
New Nature of Emerging-Market Crises

Back in 1997, then US Treasury Deputy Secretary Lawrence Summers liked to compare modern finance to a jet plane. The technology of modern finance, like a jet plane, lets you get to your destination faster than older transportation technology. But the rare crashes that occur along the way are also more spectacular. To Summers, the occasional crash was not sufficient cause to abandon the technology of modern finance.

This analogy now seems to suffer from one problem. Emerging-market economies crash more frequently than 747s. The jet planes flown by major airlines are a mature technology, safer than the piston-powered planes they replaced. After “financial” crises in Mexico, Thailand, Korea, Indonesia, Malaysia, Russia, Brazil, Turkey, and Argentina—as well as crises in smaller economies like Ecuador, Ukraine, Uruguay, and the Dominican Republic—it seems clear that emerging economies are still at the early stages of understanding how they can best benefit from global financial markets.¹

The collapse of an exchange rate peg, whether a soft peg or a currency board, has marked almost all recent crises.² A currency crisis, though, is

1. See the recent IMF study by Rogoff et al. (2003) for an examination of whether or not capital account liberalization has brought benefits to emerging-market economies. The debate on capital account liberalization is highly contested: Stiglitz (2002) and Rodrik and Kaplan (2001) offer a skeptical perspective of the benefits of capital account liberalization.

2. Mexico, Thailand, Korea, Indonesia, Malaysia, Russia, Brazil, and Uruguay all had had soft pegs or pegged but adjustable exchange rates before the crisis. Turkey had a regime with a programmed rate of depreciation well below the current inflation rate (formally a forward-looking crawling peg) reinforced by a “quasi currency board.” Argentina had a currency board. Most countries moved toward a more flexible exchange rate during their crisis.

not quite the same as a payments crisis, which requires an IMF rescue loan or a debt restructuring. Industrial countries—like the United Kingdom in 1992—have been able to let their currencies float, reduce domestic interest rates, and move on without experiencing further financial distress. Emerging economies generally are not so lucky: Currency crises usually are associated with severe banking, corporate, or sovereign payments crises.

Several reasons exist for the strong correlation between the collapse of an exchange rate peg—or for that matter sharp falls in the value of a floating currency—and payments problems. The need to let the currency float from a previous peg usually indicates a broader loss of confidence in the crisis country's economic policies and a sharp fall in international capital flows into the crisis country. This fall in capital flows, in turn, often creates financial difficulties for banks, firms, and sovereign governments, which count on continuous access to market financing both to cover ongoing current account and budget deficits and to refinance existing debts. Moreover, exchange rate stability often leads to excessive foreign-currency borrowing. In turn, the increase in the burden of these foreign-currency debts after the exchange rate collapses makes it harder for banks, firms, and the government alike to service their long-term debts, let alone convince creditors to refinance maturing short-term debt.

When crises struck Thailand, Korea, and Indonesia, private banks, financial institutions, and corporations experienced the most acute payment difficulties. The external borrowing of private banks and firms, not the government, had financed current account deficits in Asia before the crisis.³ In Mexico, Russia, Brazil, Ecuador, Argentina, and Turkey, the sovereign was at the center of the country's financial difficulties. These countries either averted a sovereign payments crisis with IMF lending or had to seek a sovereign debt restructuring. Uruguay combined a banking system vulnerable to a cross-border and domestic run with a heavily indebted sovereign.

However, clean lines between corporate, banking, and sovereign payments crises are hard to draw. The systemic collapse of the corporate sec-

Malaysia and Ecuador are the exceptions. Malaysia repegged its exchange rate at a lower level after floating for a year and bolstered its new peg with capital controls. Ecuador's currency fell into a free fall early in its crisis, well before its government defaulted in 1999. After the government default, it formally adopted the US dollar as its currency to restore its monetary stability. Also, most floats are heavily managed, both in Asia and other emerging economies, which may be in part due to what Calvo and Reinhart (2002) refer to as the "fear of floating."

