

# Banking and Currency Crisis Recovery: Brazil's Turnaround of 1999

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**B***razil's commercial banks' high capitalization ratios, shrunken loan portfolios, and expanded holdings of government paper allowed the central bank to take drastic postdevaluation stabilizing measures that calmed markets and created the foundations for a relatively quick economic turnaround without putting the banking system at risk.*

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Although events that lead to currency crises in countries with pegged or fixed exchange rates are the subject of a large and growing body of literature, how countries get out of these crises has received less attention.<sup>1</sup> This article focuses on how Brazil turned around after its 1999 currency crisis. We argue that Brazil's postdevaluation exchange rate was rapidly stabilized and economic recovery began soon after because the banking system had been prepared to withstand not only severe economic shocks but also severe economic policies.

Brazil's commercial banks' high capitalization ratios, shrunken loan portfolios, and expanded holdings of government paper allowed the central bank to take drastic postdevaluation stabilizing measures that calmed markets and created the foundations for a relatively quick economic turnaround without putting the banking system at risk. The Banco Central do Brasil's stabilization policy options were further expanded because Brazilian private sector foreign liabilities were largely hedged in ways that shifted the impact of the devaluation from the private to the public sector.

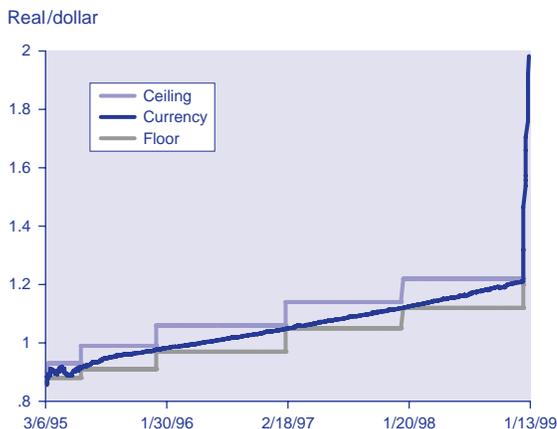
Most exchange rate crises of the 1990s were preceded by banking crises. Tensions sometimes surfaced between looser monetary policy to lower default rates and tighter policy to reduce the inflationary pass-through problems that materialize after a devaluation. Unable to decide what to do, some countries neither stabilized the banking system nor achieved their inflation goals. Other countries simply tolerated giving up one goal to reach the other. In any case, these countries' options were different and more problematic than Brazil's, in part because Brazil and its banks had taken steps to avoid this dilemma of twin crises. To elucidate what permitted Brazil's relatively fast postdevaluation recovery, we begin with an outline of the events leading to the devaluation.

## **BRAZIL'S REAL PLAN**

Brazil had long had severe difficulties with inflation. Even in the 1980s and early 1990s, Brazilian policymakers did not behave as if they appreciated the connections between (1) a problematic tax system, (2) fiscal deficits, (3) printing of money to pay for what taxation could not, and (4) inflation.

Policymakers seemed to perceive inflation as a problem solvable by decree and by indexing the cost of everything from private school tuition to power bills on past price movements. In their periodic efforts to fight inflation, policy-

**Figure 1**  
**Wide Exchange Rate Band and Actual Rate**



SOURCE: Banco Central do Brasil.

makers would typically freeze wages and prices for a while, stop indexing, and perhaps impose a fixed exchange rate. The unsustainable fiscal deficits behind these problems received less attention.

In 1994 Brazil finally initiated an economic stabilization plan that showed appreciation for the linkage between spending, money creation, and inflation. This Real Plan—named after the new currency, whose exchange rate system would be key to inflation-fighting efforts—temporarily involved indexation. However, the indexation was tied, through the exchange rate, to the number of dollars required to purchase a product rather than to measures of inflation and the currency.

To increase competition and, accordingly, pressures on oligopolies and monopolies that historically had been relatively free to raise prices, Brazil began to liberalize not only foreign investment restrictions but also trade. Brazilian tariffs were lowered from an average of 51 percent in 1988 to an average of 14 percent in 1994.

Brazil took steps against what had become a large federal deficit problem, although they ultimately were not enough. On the expenditure side, the Congress approved a reduction in the funds the federal government transferred to the states and municipalities. On the revenue side, federal income tax rates were increased. Monetary policy was restrained gradually.

As the linchpin of this program, the real was allowed to fluctuate within formally established wide and narrow bands that were periodically adjusted—an exchange rate regime that lasted from 1995 through early 1999. Figure 1 depicts the wider band.

A small, controlled devaluation had been built into the system to accommodate Brazilian

deviations from the U.S. inflation rate and, more generally, some alleviation of ongoing pressures against the currency. As Figure 1 shows, redefinitions were orderly and regular. Aside from some instability during Mexico's financial crisis of early 1995, the path of the Brazilian real was smooth and closely controlled.

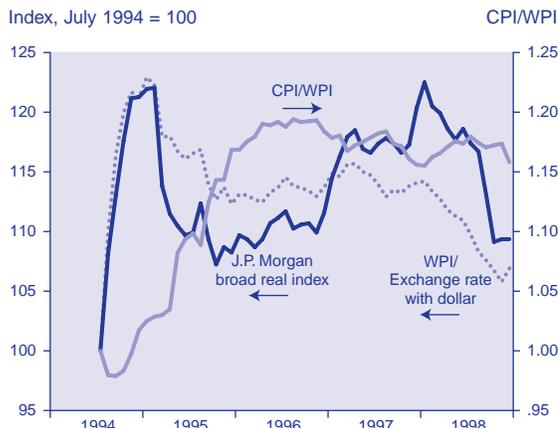
### SOME PROBLEMS PERSIST

Despite reducing inflation below zero by the end of 1998, the controlled devaluation built into Brazil's crawling peg was not enough to offset fully the effects of earlier differences between U.S. and Brazilian inflation rates under the Real Plan. Although there is no hard and fast definition of overvaluation and no hard and fast date on which to base the correct valuation from which we here calculate the overvaluation, Brazil's currency had been considered overvalued by 15 to 25 percent. The base period used to calculate the baseline exchange rate has typically been some time in 1994. We use July 1994 because that is when the Real Plan began.

