

RESISTING AND RECOVERING FROM CRISES: LESSONS FROM BRAZIL AND ARGENTINA

William C. Gruben

Federal Reserve Bank of Dallas

John H. Welch

Barclays Capital

A huge amount of research has focused on the causes of crises and their prevention. But not much research has looked at how countries recover after a crisis. The recent events in Argentina underline how important recovery is to preventing future crises. Here we explore the paths that crisis countries have taken or not taken to recovery. We find that countries have reached recovery through a number of different means. While many have counseled a pure laissez-faire approach to policy, countries like Korea followed highly interventionist policies en route to ultimately bona fide recoveries. Others such as Russia and Ecuador were helped by large surges in oil prices in 1999 and 2000 that rectified government finances and the balance of payments. Argentina was able to recover after the 1995 Mexican crisis but not after the Russian 1998 and Brazilian 1999 crises and went into full-fledge crisis in September 2001. Indonesia also had trouble recovering from its crisis, unlike its neighbors in Thailand and Korea.

Although different countries found different paths to recovery, recovery in general figures importantly in avoiding future problems. Argentina could not recover from the Russian and Brazilian crises and finally went into a full-blown solvency, exchange rate, and banking crisis of its own in late 2001. Argentina thus became the final country outside of Hong Kong to give up a fixed exchange rate regime in the face of a crisis. Perhaps the lack of recovery has something to do with the exchange rate regime, but not in the simple way that some analysts imagine. We argue here that the condition of the banking system and the robustness of international investor interest may interact with the exchange rate regime to hinder or stimulate recovery.

Certainly, the health of the banking system had something to do with the onset and the depth of the crises. As Table 1 shows, the combination of a high amount of short-term government debt and high banking leverage makes for a lethal elixir. As long as Argentina kept its bank leverage low and did not resort to short-term financing, it was able to stave off crises. In 2001, however, the Argentine government desperately increased the use of short-term financing and raised leverage in the banking sector by expanding monetary policy in the face of large and persistent deposit outflows. Argentina defaulted in December 2001 on its external and internal debts and froze deposits; in January 2002, the country abandoned its fixed exchange rate peg. In

the end, then, Argentina's crisis came in some ways to resemble what had happened in years past in Mexico, Russia, and Ecuador rather than in Brazil.

The banking system proved crucial in Brazil's escape trajectory. Following its January 1999 devaluation, Brazil was able to float without a full-fledged banking crisis and to recover quickly. But recovery in other countries did not rely on bank health. Mexico, Korea, and Thailand have all recovered after deep falls in gross domestic product (GDP) while their banking systems were still broken. A crucial element in these recoveries may prove to be the economy's openness to foreign trade. In a way, the reasons why harken back to the discussion on contractionary devaluation. McLeod and Welch (1993) show that in an endogenous growth model, whether devaluations are contractionary depends in a nonlinear way on how open an economy is. For closed economies, the larger the devaluation, the larger the output contraction. The more open an economy is, the smaller the negative impact on output. For very open economies, devaluation is expansionary. We are still exploring this nature of the recoveries from crises—or lack thereof—and will leave a more systematic examination of this theme to later work.

The discussion here focuses on the similarities of and differences between two recent Latin American exchange rate crises, the Argentine peso devaluation of January 2002 and the Brazilian *real* devaluation of January 1999, with background from other crises. We think that the differences between the two crises in and of themselves are important. Understanding these differences is important because they offer information about the likely postcrisis stresses that permit or discourage various stabilization policies. These stresses accordingly affect the likelihood that various growth, price, and fiscal trajectories will materialize.