3. Malaysia also experienced a currency crisis but of a slightly different kind. It ran a large current account deficit before 1997 and financed it largely with foreign direct investment (FDI) and portfolio equity, not debt. While it shared many of the characteristics of other Asian economies, Malaysia had a much lower level of short-term external debt. Therefore it was able to avoid both a debt restructuring and an IMF program but not a sharp currency depreciation and a major fall in output.

tor typically bankrupted the banking sector, and the cost of saving the banking system increased the government's own debt. In some crises, domestic banks borrowed from abroad to purchase the government's domestic debt, blurring the lines both between a domestic and an external crisis and between a sovereign and a banking crisis. Most sovereign debt crises contaminate the banking system in some way (often because banks hold large amounts of government debt) and trigger large falls in the currency's value that create payments problems for many firms. Argentina is a case in point. Table 2.1 provides an overview of the most salient characteristics of recent crises in a cross-country format that helps identify commonalities and isolate differences.

These crises not only force the IMF and the G-7 to decide how to respond to a request for help but also have serious economic consequences. Output fell sharply in almost every crisis country, and, by advanced-economy standards, these output contractions were extraordinarily steep: Falls of 5 percent of GDP were common, and falls of 10 percent of GDP or more marked the worse crises.⁴ Brazil in 1999 is a partial exception: With the IMF's help, it was able to avoid both a sovereign and a banking crisis when it let its currency float and only experienced a mild fall in output. Russia is the true exception: Its economy was contracting before its financial crisis in 1998 and started to rebound after the crisis.

This chapter explores the reasons why many emerging markets have experienced severe financial crises. The first section explores the sources of vulnerability common to most recent crises. The second section reviews the specific vulnerabilities that, in our view, contributed to major recent crises. However, no relatively brief overview can cover individual countries in enough depth to explore all the policy weaknesses that contributed in one way or another to the country's vulnerabilities.⁵ Our goal is to provide readers with the basic background on each country's crisis and, in some cases, to highlight specific financial weaknesses of broader interest. Chapter 4 picks up the case studies of the individual countries as it evaluates the success of efforts to contain and resolve their crises.

4. The output contraction in the crisis year was severe in all countries but Russia, Ukraine, and Brazil. In the year following the crisis, output fell 8 percent in Mexico, 6.7 percent in Korea, 13.1 percent in Indonesia, 10.2 percent in Thailand, 7.4 percent in Malaysia, 6.3 percent in Ecuador, 7.4 percent in Turkey, 10.9 percent in Argentina, and 10.8 percent in Uruguay. In Argentina, the cumulative fall in output, relative to the precrisis peak, was over 20 percent, as the output fall started before the crisis and persisted longer.

5. These vulnerabilities have been studied in a very large body of literature; for comprehensive analyses and surveys of the causes of last decade's financial crises, see the volumes edited by Feldstein (2002), Dooley and Frankel (2003), and Edwards and Frankel (2002). See also Roubini and Uzan (2004) for a collection of readings on the crises of the last decade and crisis resolution.