Figure 2 presents three of many approaches to measuring exchange rate appreciation adjusted for inflation-rate differentials and to assessing degree of overvaluation. All three suggest Brazil's exchange rate appreciated after adjustment for inflation. One measure, the J.P. Morgan broad real exchange rate index, shows the inflation-adjusted value of the real appreciating by 22 percent between July 1994 and its peak in early 1998.

Another standard procedure, calculating the ratio of Brazil's consumer price index (CPI) to its wholesale price index (WPI), is designed to capture the changes in nontradable product

**Figure 2**  
**Proxies for Currency Overvaluation**



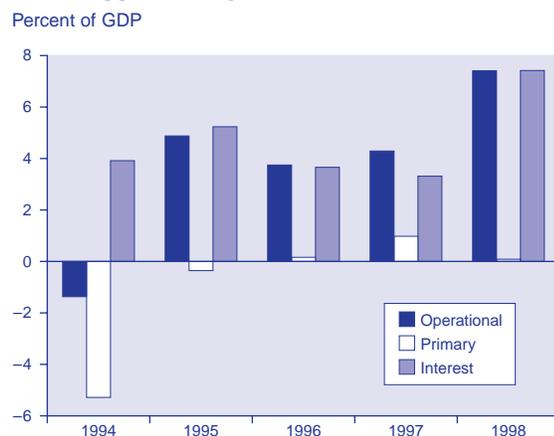
SOURCES: International Monetary Fund; J.P. Morgan.

prices (proxied by CPI) relative to the prices of tradable products (proxied by WPI)—and here reinforces the conclusions one could draw from the Morgan index. A large increase in this ratio is a common symptom of the pressures that culminate in a current-account crisis. As the figure illustrates, this variable shows 1994–98 maximum appreciation of about 18 percent.

A third characterization of exchange rate pressures involves the ratio of the WPI to the nominal exchange rate. As noted above, the WPI may be seen as a proxy for the prices of tradable goods, including exports. When the exchange rate does not adjust sufficiently to avoid large dollar (or other foreign currency-denominated) price increases for such products, foreigners become less interested in purchasing Brazilian products. Current-account pressures can materialize that may be difficult to alleviate without devaluation. Foreign investors know this, become fretful, and demand higher risk premiums, if they invest at all. The maximum appreciation over 1994–98 was about 22 percent.

In making these comparisons over time, the starting point of July 1994 is arbitrary in some senses, even though that is when the Real Plan began. However, despite the disparities between the three proxies for exchange rate appreciation, not one suggests exchange rate equilibrium in the year before Brazil's 1999 devaluation. Note also that each measure falls by year-end. These drop-offs reflect absolute declines in prices (including CPI and WPI) during 1998 and in CPI relative to WPI. By late 1998, these reductions could not offset pressures on the exchange rate.

**Figure 3**  
**Brazil's Fiscal Deficit**  
**While Approaching 1999 Crisis**



SOURCE: Standard & Poor's DRI.

**Figure 4**  
**Short-Term Brazilian Interest Rates**  
*(SELIC rate shown, an overnight interbank rate)*



SOURCE: Banco Central do Brasil.

Although an assortment of difficulties led to Brazil's devaluation, one of the most widely recognized was the nation's growing fiscal deficit—a problem that had never been fully solved despite the efforts expressed through the Real Plan. Figure 3 breaks down Brazil's government deficit between the portion due to interest payments (interest) and the portion due to the difference between government expenditures on goods and services and the government's income from taxes and fees (primary). The operational balance is the sum of interest plus primary. The primary deficit is not overwhelmingly large on a year-to-year basis. However, the year-in, year-out persistent accumulation of these deficits by a country that has a history of debt defaults or moratoriums clearly discomfited investors, especially in the context of financial crises in Asia and subsequently in Russia.

The combination of increasing cumulative debt together with investor fears, expressed in high interest rates, resulted in large interest payment portions of the deficit. In 1998, the two parts of the deficit depicted in Figure 3 summed to nearly 8 percent of GDP, of which virtually all was the interest portion. However, concerns quickly grew that the reduction of the primary deficit to almost nil would not last and that the government would return to its less prudent fiscal traditions. Even with the primary deficit reduction, measures of Brazil's international debt-servicing capacity were very weak.

Brazil did not cause the Asian crises of 1997 or the Russian crisis of 1998. However, Brazil responded to these crises by raising interest rates (*Figure 4*) in hopes of maintaining its

exchange rate and holding foreign capital in the country. Note the 1997 spike around South Korea's financial crises and in 1998 during the Russian crisis.

One result of Brazil's interest rate increases was the drop in Brazil's industrial production index (Figure 5). After ups and downs in 1997, industrial production fell noticeably during the second half of 1998. The high real exchange rate (Figure 2), which makes it hard to earn a profit from foreign sales, also contributed.

Although Brazil's interest rate increases in the wake of the 1995 Mexican Tequila Crisis and the 1997 Asian crises had the expected effect of raising the demand for Brazilian domestic currency and holding foreign currency reserves in the country, interest rate increases after the 1998 Russian crisis had the opposite effect. A fiscal reform package announced in conjunction with the interest rate increases lacked credibility—casting suspicion on the viability of other Brazilian stabilization efforts. Moreover, the interest rate increases forced up nominal fiscal deficits, aggravating existing concerns over sovereign default (Goldfajn 2000).

