, Vol.51, No.7, pp. 24-32.

Faria, Lauro Vieira de (2000), "Para Além dos Vestígios da Desvalorização", Insight Inteligência, Vol.3, No.10, pp. 124-132.

Franco, Gustavo H.B. (2000), "The Real Plan and the Exchange Rate", *Essays in International Finance*, Department of Economics, Princeton University.

Getulio Vargas Foundation, *Conjuntura Econômica,* several issues.

Giambiagi, Fábio and Ana Cláudia Além (1999), *Finanças Públicas: Teoria e Prática no Brasil*, Ed. Campus, Rio.

Goldfajn, Ilan and Sérgio R.C. Werlang (2000), "The pass-through from depreciation to inflation: a Panel Study", *Discussion Paper* No. 0423, Department of Economics, PUC-Rio.

Hakkio, Craig S. (1997), "Efectos de la reducción del deficit presupuestario sobre el tipo de cambio", Boletim CELA, Mexico, Vol. XLIII, No.1, pp.4-13.

Mundell, Robert (1968), *International Economics*, Macmillan, N.Y.

Simonsen, Mário Henrique (1983), *Dinâmica Macroeconômica*, McGraw-Hill, São Paulo.

Simonsen, Mário Henrique (1995), *30 Anos de Indexação*, Ed. FGV, Rio.

Yeager, Leland (1976), *International Monetary Relations: Theory, History and Policy*, Harper & Row, 2nd Ed.

Yokota, Paulo, Marcelo Tsuji and Cassiana H. Fernanedez (2000), "Poupança e Crescimento no Brasil", in Relatório Mensal CAPRES, Sept. 2000, mimeo.

Appendix

Some basic features of the modeling approach used by the Central Bank are presented below, as given by Bogdansky et al (2000):

"The approach is based on the estimation of a group of structural equations with the main objective of identifying and simulating the mechanism of monetary policy transmission in Brazil, including the main channels of transmission as well as the lags involved. The structural model can be summarized as containing: (i) an IS type equation expressing the output gap as a function of its own lags, real interest rate (*ex ante* or *ex post*), and real exchange rate; (ii) a Phillips curve expressing the rate of inflation as a function of its own lags and leads, the output gap, and the nominal exchange rate (and imposing the long-term neutrality condition); (iii) an uncovered interest parity condition relating the differential between external and domestic interest rates with the expected rate of devaluation of the domestic currency (the *Real*), and the risk premium; and (iv) an interest rate rule, alternatively fixed rules on nominal or real interest rates, Taylor-type rules (with weights for contemporaneous deviations in inflation and output), forward-looking rules (with weights for deviations of expected inflation from the target), and optimal deterministic and stochastic rules."

"This family of models allows several reduced-form specifications, depending on which issues the Committee on Monetary Policy (COPOM) wants to discuss in detail. If, for example, the government is fully committed to a fiscal adjustment, the targets for the primary surplus of the consolidated public sector will be observed. In this case, the fiscal policy will produce important effects on aggregate demand, which should be explicitly taken into consideration. One possible way to incorporate this information into the model is to include a fiscal variable directly in the IS equation. In this specification, two variables represent policy instruments: the interest rate and the primary fiscal surplus. The first is a Central Bank instrument and the second is a Treasury instrument."

"The primary instrument of monetary policy is the short-term interest rate set by the Central Bank. To run a simulation in any of the model variants, it is necessary to choose a

monetary policy rule. The rules can be divided in three basic families: fully exogenous interest rate paths, linear combination of system variables and optimal response functions."

"Fully exogenous interest rate path provides a direct way to input any interest rate path in the model. This is useful to analyze the consequences of an expected interest rate trajectory, such as that implied by financial market instruments or the implicit path considered in the government budget. A particular rule of this family can be very helpful for institutional communication. The quarterly Inflation Report traditionally presents inflation and output growth forecasts constructed under the assumption that the short-term interest rate will remain constant at the current level along the projection period. The interest rate rule in the family of linear functions of some system variables is instrumental to analyze the system behavior under the choice of a particular set of variables as the output gap or the deviations of inflation from target. An optimal rule can be found using two basic optimization methods available for simulation. The first one is a deterministic optimization made considering the expectation for the system variables equivalent to the model own realizations. These two optimization methods may be used with a fully arbitrary interest rate trajectory or with a trajectory given as function of inflation, output gap and the lagged interest rate. The deterministic case is useful for simulating alternative scenarios during a forecast team meeting since this procedure is fast. On the other hand, the stochastic case is more accurate and gives the confidence intervals for the implied interest rate trajectory, though it requires substantial computation time, making this procedure unfeasible during a COPOM meeting."

"By combining equations given by (i), (ii), (iii), and (iv), along with a choice of inflationary expectations and passthrough specification, the basic framework for simulation and forecasting is determined. Then, COPOM members exchange views with the staff and choose relevant possible shocks. These shocks are then stylized and introduced into the structural models. It is important to note that given the simplified nature of the macro models, the staff is required to carefully identify the form, the intensity, as well as the timing of the interventions. The introduction of shocks in the simulation process involves a previous work on how much the economic agents have already anticipated them. This is particularly true for nominal variables. Given these definitions, the following results can be obtained: (i) inflation forecasts (central path and confidence intervals around the median) with definitions of a measure of dispersion (variance) and of risks (asymmetries); (ii)

forecasts for output; (iii) the trajectory for interest rates (both nominal and real) resulting from the various reaction functions; and (iv) dynamic simulations of exogenous shocks. Simulations permit the visualization of the transmission mechanism of monetary policy implicit in these simplified models, with the interest rate affecting the nominal exchange rate contemporaneously and the output gap with a lag; the nominal exchange rate affecting the imported inflation and, thus the inflation rate contemporaneously; and the output gap affecting the inflation rate with a lag. The simulation of the structural models is based on the selection of a core scenario that involves the most likely hypothesis and a set of alternative scenarios representing the perceived risks of departure from the basic hypothesis. A careful assessment of the various hypotheses is a necessary condition for balanced decisions on the instrument of monetary policy. Naturally, the results from the simulation exercises are combined with other elements in making policy decisions. In particular, forecasts cannot be limited to those produced by models. Alternative sources such as market surveys and forecasts, and information on inflation expectations embodied in financial instruments need also be considered in the decision process."