Fiscal Deficits and Banking Weakness: Two Keys to Exchange Rate Crisis

Although difficult-to-quantify social and political stresses clearly have their impacts on exchange rate crises, simple financial ratios capture much of the foundation of any crisis. After all, both foreign and domestic investors who must decide whether or not to keep their money in a certain country routinely base their considerations on such indicators. The appearance of large amounts of short-term government debt or high banking/financial leverages increases the likelihood that investors will remove their financial capital from a country. When the two high ratios turn up together, the Diamond and Dybvig phenomenon of investors leaving simply in anticipation that others will leave is even more likely to materialize than when just one occurs. Table 1 depicts the two types of leverage. The columns show the presence or absence of high banking/financial leverage. The rows account for the presence or absence of short-term government debt problems.

By the term banking/financial leverage we refer 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. Here we measure the possible contingent liability facing the central bank if a banking panic sets in. If the banks' capital is insufficient to accommodate the difference between crisis-adjusted asset values and deposit values, governments typically step in and bail them out. The reasons why are less important here than the simple fact

that this is what happens. That is, the banks' liabilities become the government's liabilities—and ultimately the taxpayers'.

When the odds of getting one's money out of the bank is under question, the denominator may involve bank capital. Lower leverage, which 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 insufficient capital to pay off depositors, and that political pressures might cause the government to pay them off instead. Investors will naturally wonder whose money will be used to make these anticipated payoffs—certainly if the government will be making them—and how the money will be collected.

Addressing the issue of getting one's finances away from a country involves other measures of banking/financial leverage. These measures typically employ foreign currency reserves. Soon-to-be ex-depositors or ex-investors may wonder about the likelihood that they can convert their domestic currency-denominated assets 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 a relevant leverage measure could involve the volume of foreign currency reserves. A high bank liabilities to foreign currency reserves ratio might mean insufficient dollars at the erstwhile exchange rate for every ex-bank depositor who wants to get her money out of the country.

Measures of fiscal vulnerability (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 perspective of holders of foreign debt, 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. Moreover, domestic debt—whether denominated in domestic or foreign currency—may also create problems for a central bank. If banks are highly exposed to short-term government debt, the central bank may try to maintain the par value of these bonds through open market operations. Such monetization would precipitate the end to a rigid exchange rate regime. If the central bank were to defend the exchange rate with high interest rates, the potential market-to-market losses to the banks could also precipitate a run on the banks (Calvo 1995).

Table 1 presents combinations of high bank financial leverage and high short-term government debt (Mexico, 1994; Indonesia, 1997; Turkey, 2000; Ecuador, 1999; and Argentina, 2001); high bank financial leverage and low short-term government debt (South Korea, 1997; Thailand, 1997; Indonesia, 1997); and low bank financial leverage and high short-term government debt (Brazil, 1999).¹ The only countries that figured into the low bank financial leverage and low short-term government debt category were Hong Kong and Argentina (1991–

¹ For discussion of these various combinations of problems, see (for Mexico) Kamin and Rogers (1996), Calvo and Mendoza (1996), Kaminsky, Lizondo, and Reinhart (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 trigger most stock-market jitters in two countries, one that we would expect (Indonesia) and one where fiscal problems do not play a role in Table 1 (Thailand).

2000). Argentina's stay in that quadrant proved only temporary. This figure, however, is designed only to present an overview.

To elucidate these notions of risk more fully, we present characterizations of banking financial leverage, beginning with the ratio of inside money to bank capital (Chart 1). Inside money is simply M2 minus monetary base—which is to say that inside money is roughly demand deposits plus savings deposits. Of course these bank liabilities are the basis for loans and other types of assets that can lose significant value in a crisis. The ratios of bank liabilities to capital offers evidence of risk. Of the two categories of bank risk that we have mentioned—getting out and getting away—this measure addresses the risk of having difficulties getting money out of the bank. A high ratio is riskier than a low ratio. A high rate means there is not much bank capital to dip into if depositors want more money than there are assets to retire to get them. Note the strength of Brazil's inside money/bank capital compared with those of other countries. Although our subsequent discussion will emphasize Argentina's crisis as a classic fiscal leverage problem, note that even Argentina's inside money/capital ratio is twice Brazil's. With the exception of Russia's, the remaining countries' ratios are far higher, suggesting a considerably riskier banking structure than Brazil's.