## THE END OF THE CURRENCY BAND

As problems became more acute in 1998 and suspicions mounted about the government's commitment to future fiscal balance, some well-known economists called openly for a Brazilian devaluation (Dornbusch 1998). Although President Fernando Cardoso had worked to bring the national budget into balance early in his first presidential term, during the late 1990s his focus turned toward reelection.

Once reelected in fall 1998, Cardoso again addressed Brazil's budgetary difficulties. At the end of October, Cardoso announced a new budget plan intended to save \$23 billion. Some analysts began to forecast federal primary surpluses for 1999, which might offset deficit problems due to interest payments. In November, a \$41.5 billion International Monetary Fund pre-emptive program was announced. This was intended to warn currency speculators that attacks on the real would not be worth the expense.

However, hopes for exchange rate stability faded as it became clear that many politicians in Brasilia did not share Cardoso's declared commitment to fiscal balance. In December 1998, a deficit reduction bill was voted down in large part by members of the president's own coalition. A significant social security reform effort was voted down for the fourth time. In re-

sponse, the rate of capital outflow from Brazil accelerated rapidly. With Brazilian foreign currency reserves in the \$30 billion to \$40 billion range, down from a more than \$70 billion peak earlier in the year, daily outflows of \$350 million to \$400 million became commonplace.

If a particular event could be said to have triggered Brazil's devaluation, it was most likely Minas Gerais Governor Itamar Franco's announcement in January that he would suspend his state's debt payment to Brazil's national government for three months. This declaration was soon followed by supportive statements from six other governors, who expressed interest in renegotiating their own debt. Since investors' principal exchange-rate-related concerns had been Brazil's ability to maintain fiscal balance, to pay its debts, and to resist the temptation to pay them through monetization, capital outflows accelerated further.

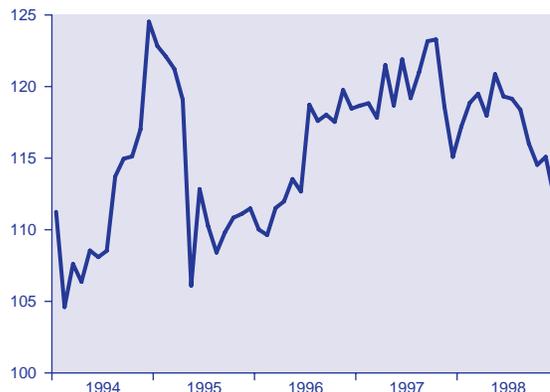
A week after Governor Franco's default announcement, the head of Brazil's central bank resigned and the central bank announced changes in the nation's exchange rate band to allow a 9 percent devaluation. At this time, capital was flowing out of Brazil at a rate on net of about \$1 billion per day, and the 9 percent devaluation announcement did not slow it.

As capital flight continued, rumors circulated rapidly—and were rapidly denied—that the currency would be turned loose from any band or peg. New central bank Governor Francisco Lopes, who held the job about two weeks, repeatedly asserted that the new 9 percent devalued exchange rate band would last in perpetuity.

But just two days after Brazil's new devalued exchange rate band was announced—less

Figure 5  
Industrial Production

Index, 1991 = 100



SOURCE: Instituto Brasileiro de Geografia e Estatística.

Figure 6  
**Brazil–U.S. Exchange Rate During the Crisis**



SOURCE: PACIFIC Exchange Rate Service (<http://pacific.commerce.ubc.ca/xr/>).

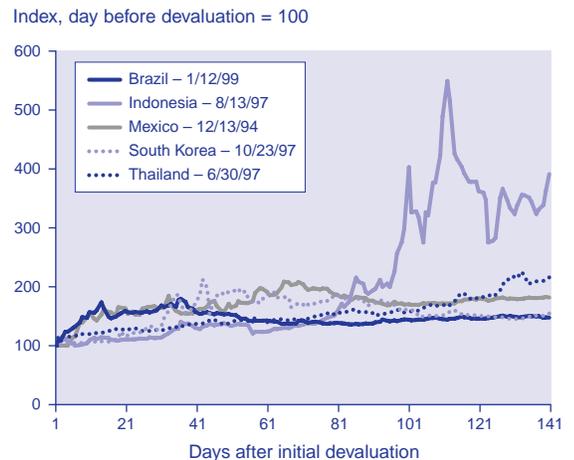
time than it takes some games of cricket to be played—Brazil declared that its exchange rate would be allowed to float after all. Brazil’s official exchange rate arrangement remains a floating regime. Figure 6 represents daily Brazilian exchange rates from December 1998 through January 1999, when the exchange rate system broke down, and on through April. Movements after January 13 alternated between episodes of moderate volatility and stability, but the exchange rate clearly strengthened from its weakest point of 2.11 reals per dollar in early March.

**BRAZIL POSTCRISIS:  
 EXCHANGE RATES AND OUTPUT**

Figure 7 offers a broader perspective on Brazil’s relatively quick stabilization of the real. The figure depicts the trajectory of indexed exchange rates for five currency-crisis countries of the 1990s. Each nation’s exchange rate with the dollar equals one unit (Brazilian real, Indonesian rupiah, Korean won, Thai baht, or Mexican peso). Despite early volatility, Brazil’s exchange rate stabilizes after sixty-one trading days, while those of Indonesia, South Korea, Mexico, and Thailand are still headed upward. By ninety-one days, Mexico’s exchange rate has begun to stabilize, but Thailand’s is still climbing, as Thai officials are unable to wring uncertainty or inflationary expectations out of the market. By 121 days, South Korea’s exchange rate is as stable as Brazil’s.