Table 2.1a Crisis countries' aggregate balance sheet vulnerabilities

Indicator	Mexico 1994	Korea 1996	Thailand 1996	Indonesia 1996	Malaysia 1996	Russia 1997
Stock imbalances						
Liquidity/rollover risk						
Short-term foreign debt (percent of reserves)	203	289	136	158	49	255
M2/reserves	High	6.2	4.0	6.6	3.5	6.2
Country solvency risk						
External debt (percent of GDP)	33	31	60	43	38	35
External debt (percent of exports)	196	104	150	164	42	140
Sovereign solvency risk						
Public debt (percent of GDP)	35	12	5	24	35	53
Public debt (percent of revenues)	155	58	27	186	154	148
Currency mismatch risk						
Net foreign currency external debt (percent of GDP)	Medium	Medium	Medium	Medium	Medium	Medium
Foreign-currency government debt (percent of total government debt)	53	n.a.	12	100	14	60
Dollarization vulnerability indicator (liability dollarization in banks)	n.a.	n.a.	1.1	89	n.a.	56
Capital structure mismatch						
Equity/FDI (percent of foreign liabilities)	Medium	Low	Medium	Medium	High	Low
FDI (percent of GDP)	2	-0.3	2.6	2.1	7.2	0.4
Flow imbalances						
Current account deficit (percent of GDP)	-7.1	-4.4	-8.1	-3.4	-4.4	0.5
Fiscal deficit	-0.2	n.a.	1.7	1.6	2.4	-7.6
Primary balance	2.1	0.6	2.6	2.9	4.7	-2.8
General government interest payments (percent of general government revenue)	n.a.	n.a.	1.8	11	10	13
Other relevant issues						
Exchange rate regime	Soft peg	Soft peg	Soft peg	Soft peg	Soft peg	Peg
Currency overvaluation	High	Modest	High	Modest	Modest	High
Banking sector fragility						
Government debt as percent of banks' assets	n.a.	<10	<10	<10	<10	31
Liquidity ratio relative to BIS banks	140	232	507	251	64	76
Overall banking system fragility	High	High	High	High	Medium	High
Political/electoral instability	High	Medium	Medium	High	Medium	High
Domestic financial repression	Low	Low	Low	Modest	Modest	Low
Capital account controls (before the crisis)	Open capital account	Open capital account	Open capital account	Open capital account	Open capital account	Open capital account

	Brazil 1998	Ecuador 1998	Pakistan 1998	Ukraine 1998	Turkey 2000	Argentina 2000	Uruguay 2001	Brazil 2002
	126	181	189	327	246	149	320	142
	5.7	2	14.7	7.8	3.9	3.7	3.3	3.1
	31	68	68	29	60	51	81	41
	369	267	347	66	203	376	365	300
	48	67	103	41	53	45	38	73
	143	486	646	113	203	226	191	211
	Medium	High	Medium	Medium	Medium	High	High	Medium
	n.a.	n.a.	52	68	50	91	83	25
	0	High	168	64	96	123	132	0
	High	Medium	Medium	Medium	Low	Low	Low	Medium
	3.7	3.7	0.7	1.8	0.1	1.3	1.7	3.7
	-4.3	-8.6	-3.6	-3.1	-4.9	-3.1	-2.6	-1.7
	-6.3	-4.1	-6.2	-2.7	-10.4	-2.4	-4.4	-5.2
	0	-1.3	0.5	-0.4	5.4	-1.0	-2.2	3.9
	20	29	40	7	62	17	13	21
	Peg	Managed and float	Heavily managed	Heavily managed	Quasi currency board	Currency board	Peg	Managed float
	High	Modest	Modest	Modest	Modest	High	High	No
	n.a.	High	30	14	n.a.	21	n.a.	n.a.
	70	48	58	141	70	70	49	
	Medium	High	Medium	Medium	High	High	High	Medium
	Medium	High	High	Medium	High	High	Medium	High
	Low	Low	Significant	Significant	Low	Low	Low	Low
	Open capital account	Open capital account	Capital controls	Capital controls	Open capital account	Open capital account	Open capital account	Open capital account

Table 2.1b Policy adjustment, bail-ins, bailouts, and other policies to resolve crises

Indicator	Mexico 1994	Korea 1997	Thailand 1997	Indonesia 1997	Malaysia 1997	Russia 1998
Output fall	Large	Large	Large	Very large	Large	Small
Currency crisis	Yes	Yes	Yes	Yes	Yes	Yes
Banking crisis	Yes	Yes	Yes	Yes	No	Yes
Fiscal costs of banks' bailout (percent of GDP)						
Corporate financial crisis	Yes	Yes	Yes	Yes	Some	Yes
Fiscal/domestic policy adjustment during the crisis	Large	Large	Large	Large	Modest	Modest
Domestic bank run	No	No	No	Yes	No	Some
Cross-border bank run	No	Yes	Yes	Yes	Yes	No
Deposit freeze	No	No	No	Some	No	No
Default or coercive restructuring of sovereign debt	No	No	No	No	No	Yes, domestic and external debt
Default on private corporate external debt	No	Some	Some	A lot	No	No
Capital controls after crisis	No	No	No	No	Yes	Yes
IMF package (bailout)	Large	Large	Large	Large	No	Large but stopped
Bail-in or PSI	No PSI	Coercive on interbank loans	Coercive on some interbank loans	Coercive on some interbank loans	No PSI (apart from capital controls)	Default on GKO and London Club debt
Paris Club debt restructuring	No	No	No	Yes	No	Yes