Chart 2 presents the ratio of M2/foreign currency reserves—perhaps 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). In contrast to the prior measure, which characterizes possible complications in getting money out of the bank, this ratio captures risk in getting money away from the country. The ratio of M2/foreign currency reserves is used as a broad approach for capturing phenomena in which a “prior boom in bank lending indicates greater weakness in bank balance sheets and, therefore, more vulnerability” (Sachs, Tornell, and Velasco 1996, 150).

The ratio 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” (150).² 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 our chart was generally higher for Asian economies than Latin American economies.³ Note that this chart offers a measure of bank leverage that is relatively exogenous to government policy. That is, as crisis conditions begin to materialize, it becomes increasingly difficult for the exchange authorities to manage the size of their reserves.

Note also that Brazilian banking financial leverage on this chart is the lowest of any crisis country at or just prior to crisis. We argue that bank capitalization ratios like the one in Chart 1

² 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.

are relatively endogenous because governments can set and sometimes enforce them. Leverage measures involving foreign currency reserves, like the one in Chart 2, are more exogenous than capitalization ratios because governments cannot control foreign currency reserves as easily as they can make up and enforce bank capitalization ratios.

The next two charts—debt service as a percentage of exports (Chart 3), and foreign debt as a percentage of exports (Chart 4)—present two widely used measures of fiscal vulnerability, each of which measures a nation's ability to earn enough foreign exchange to service its foreign (and, in the case of the seven countries here, typically foreign currency denominated) debt.⁴ In contrast to Brazil's low bank leverage, its fiscal leverage or vulnerability was very high compared with low vulnerability for such countries as Korea and Thailand. Note that Argentina's fiscal vulnerability was even higher than Brazil's while Argentina's financial leverage was in the same range as some Asian crisis countries—and more problematic than Brazil's. Brazil's high leverages can be seen in the depiction of external debt service ratios (Chart 3, the ratio of countries' foreign debt service payments to the income from exports they use to make these payments) and of the ratio of external debt to exports, which appears in Chart 4.

Note again that the charts show that Argentina had higher fiscal vulnerability than any of the other six nations, including Brazil, whose crises punctuated the financial history of the twentieth century's last decade, even though Brazil's is also high. Note also that after Argentina and Brazil, the other high fiscal leverage countries are Mexico and Indonesia, followed by Russia. Recall that in Table 1, Mexico and Indonesia fall into the category of high fiscal vulnerability and high bank financial leverage.

Despite the distinctions we have made between banking financial leverage and fiscal weakness, both can signal possible fiscal difficulties. After all, if high bank leverage (particularly as expressed by asset or liability/capital ratios) signals high likelihood that the obligations of banks may be assumed by the government in the event of asset quality deterioration, then what may really be scaring investors is in part just another fiscal problem.

Brazilian Bank Regulation Is Transformed in the 1990s

So far we have discussed the relative strength of Brazil's precrisis banking system but have not explained either why or how. 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 had become clear, concerns increased about the stability of the world's banks. The result was a movement to assure that banks would be properly capitalized. One manifestation was the Basle

³ 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."

⁴ 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 and 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.

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.⁵ In November, following the onset of Korea's financial crisis, they raised the requirement to 11 percent. In 1994, moreover, absolute minimum capital limits had been set for any bank, regardless of where these minima would place it in terms of risk-based capital ratios. Commercial banks could have no less capital than 6 million *real*.