To put this exchange rate variance in a clearer perspective, note that—over the first 130 trading days following each of their devaluations—the standard deviation of the index of each country’s exchange rate is as follows: Brazil,

Figure 7  
**Exchange Rates Through  
 Periods of Devaluation**



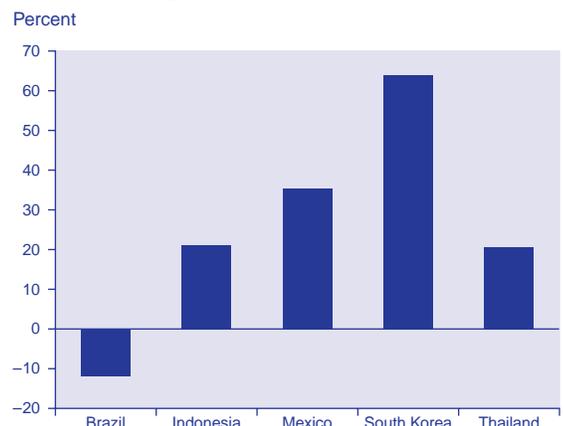
NOTE: Nontrading days are not counted as days on this figure, so 61 days are more than two calendar months and 91 days are more than three calendar months.

SOURCE: PACIFIC.

10.1; Indonesia, 150.8; Mexico, 23.7; South Korea, 20.6; and Thailand, 24.2. Thus, using this measure, Brazil’s exchange rate volatility is less than half as much as even South Korea’s.

Another way of considering exchange rate movements is to exclude the first ten trading days after the original devaluation to show that some exchange rates settle down quickly and others are reluctant to stabilize. Figure 8 presents percentage exchange rate movements for each of the five currency-crisis countries between ten and seventy-one trading days after the initial devaluation.

Figure 8  
**Postdevaluation Devaluation**  
*(Percentage devaluation relative to dollar between 10 and 71 trading days after initial devaluation)*



SOURCE: PACIFIC.

Of the five countries, only Brazil has an absolute decline (signifying a 12 percent revaluation) in the number of domestic currency units traded per dollar over this period. The rest range from a 20.6 percent postdevaluation-date devaluation (Thailand) to 63.9 percent (South Korea). Recall that Brazil's exchange rate was flexible rather than pegged or fixed during this period.

Figure 9 compares postdevaluation industrial production in each of the five countries under consideration, offering another example of the results, in part, of Brazil's stabilization policy—a growth turnaround. The figure presents measures for one through fourteen months following the devaluation month for each country, regardless of when the devaluation took place. The figure shows that Brazil's industrial production response to devaluation and subsequent stabilization policies was more positive sooner than the other countries' responses to their particular devaluations and stabilizations.

In sum, of the five crisis countries under consideration here, Brazil stabilized its exchange rate more quickly than all but (for some measurement periods) South Korea and turned its industrial production up more quickly than any of the other four countries. What permitted the Brazilians to pursue economic stability and allowed an output turnaround so much faster than in the other countries? We argue that an important reason is the stability of Brazilian banks compared with those of the remaining countries.

## TWO ROOTS OF EXCHANGE RATE CRISES: BANKING WEAKNESS AND FISCAL DEFICITS

To clarify the connection between bank health and Brazil's recovery from the 1999 currency crisis, we present measures of precrisis fiscal and banking–financial leverage for the five 1990s currency-crisis countries considered in this article and show that every country's crisis was preceded by at least one high-leverage measure. However, Brazil's high-leverage measure did not involve banking. Table 1 presents an overview, offering a matrix of combinations of banking–financial and fiscal leverage.

A large economic literature claims that when countries have high values for banking–financial or fiscal leverage, investors are more likely to remove their financial capital than otherwise. In Table 1, the columns account for the presence or absence of high banking–financial leverage, while the rows account for the presence or absence of fiscal leverage problems.

The term *banking–financial leverage* refers

Table 1  
**Roots of Exchange Rate Crises**

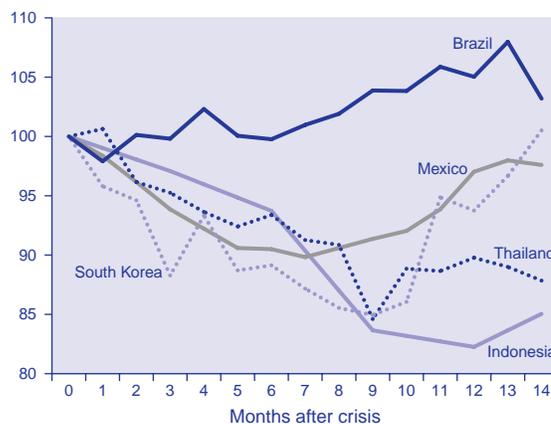
	High banking–financial leverage	Low banking–financial leverage
High fiscal leverage	Indonesia, 1997 Mexico, 1994–95	Brazil, 1999
Low fiscal leverage	South Korea, 1997 Thailand, 1997	

to the quotient of some measure of bank or financial assets divided by the value of something that could allow depositors to get their money out of a bank or away from the country. When the likelihood of getting one's money out of the bank is under question, one logical denominator is bank capital. Low leverage, which in such a case would mean a low ratio of assets to capital, signifies that banks would have enough capital to pay off fleeing depositors if asset-quality problems triggered bank runs. A high ratio could mean that there is insufficient capital to pay off depositors and the government might get the job by default.