BIS = Bank for International Settlements
 FDI = foreign direct investment
 M2 = money supply
 n.a. = not available
 PSI = private-sector involvement

Brazil 1998	Ecuador 1998	Pakistan 1998	Ukraine 1998	Turkey 2000	Argentina 2001	Uruguay 2001	Brazil 2002
Small	Very large	Modest	Modest	Large	Very large	Large	Small
Yes	Yes, from a float	No	No	Yes	Yes	Yes	No
No	Yes	No	No	Yes	Yes	Yes	No
No	Yes	No	No	Yes	Yes	No	No
Modest	Large	Modest	Modest	Large	Large	Large	Modest
No	Yes	No	No	No	Yes	Yes	No
Yes	Yes	No	No	Yes	Yes	Yes	No
No	Yes	Some	No	No	Yes	Some	No
No	Yes, domestic and external debt	Yes, external debt	Yes, external debt	No	Yes, domestic and external debt	Yes, domestic and external debt	No
No	Yes	No	No	No	Yes, a lot	No	No
No	No	Yes, pre exist	Yes, pre exist	No	Yes	No	No
Large	Small	Small	Small	Large	Large but stopped	Large	Large
Soft PSI; agreement to rollover interbank loans	Coercive default and debt reduction	Restructuring of external debt but no principal haircut	Restructuring of external debt but no principal haircut	Very soft PSI Interbank Rollover	Soft PSI at first, then full default on domestic external debt	Restructuring of external debt but no principal haircut	Very soft PSI; voluntary interbank rollover
No	Yes	Yes	Yes	No	No	No	No

Note: Data for Asian countries' current account and primary balance are for 1996, as the onset of the crisis affected the 1997 data.

Sources: Most data are from Moody's Statistical Handbook, Country Credit, October 2003. Data for Mexico are from IMF datasets, and primary deficit data are from IMF sources.

Sources of Vulnerability in Emerging-Market Crises

Some sources of vulnerability are common to most recent crises, even though every crisis also has its own specific causes. These common sources include the following:

- large macroeconomic imbalances, such as current account, fiscal deficits, or both, that led to the accumulation of large stocks of public and foreign liabilities;
- financing these deficits in ways—with short-term debt, foreign-currency debt, and with debt rather than equity—that made countries vulnerable to liquidity runs and increased the risk of a fall in the exchange rate leading to a debt crisis because of the depreciation’s “balance sheet” effect;
- doubts about the credibility of a country’s commitment to take the policy steps to assure its long-term creditworthiness;
- fixed or semifixed exchange rates, which increased both the risk of a large current account imbalance and the risk that borrowers would underestimate currency risk and rely too heavily on foreign-currency debt;
- poor banking regulation, implicit and/or explicit government guarantees, and other microeconomic distortions, which can lead to excessive investment and overreliance on dangerous forms of borrowing;
- political shocks—whether from elections, weakening governments, scandals, or political violence—that increase policy uncertainty and make investors trigger-happy; and
- external shocks—commodity price shocks that deteriorate a country’s terms of trade, interest rate changes in the world’s major financial centers, and sudden changes in the willingness of domestic and international investors to invest in risky financial assets—that tend to hit emerging economies more frequently and harder than advanced economies.

Emerging economies tend to be more exposed than advanced economies to shocks and also must pay more to borrow in ways that insulate them from various risks. Those that have not carefully managed their finances generally have little capacity to respond to shocks by borrowing to defer the need to adjust. They also can be punished severely for macroeconomic policy errors, as rapid swings in the willingness of domestic and international investors alike to roll over existing debts can trigger a vicious circle where growing financial distress overwhelms belated efforts to make needed policy changes.