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 (the BCB) to demand that a bank with liquidity problems transfer control to new management or reorganize through merger or closure. That is, the central bank could now appropriate the equity interests of a commercial bank's controlling group and sell them 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 government-owned banks. Brazil's central bank had long served not only as a lender of last resort to the publicly owned banks, but also as a routine supplier of capital injections to them. In August 1996, in the wake of these institutions' loan portfolios having gone from bad to worse, new regulations were issued about the conditions for their rescue. Bailouts would take place, but only provided that 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, controlling interest by foreigners began to be permitted 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 away from profiting from float and encouraged them toward greater efficiency, a perhaps more

⁵ 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 that the average capital requirement would go up more than what was expressed simply by a move from 8 percent to 10 percent.

important contribution to bank efficiency was the new competition imposed by the introduction of the foreign banks.⁶

Government Policies Also Have Indirect Effects on Bank Leverage

In addition to the direct effects of bank regulation changes on bank leverage and on other measures of prudential bank behavior, some Brazilian government policies also had indirect effects that contributed to this result. For example, protracted central bank tightening in defense of the *real* prior to the January devaluation also placed commercial banks in asset positions that would allow them to be strong enough to withstand the economic turmoil that attends 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 it 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 process as characterized by Stiglitz and Weiss (1981).

The resulting reduction in loan leveraging, as banks pulled their funds from private sector lending and placed them in high yield government securities, was reflected in marked declines in Brazilian commercial banks of the ratio of loans to capital. Over the period 1995–98, the share of loans in bank portfolios declined while the share of short-term government debt increased. In any case, while reductions in the ratio of bank loans to capitalization would be consistent with the regulatory changes discussed in the previous section, the magnitude of changes in these ratios went far beyond what could be explained by such regulations. The wedge between these changes was caused when bank concerns over the slowing economy motivated them to shift their portfolios away from loans and toward government securities.

The reduction in Brazilian bank loan leverage has important implications for a debate that has persisted over the optimum time for a Brazilian devaluation. It is not unusual to come across arguments that Brazil should have devalued long before it did. However, one virtue of waiting until 1999 is that banks by then had reduced the share of loans in their portfolios sufficiently to allow them to endure the tight monetary policy that in fact 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 in defense of the currency during 1997 and 1998. In this context it may be seen that postponing the devaluation resulted in bank portfolios

⁶ For a contrast to Brazil's experience, consider the observations of Radelet and Sachs (1998, 30). They note 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 Korea, 13.3 percent.

and bank capitalizations that allowed the central bank to persist with tight monetary policies after the devaluation.

Another more general financial reason why Brazil's devaluation did not cause the Brazilian economy to stagger protractedly is because the private sector in general was in large part hedged against Brazil's economy. Unlike what happened in the Asian crisis countries, Brazil's devaluation was not only widely anticipated by the private sector but also had been expected for at least a year in advance. For the period of Brazil's devaluation, BCB data show U.S.\$95 billion in private sector foreign liabilities in the Brazilian economy. Of those \$95 billion, \$71 billion were hedged, either through the purchase of such assets as indexed securities (U.S.\$60.5 billion) or by taking foreign exchange derivative positions (U.S.\$10.5 billion). Partly for this reason, but also because Brazil's foreign exchange crisis did not involve a banking crisis as did Mexico's (1994–95) and Thailand's, Indonesia's, and Korea's (1997), floating the *real* resulted in little bankruptcy and modest balance sheet efforts.

Brazil's Tight Monetary Policy

We argue that banking sector strength meant that Brazil could pursue a tight monetary policy that would hold down inflation and expectations of it for the future, which could accordingly stabilize exchange rates and consequently create the investor and consumer confidence that could allow the rapid turnaround in industrial production. Not accidentally, Brazil's and Korea's rates of monetary expansion were markedly slower than those of Indonesia, Mexico, and Thailand—but Brazil's was far and away the slowest of all. Specifically, cumulative monetary growth for the first five postdevaluation months was: Brazil 1.1 percent, Korea 5.7 percent, Thailand 8.4 percent, Mexico 15.9 percent, and Indonesia 30.3 percent. All this culminated in more stability in the exchange rate after the initial devaluation and overshooting. The ability of various crisis countries to impose credible stabilization programs in the wakes of their devaluations may be seen in Chart 5.