Getting one's finances away from a country involves other measures of banking–financial leverage, such as foreign currency reserves. Soon-to-be ex-depositors or ex-investors may wonder whether they can convert their domestically denominated currency into foreign currency at the old pegged exchange rate before the central bank loses so many reserves that it stops defending its currency and devalues. The denominator of

Figure 9  
**Production in the Crisis Countries**

Index, month of crisis = 100



SOURCES: Mexico: Instituto Nacional de Estadística, Geografía e Informática; Brazil: Instituto Brasileiro de Geografia e Estatística; Thailand: Bank of Thailand; South Korea: Korea National Statistical Office; Indonesia: Biro Pusat Statistik; authors' calculations.

a relevant leverage measure could be the volume of foreign currency reserves. A high bank assets/foreign currency reserves ratio might mean insufficient dollars at the erstwhile exchange rate for all ex-bank-depositors who want to get their money out of the country.

Measures of fiscal leverage (upper row of *Table 1*) typically involve some ratio of how much a nation must pay to what it has to pay it with. From the foreign-debt holder's perspective, the narrower issue of whether a country can earn enough foreign currency to pay its foreign-currency-denominated debt is of particular concern. For this category of debt holders, the fiscal leverages of greatest interest will involve a denominator that measures foreign-currency earning capacity.

Table 1 presents combinations of high banking–financial leverage/high fiscal leverage (Mexico, 1994; Indonesia, 1997); high banking–financial leverage/low fiscal leverage (South Korea, 1997; Thailand, 1997); and low banking–financial leverage/high fiscal leverage (Brazil, 1999).<sup>2</sup> This table, however, is designed only to give an overview.

To more fully elucidate these notions of risk, we begin with characterizations of banking–financial leverage (*Figure 10*). The leverage depicted by the M2/foreign currency reserves ratio is perhaps the international economic literature's most widely used method for characterizing banking–financial fragility's connection to a currency crisis (Calvo 1995; Sachs, Tornell, and Velasco 1996; Kaminsky and Reinhart 1999; Chang and Velasco 2000; and Velasco 2000). This ratio is used as a broad approach for capturing phenomena in which a “prior boom in bank lend-

ing indicates greater weakness in bank balance sheets and, therefore, more vulnerability” (Sachs, Tornell, and Velasco 1996, 150).

The ratio of M2/foreign currency reserves is used as such an indicator because “when capital inflows suffer a reversal, not only do gross inflows dry up, but also, holders of liquid domestic liabilities try to convert them into foreign exchange and flee the country” (Sachs, Tornell, and Velasco 1996, 150).<sup>3</sup> Thus, this approach to leverage assessment is of the getting away (from the country) form rather than of the getting out (of the bank) form, both of which are discussed above. Although the sample of countries for which we use this ratio is small, it proxies for a much larger group. Velasco (2000) notes that at the onset of the Asian crisis, the same M2/foreign currency reserves ratio that appears in *Figure 10* was generally higher for Asian economies than for Latin American economies.<sup>4</sup>

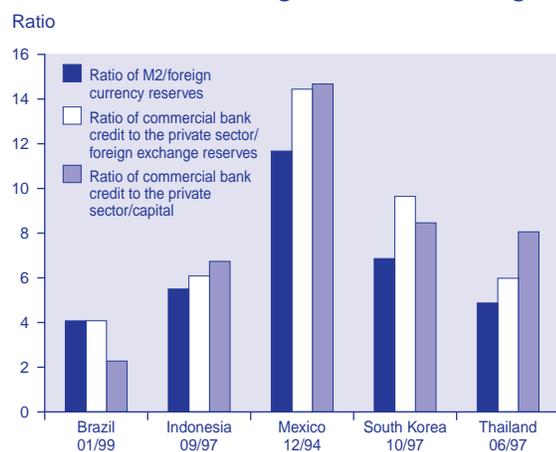
The ratio of commercial bank credit to the private sector/foreign currency reserves offers a second, narrower look at the getting away (from the country) approach to measuring leverage but with the same analytical results. Here again, precrisis bank leverage in Brazil is markedly lower than in the other four currency-crisis countries (*Figure 10*).

These two ratios offer bank leverage measures that are relatively exogenous to government policy. Thus, as crisis conditions materialize, it becomes increasingly difficult for the exchange authorities to manage the size of their reserves.

The ratio of commercial bank credit to the private sector/capital, in contrast, is not only more subject or endogenous to government control than the previous two ratios, but focuses on the getting out (of the bank) problem rather than the getting away (from the country) problem. Even though this measure of bank leverage is very different from the other two ratios depicted in *Figure 10*, it also is lower for Brazil than for any of the other four countries.

In sum, Brazilian banking–financial leverage is relatively low whether we are discussing exogenous measures (M2/foreign currency reserves, commercial bank credit to the private sector/foreign currency reserves) or endogenous measures (commercial bank credit to the private sector/capital). We argue that bank capitalization ratios are relatively endogenous because governments can set and sometimes enforce them. Leverage measures involving foreign currency reserves are more exogenous than capitalization ratios because governments cannot control foreign currency reserves as easily as they can

**Figure 10**  
**Three Kinds of Banking–Financial Leverage**

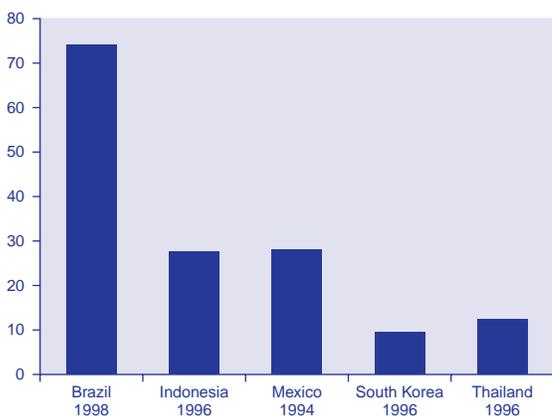


NOTE: Data are seasonally adjusted.