Large Macroeconomic Imbalances. Most crisis countries had significant macroeconomic imbalances going into their crises. A country running a current account deficit necessarily either is attracting foreign direct investment (FDI) into its economy and net inflows of portfolio investment into its stock market or is borrowing from the rest of the world. Budget deficits typically have to be financed by selling government debt, either at home or abroad. The ongoing need for *new* net financing to cover fiscal and current account deficits is a potential source of vulnerability: Access to the needed new financing can disappear, or the cost of new borrowing can increase suddenly.

Most crisis countries had significant current account deficits before their crises (Russia is the major exception). The Asian-crisis countries demonstrated that a booming private economy could lead to current account deficits and the accumulation of external liabilities even in the absence of budget deficits.⁶ However, outside of Asia, persistent fiscal deficits typically contributed to the creation of “twin” current account deficits and added to the country’s vulnerability: Government borrowing competes with private investment unless additional financing is obtained from abroad, and public spending often leads to the real appreciation of the local currency.⁷

Risky Financing of Budget and Current Account Deficits. The way ongoing budget and current account deficits are financed can exacerbate a country’s financial vulnerability.

An enormous difference exists between financing a current account deficit with short-term interbank borrowing and with long-term bonds or FDI and between financing a budget deficit with 90-day foreign currency-linked paper and with 10-year maturity local-currency bonds. After a few years of financing substantial current account deficits with short-term borrowing, a number of Asian countries found that they had accumulated a large stock of short-term external debt. Similarly, gov-

6. The East Asian countries—China, Hong Kong, Singapore, and Taiwan—that avoided a severe financial crisis in 1997–98 despite coming under pressure all had persistent current account surpluses and, as a result, had less need for net new financing and had not accumulated large stocks of foreign debt. The Philippines also avoided a severe crisis but for different reasons: It had a financial and banking crisis earlier in the decade and had not experienced a large precrisis boom.

7. The current account deficit is equal to a country’s capital account surplus, net of reserve accumulation. The current account balance is determined by the difference between national (public plus private) savings and investment. A budget deficit is equal to public dissavings (excess of public spending including interest payments over its income—i.e., revenues) and, unless private saving rises or private investment falls, it will lead to a current account deficit. Government spending is usually biased toward domestic and nontradable goods. Excessive budget deficits thus lead to an increase in the price of domestic goods relative to foreign goods or to an increase in the relative price of nontraded goods—i.e., a real appreciation.

ernments that financed their fiscal deficits by issuing short-term debt (Mexico, Russia, Brazil, Turkey, and to a lesser degree, Argentina) quickly found that their financial health depended on the creditors' willingness to roll over large amounts of their debt at reasonable interest rates.

Borrowers that depend on short-term debt are in effect giving their creditors an option to exit at par when these debts mature. Countries typically assume that they can refinance their existing debt rather than pay the debt as it matures. However, investors are—unsurprisingly—more inclined to exercise their option to get out in bad times than in good times. Consequently, in a crisis, an emerging economy finds not only that it cannot raise new funds to cover ongoing deficits (let alone run larger deficits to minimize its need for immediate adjustments) but also that it must come up with money to pay off its existing debts. At a minimum, a country is likely to find that its costs of funds go up, even as an adverse shock may reduce its ability to pay.

Countries that finance themselves by issuing foreign currency–denominated debt are selling investors protection against the risk that the country's own currency will depreciate—and, in the process, increasing their own vulnerability. Often, the easiest way to adjust to a shock—domestic or external—is to let the exchange rate adjust to reduce the country's external imbalance. However, a large stock of debt denominated in foreign currency—either external debts owed to nonresidents or domestic debts denominated in foreign currency—complicates the exchange rate adjustment. The real burden of foreign currency–denominated debts goes up in the face of a real depreciation of the local currency (this effect is often called the “balance sheet effect”).⁸ The risk that short-term creditors will run and the risks of borrowing in foreign currency are interrelated. Difficulties refinancing short-term debts often result in a sharp depreciation in the currency that increases the real burden of foreign–currency debt. A shock to the real exchange rate that increases the real burden of foreign–currency debts, in turn, increases the risk that short-term creditors will run (box 2.1).