Chart 5 depicts percentage devaluation for a sixty-one-day trading period that begins ten trading days after the initial devaluation in each country's exchange rate crisis and ends seventy-one trading days after the initial devaluation. A positive value signifies a postdevaluation devaluation, whereas a negative value signifies a revaluation or strengthening of the currency over the sixty-one-day postdevaluation period. Note that only Brazil strengthens, although Russia shows very little change. Argentina's post-devaluation devaluation is the most extreme, signaling the country's inability to stabilize currency demand or expectations about related factors, such as growth or inflation. The issue at hand here is that most exchange rate crisis countries did not manage to impose tight monetary policies over this period—perhaps in part out of concerns for the consequences of tight money for their leveraged banking systems—in contrast to Brazil.

Conclusion

One of the most striking aspects of the Brazilian devaluation is its difference from those of Mexico, Thailand, and Korea, among others, in that financial sector weakness did not trigger it. Brazil's January 1999 crisis is closer to so-called "first generation" currency crises than to other types. These first generation crises materialize owing to 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, Korean, Mexican, and Thai crises may be seen as closer to the so-called "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, a banking crisis so regularly precedes the currency crisis (see Calvo and Mendoza 1996, for example) that some kind of reckoning of the liabilities of the banking sector becoming government liabilities seems as a practical matter to be part of the phenomenon. Whether one sees a necessary connection between second generation models and banking crisis literature, there is substantial *twin crisis* literature (for example, Kaminsky and Reinhart 1999, McKinnon and Pill 1996) that links these crises in ways that the "first generation" models do not.

Argentina's crisis is harder to categorize. Fiscal vulnerability started low in the early 1990s but increased substantially over the decade. Banking-financial leverage was also low but increased dramatically going into the default of late 2001. In the event of the devaluation, the government further weakened the banking system by converting foreign denominated assets and liabilities at different exchange rates, imposing huge losses on banks. In an extreme turnaround, Argentina went from being able to resist crises to having the worst of all worlds. But Argentina's solvency depended upon a return to growth rates above 3 percent per annum, a goal that proved elusive or even impossible after the 1998 Russian and 1999 Brazilian crises.

Based on Brazil's experience, it seems that if the first generation model is what a country is going to follow 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.⁷ Taking steps to allow the private sector to hedge against an impending devaluation, as also occurred in Brazil, can similarly be seen as aiding 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.

While it is unlikely that any country looks forward to an exchange rate crisis, the trajectory Brazil followed through an initially very tight monetary policy to stabilize prices and to convince the markets that the goal of price stability was going to persist seems to offer opportunities for quicker resolution of the problem than other approaches. The credibility of such policy persistence

⁷ 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.

is enhanced when the banking system has low enough loan leverage and heavy enough capitalization that markets realize that the central bank can persist in its policy for a long time.⁸

In sum, Brazil's experience offers a perspective on the so-called 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 very much to recommend it, we have attempted to broaden consideration of the relation between banking system health and currency crises. We have attempted to show that 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.

⁸ 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.