SOURCES: International Monetary Fund; authors' calculations.

Figure 11  
**Debt Service Ratio**

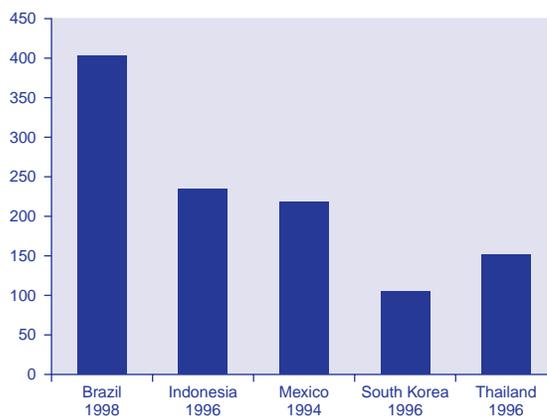
Ratio of debt service to export



SOURCE: World Bank.

Figure 12  
**External Debt as a Percentage of Exports**

Percent



SOURCE: World Bank.

make up and enforce bank capitalization ratios.

Figures 11 and 12 present two widely used measures of fiscal leverage, each of which gauges a nation's ability to earn enough foreign exchange to service its foreign (and, as in the case of the five countries here, foreign-currency-denominated) debt.<sup>5</sup> In contrast to Brazil's low bank leverage, these fiscal leverages are very high for Brazil and low for such countries as South Korea and Thailand. Brazil's high leverages can be seen in the countries' external debt service ratios (the ratio of countries' foreign debt service payments to the income from exports they use to make these payments) (*Figure 11*) and in the ratio of external debt to exports (*Figure 12*). Note that after Brazil, the other two high fiscal leverage countries are Mexico and Indonesia. Recall that in Table 1 Mexico and Indonesia fall into the category of high fiscal leverage and high banking—financial leverage.

Despite the distinctions we have made between banking—financial leverage and fiscal leverage, either one can signal possible fiscal difficulties. After all, if high bank leverage (particularly as expressed by asset/capital ratios) signals high likelihood that the government will assume bank obligations if asset quality deteriorates, what may really be scaring investors is just another fiscal problem.

## BRAZILIAN BANK REGULATION IS TRANSFORMED IN THE 1990S

What brought about the relative strength of Brazil's pre-crisis banking system? As international capital markets began to open in the late 1980s, and as the problematic results of domestic financial liberalizations in the industrial

countries also became clear, concerns increased about the stability of the world's banks. The result was a movement to ensure that banks would be properly capitalized. One manifestation was the Basle Accord, whose eleven signatory nations in 1987 agreed to enforce risk-based capital requirements of 8 percent on all banks within their boundaries.

Brazil was not among the signatory nations of the 1987 Basle Accord but did, in 1994, establish risk-based minimum capital requirements consistent with the accord. In June 1997, as banking problems were materializing in Asia, the Brazilians raised their risk-based minimum capital requirements from the 8 percent Basle Accord standard to 10 percent.<sup>6</sup> In November, following the onset of South Korea's financial crisis, Brazil raised the requirement to 11 percent. In 1994, moreover, absolute minimum capital limits had been set for any bank, regardless of where these minimums would place it in terms of risk-based capital ratios. Commercial banks could have no less capital than 6 million reais.

Although the legal structure governing the regulation of Brazil's banks was obviously changing, a common problem in Latin America is that those in charge of bank supervision and regulation do not have the power to enforce the regulations on the books. The ability of the Banco Central do Brasil—Brazil's regulatory authority for banks—to cause banks to follow its directives was very limited even during most of the 1990s.

In March 1997, however, new laws permitted the Banco Central do Brasil to demand that a bank with liquidity problems transfer control to new management or reorganize through merger or closure. The central bank could now

appropriate the equity interests of a commercial bank's controlling group and sell it to others. In 1998, the central bank was given new powers to compel financial institutions to implement systems of financial controls, also in accordance with the Basle Committee.

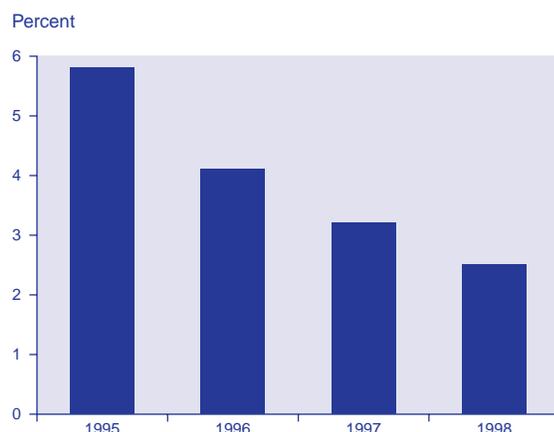
Meanwhile, Brazil took steps to force the privatization of publicly owned banks. Brazil's central bank had long been not only a lender of last resort to the publicly owned banks, but also a routine supplier of capital injections to them. In August 1996, after these institutions' loan portfolios went from bad to worse, Brazil issued new regulations about the conditions for their rescue. Bailouts would take place, provided the banks were either privatized, liquidated, or transformed into development agencies.

Also in 1996 Brazil's government began to permit foreign banks to take control of small financial institutions. In 1997, in the wake of government interventions in larger banks, Brazil allowed foreign controlling interest in these institutions as well. In the conclusion to a study of Brazilian bank efficiency, Bevilaqua and Loyo (1998) argue that, while the new price stability brought on by the advent of the Real Plan in 1994 weaned banks from profiting from float and encouraged them toward greater efficiency, a perhaps more important contribution to bank efficiency was the new competition imposed by the introduction of foreign banks.<sup>7</sup>

### GOVERNMENT POLICIES INDIRECTLY AFFECT BANK LEVERAGE

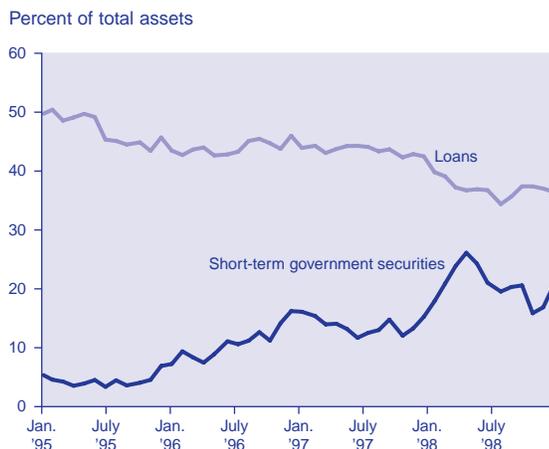
Bank regulation changes and other prudential bank behavior improved bank leverage.

Figure 13  
**Ratio of Loans to Capital in Brazilian Commercial Banks**



SOURCE: Banco Central do Brasil.

Figure 14  
**Comparison of Bank Loans and Short-Term Government Debt**



SOURCE: Banco Central do Brasil.

Some Brazilian government policies indirectly affected leverage also. For example, protracted central bank tightening in defense of the real prior to the January devaluation also encouraged commercial banks to take asset positions that allowed them to withstand the economic turmoil attending most devaluations.

More to the point, as the central bank of Brazil pushed up interest rates to defend the currency during the contagion effects from the Asian crises of 1997 and the Russian crisis of 1998, it not only discouraged borrowing as the economy began to slow but also discouraged lending inasmuch as bankers fear that high interest rates increase the likelihood of default. The result appears to have been a credit rationing, as characterized by Stiglitz and Weiss (1981).

The reduction in loan leveraging, as banks pulled their funds from private sector lending and placed them in high-yield government securities, can be seen in Figure 13, which shows the marked declines in the loans-to-capital ratio in Brazilian commercial banks. To offer another perspective, Figure 14 depicts the ratio of loans to assets and of short-term government securities debt (not including state and local government debt) to total assets. Over the period 1995–98, the share of loans declines while the share of short-term government debt increases. Although reductions in the ratio of bank loans to capitalization would be consistent with the regulatory changes discussed in the previous section, the magnitude of the ratios in Figure 13 requires an explanation beyond such regulations. The portfolio shift depicted in Figure 14 away from loans and toward government

securities provides an explanation for the drop in loans-to-capital ratio.

The reduction in Brazilian bank loan leverage has important implications for the persistent debate regarding the optimum time for a Brazilian devaluation. One argument is that Brazil should have devalued long before it did. However, one virtue of waiting until 1999 is that by then banks had reduced the share of loans in their portfolios sufficiently to endure the tight monetary policy that allowed Brazil to stabilize. The reduction in loans as a percentage of total bank assets was not instantaneous, but required adjustment time in response to tight monetary policies adopted in defense of the currency during 1997 and 1998. In this context, it may be seen that postponing the devaluation resulted in bank portfolios and bank capitalizations that allowed the central bank to persist with tight monetary policies after the devaluation.

There is another more general financial reason why Brazil's devaluation did not cause the Brazilian economy to stagger protractedly. Unlike what happened in the Asian crisis countries, the private sector anticipated Brazil's devaluation for at least a year in advance and hedged against it. For the period of Brazil's devaluation, Banco Central do Brasil data show \$95 billion in private sector foreign liabilities in the Brazilian economy. Of that \$95 billion, \$71 billion was hedged, either through the purchase of such assets as indexed securities (\$60.5 billion) or by taking foreign exchange derivative positions (\$10.5 billion). Partly for this reason—but also because Brazil's foreign exchange crisis did not involve a banking crisis as did those in Mexico, Thailand, Indonesia, and South Korea—floating the real resulted in little bankruptcy and modest balance sheet efforts.

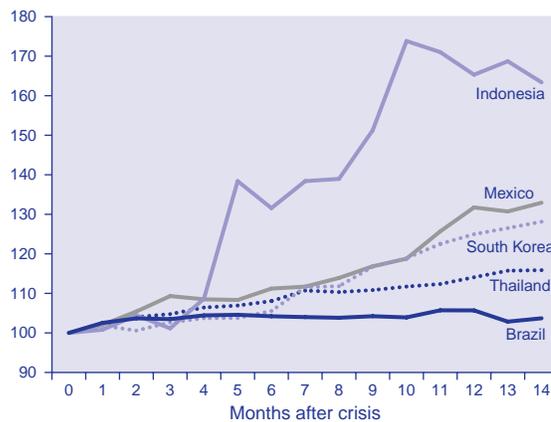
### BRAZIL'S TIGHT MONETARY POLICY

We argue that banking sector strength meant Brazil could pursue a tight monetary policy that would hold down inflation and expectations of it for the future. This could stabilize exchange rates and consequently create the investor and consumer confidence to allow the rapid turnaround in industrial production.

Figure 15 depicts postcrisis monetary expansion in each of the five crisis nations. The indicator here is the growth in the monetary aggregate M2 from the month of each nation's exchange rate crisis through the five months thereafter. To permit full comparability, each M2 is constructed consistently with the International Monetary Fund's definitions rather than the par-

Figure 15  
**M2 in the Crisis Countries**

Index, month of crisis = 100



SOURCES: International Monetary Fund; authors' calculations.

ticular nation's own definition of M2.