References

- Bevilaqua, Afonso S., and Eduardo Loyo. 1998. Openness and efficiency in Brazilian banking. Texto para Discussão No. 390, Departamento de Economia, Pontifícia Universidade Católica, Rio de Janeiro.
- Calvo, Guillermo. 1995. Varieties of capital market crises. University of Maryland.
- . 1996. Varieties of capital market experience. University of Maryland.
- Calvo, Guillermo, and Enrique Mendoza. 1996. Mexico's balance-of-payments crisis: A chronicle of a death foretold. *Journal of International Economics* 41, nos. 3–4:235–64.
- Chang, Roberto, and Andrés Velasco. 2000. The Asian financial crisis in perspective. In *Private capital flows in the age of globalisation: The aftermath of the Asian crisis*, edited by Uri Dadush, Dipak Dasgupta, and Marc Uzan. New York: Edgar Elgar Publishers.
- Cosset, Jean-Claude, and Jean Roy. 1991. The determinants of country risk ratings. *Journal of International Business Studies* 22, no 1:135–42.
- Da Fonseca, Manuel A.R. 1998. Brazil's real plan. *Journal of Latin American Studies* 30: 619–39.
- Dornbusch, Rudiger. 1998. As opções de política econômica no segundo mandato. *Cojuntura Econômica* (Novembro): 20–21.
- Flood, Robert, and Peter Garber. 1984. Collapsing exchange rate regimes: Some linear examples. *Journal of International Economics* 17: 1–13.
- Garcia, Marcio G.P., and Marcus Vinicius F. Valpassos. 1998. Capital flows, capital controls, and currency crisis: The case of Brazil in the nineties. Texto para Discussão No. 389, Departamento de Economia, Pontifícia Universidade Católica, Rio de Janeiro.
- Gruben, William C., Jahyeong Koo, and Robert Moore. 1999. When does financial liberalization make banks risky? An empirical examination of Argentina, Canada, and Mexico. Federal Reserve Bank of Dallas.
- Kamin, Steven B., and John H. Rogers. 1996. Monetary policy in the end-game to exchange-rate based stabilizations: The case of Mexico. *Journal of International Economics* 41 (November): 285–307.
- Kaminsky, Graciela, Saul Lizondo, and Carmen Reinhart. 1998. Leading indicators of currency crises. *International Monetary Fund Staff Papers* 45, no. 1: 1–48.
- Kaminsky, Graciela L., and Carmen M. Reinhart. 1999. "The twin crises: The causes of banking and balance of payments problems. *American Economic Review* 89: 473–500.
- Kaminsky, Graciela L., and Sergio L. Schmukler. 1999. What triggers market jitters: A chronicle of the Asian crisis. Board of Governors of the Federal Reserve System International Finance Discussion Papers No. 634.
- Kodres, Laura E., and Pritsker, Matthew. 1998. A rational expectations model of financial contagion. Board of Governors of the Federal Reserve System Finance and Economics Discussion Series, 48.
- Krugman, Paul. 1979. A model of balance of payments crises. *Journal of Money, Credit, and Banking* 11: 311–25.
- Lee, S.H. 1993. Relative importance of political instability and economic variables on perceived country creditworthiness. *Journal of International Business Studies* 34, no. 4:801–12.
- Mancera, Miguel. 1995. Don't blame monetary policy. *Wall Street Journal*, January 31, A-20.
- McKinnon, Ronald I., and Huw Pill. 1996. Credible liberalizations and international capital flows: The overborrowing syndrome. In *Financial deregulation and integration in East Asia*, edited by T. Ito and A. O Krueger. Chicago: University of Chicago Press.
- McLeod, Darryl, and John H. Welch. 1993. Exchange rate uncertainty and economic growth. Federal Reserve Bank of Dallas Working Paper.
- Pimentel Puga, Fernando. 1999. Sistema financeiro Brasileiro: Reestruturação recente, comparações internacionais e vulnerabilidade à crise cambial. Departamento Econômico do BNDES (Março).

- Radelet, Steven, and Jeffrey D. Sachs. 1998. The East Asian financial crises: Diagnoses, remedies, and prospects. *Brookings Papers on Economic Activity* 1.
- Sachs, Jeffrey D., Aaron Tornell, and Andrés Velasco. 1996. Financial crises in emerging markets: The lessons from 1995. *Brookings Papers on Economic Activity* 1: 147–212.
- Stiglitz, Joseph E., and Andrew Weiss. 1981. Credit rationing and imperfect information. *American Economic Review* 71, no. 3:393–410.
- Velasco, Andrés. 2000. Exchange rates in emerging markets: Floating toward the future. Harvard University and National Bureau of Economic Research.