During the first five months following their respective exchange rate crises, Brazil's and South Korea's monetary expansion rates were markedly slower than those of Indonesia, Mexico, and Thailand—but Brazil's was far and away the slowest. Specifically, cumulative monetary growth for the first five postdevaluation months was Brazil 1.1 percent, South Korea 5.7 percent, Thailand 8.4 percent, Mexico 15.9 percent, and Indonesia 30.3 percent.

### CONCLUSION

One of the most striking aspects of the Brazilian devaluation is its difference from those of Mexico, Thailand, and South Korea—among others—in that financial sector weakness did not trigger it. Brazil's January 1999 crisis is closer to first-generation currency crises than to other types. These first-generation crises materialize through rising fiscal deficits under a pegged exchange-rate regime and finite foreign exchange reserves, leading to a speculative attack when lender-imposed credit limits are reached.

The Indonesian, South Korean, Mexican, and Thai crises fit the second-generation model. The literature on such crises emphasizes sudden capital outflows due to changes in market sentiment—a movement from a good equilibrium to a bad one. However, in such cases, it is so common for a banking crisis to precede the currency crisis (see Calvo and Mendoza 1996, for example) that some kind of reckoning of the banking sector liabilities becoming government liabilities seems to be part of the phenomenon.

Whether a necessary connection exists between second-generation models and banking crisis literature, substantial twin crisis literature (for example, Kaminsky and Reinhart 1999, McKinnon and Pill 1996) links these crises in ways that the first-generation models do not.

Based on Brazil's experience, if a country is going to follow the first-generation model on its unfortunate route to a currency crisis, there is much to recommend preparing for the devaluation by strengthening the banking system's capitalization, lowering its loan leverage, and increasing its efficiency.<sup>8</sup> Taking steps to allow the private sector to hedge against an impending devaluation, as also occurred in Brazil, can similarly aid the subsequent turnaround. Defending one's currency with high interest rates long enough to induce bankers to reduce lending and increase bond holding may be a third approach to preparing for a strong turnaround.<sup>9</sup>

Brazil's experience offers a perspective on the twin crisis literature of the 1990s, in which the focus is on the connection between banking system weakness and a currency crisis. While we think the twin crisis literature has much to recommend it, we have attempted to broaden consideration of the relation between banking system health and currency crises. Not only banking system weakness but also banking system health affects the options governments have in defending their currency or, once the currency is floated, stabilizing it.

## NOTES

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- <sup>1</sup> Kaminsky and Reinhart (1999), which is among the most significant and well-known documents on currency crises to appear in years, does raise the issue of factors leading away from crises, but the article's principal emphases are (1) the connections between currency crises and financial crises and (2) the factors leading up to such crises. In Kaminsky, Lizondo, and Reinhart (1998), the emphasis is also on factors leading up to the crises rather than what overcame them.
- <sup>2</sup> For discussion of these various combinations of problems, see (for Mexico) Kamin and Rogers (1996), Calvo and Mendoza (1996), Kaminsky (1998), and Kaminsky and Reinhart (1999) and (for the Asian countries) Kodres and Pritsker (1998) and Kaminsky and Schmukler (1999). Complications arise, however. In Kaminsky and Schmukler (1999), fiscal issues most trigger stock market jitters in two countries: Indonesia,

which we would expect, and Thailand, where fiscal problems do not play a role (Table 1).

- <sup>3</sup> The preceding two quotations are Sachs, Tornell, and Velasco's explanations for their use of M2/foreign currency reserves as an indicator of commercial bank-related pressures leading to currency crises.
- <sup>4</sup> Extending the explanation of the usefulness of this ratio, Velasco (2000, 10) describes "a situation in which expectations of devaluation generate a sharp fall in bank deposits. Banks lend long and borrow short. Thus, they will not have enough money in their vaults to cover their liabilities."
- <sup>5</sup> As examples of evidence that such leverage may scare away foreign investors, Cosset and Roy (1991) and Lee (1993) show inverse relationships between debt service or similar ratios and debt ratings of the large rating services such as Moody's and Standard & Poor's. Dooley (2000), however, develops a model in which debt service cost minimization is shown to be an inefficient policy for governments in developing countries because such policies increase the cost of default.
- <sup>6</sup> The idea of risk-based capital requirements is that loans require more capitalization to account for asset recovery problems than, say, government bonds. Accordingly, the weights that express the capital requirement for loans are heavier than for the government bonds. In 1997, when the Brazilians raised the overall risk-based capital requirement to 10 percent, they also increased the weights, so the average capital requirement went up more than was expressed simply by a move from 8 percent to 10 percent.
- <sup>7</sup> For a contrast to Brazil's experience, consider the observations of Radelet and Sachs (1998, 30). They note South Korea, Indonesia, and Thailand "had initiated but not completed financial sector liberalization and reform. The partial reforms had led to increasingly fragile financial systems, characterized by growing short-term foreign debt, rapidly expanding bank credit, and inadequate regulation and supervision of financial institutions. These weaknesses, in turn, left the Asian economies vulnerable to a rapid reversal of capital flows." For a perspective on comparative bank conditions, note that two months after each country's devaluation, nonperforming plus in-arrears loan ratios at private commercial banks were Brazil 7 percent, Mexico 12.3 percent, and South Korea 13.3 percent.
- <sup>8</sup> Pushing the lender-of-last-resort function offshore—instead of keeping it within the central bank—by inviting foreign banking institutions to operate in one's country would also serve to strengthen the system in this case.
- <sup>9</sup> Brazil's adoption of formal inflation targeting as a measure to make its stabilization policy more transparent may be seen as a way of enhancing this credibility further, but in fact markets had already begun to settle down before the introduction of inflation targeting.

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