TABLE 1: A Taxonomy of Crises

		Banking System Leverage	
		High	Low
Short-Term Government Debt	High	Mexico 1994-1995, Turkey 2000, Russia 1998, Ecuador 1999, Argentina 2001-02	Brazil 1999
	Low	South Korea 1997, Thailand 1997, Indonesia 1997	Argentina 1991-2000, Hong Kong (1997)

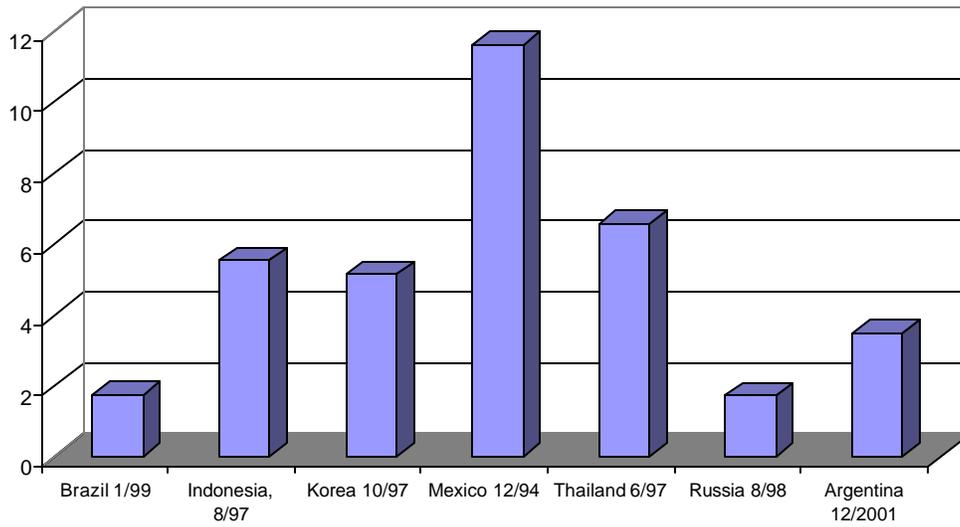
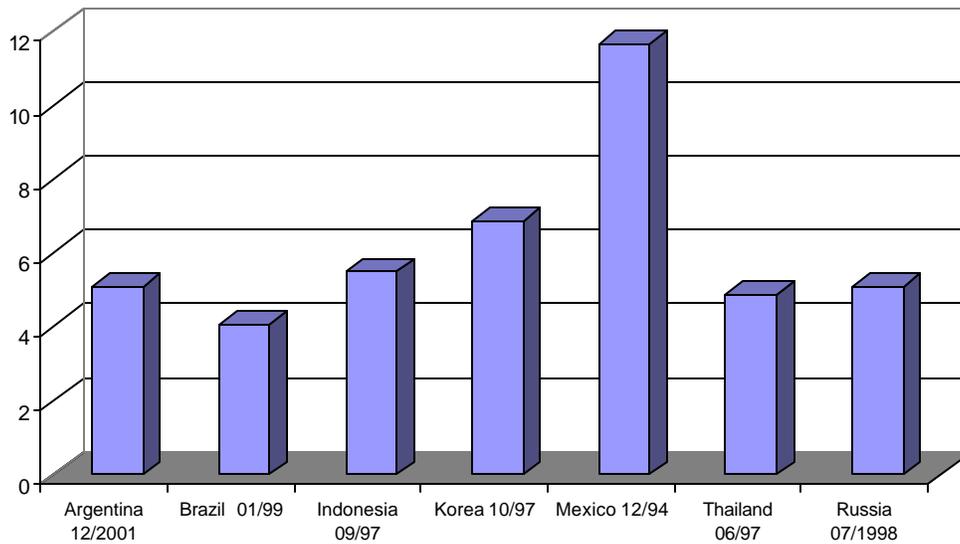
CHART 1: Ratio of Inside Money to Bank Capital in Crisis Countries**CHART 2: Ratio of M2 to Foreign Currency Reserves (Not a percent)**

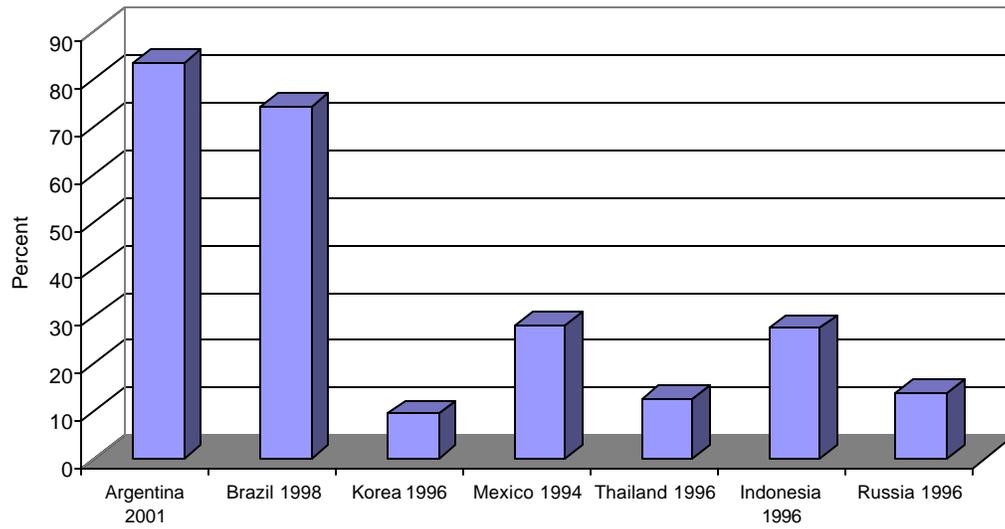
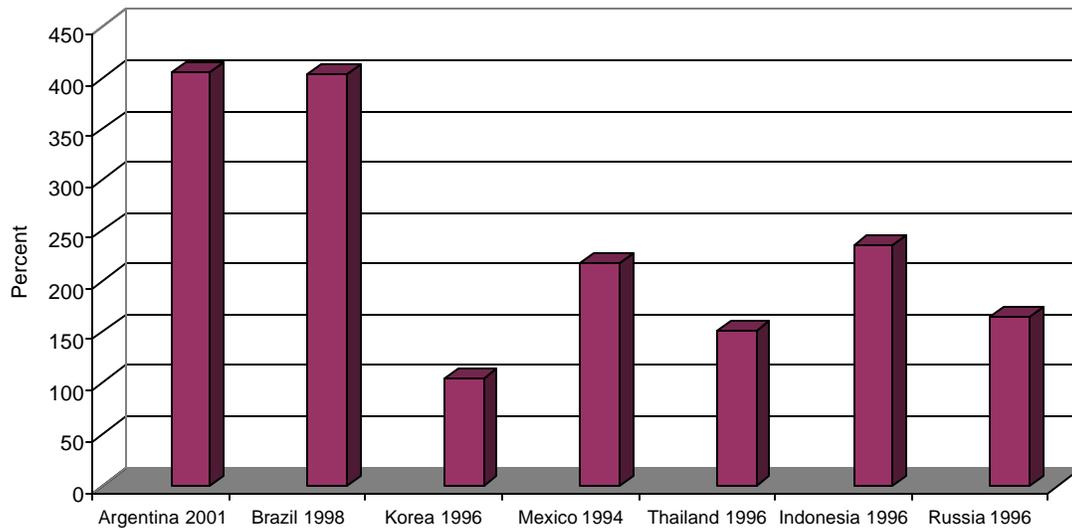
CHART 3: Debt Service Ratio (Debt Service to Exports Ratio)**CHART 4: External Debt as a Percent of Exports**

CHART 5: Post-Devaluation Devaluations