Michael Pettis (2001) has noted that the true costs of both short-term and foreign-currency debt are masked when times are good, growth is

8. If the real depreciation is large enough, negative balance sheet effects can push a borrower into technical insolvency: The borrower's larger liabilities formally exceed its assets. This “insolvency” does not necessarily trigger an automatic financial crisis. In the short run, the borrower only has to cover the payments on maturing debts as well as make ongoing interest payments. If the short-term payments are small enough, a technically insolvent borrower may remain liquid and still operate in the hope that over time the real exchange rate will bounce back (the real exchange rate often overshoots its long-run value at the peak of a currency crisis), restoring the borrower's solvency. On the other hand, even a technically solvent borrower can default if the combination of higher interest on maturing debts, larger payments on maturing debt due to a real devaluation, and reduced cash flows due to an economic contraction (and lack of other liquid assets) leave the borrower unable to cover its debt payments.

Box 2.1 Recent academic literature on currency and financial crises

The recent experience with capital account crises has led economists to thoroughly rethink the causes of currency and financial crises. Until the mid-1990s, the standard “first generation” model explained a currency crisis on the basis of fundamental macroeconomic weaknesses. Poor policies—in early models, borrowing from the central bank to finance a fiscal deficit—mechanically led to the loss of foreign exchange reserves and the abandonment of the exchange rate peg once reserves fell below a critical level (Krugman 1979, Flood and Garber 1984). Over time, the set of macroeconomic weaknesses that could trigger a crisis was expanded to include current account imbalances, real exchange rate misalignments, borrowing to defend a pegged exchange rate, and a projected increase in the government’s debt-servicing costs after an expected devaluation.

The 1992 exchange rate mechanism (ERM) crisis and, more important, the 1994–95 Mexican crisis led to “second generation” crisis models. Early second-generation models argued that a crisis was not triggered by the mechanical fall in reserves but by authorities who were constantly assessing the trade-off between defending the peg by raising interest rates and floating. For example, in the 1992 ERM crisis, some European governments chose to devalue when the costs of using high interest rates to defend an overvalued exchange rate—lower growth and higher unemployment—became too great. In other cases modeled in the literature, high interest rates lead to an unsustainable increase in fiscal deficits that prompts the government to abandon the peg.

These models added the insight that some crises may stem in part from self-fulfilling shifts in investor expectations as well as from fundamental weaknesses. If investors doubt the government’s commitment to the peg, the (output and fiscal) costs to the government of defending the peg increase. These costs may become so high that they can trigger a crisis that would not have occurred if investors had not expected a crisis in the first place. Doubts about the government’s commitment to the peg make the costs of defending the peg higher than the government wants to bear, and the government’s decision to abandon the peg, in turn, validates *ex post* the investors’ *ex ante* doubts. In formal terms, crises could be the result of the endogenous policy choice of an authority assessing the benefits and costs of maintaining the peg rather than the automatic result of reserves reaching a critical level (Obstfeld 1994, Drazen and Masson 1994, Cole and Kehoe 1996).¹

The possibility of multiple equilibria in many of these models was extended to examine how liquidity mismatches, either in the government or the private sector, could lead to a currency crisis in the event of a self-fulfilling rollover crisis. Vulnerability to this kind of self-fulfilling crisis of expectations stemmed directly from an excess of short-term claims relative to the liquid assets (foreign reserves) of the country. This emphasis on the risk of runs stemming from gaps between short-term debts and liquid reserves was further developed in many “third generation” models.

The “third generation” models were developed after the Asian crisis, in part because clearly the fiscal imbalances the first generation models emphasized did not cause the 1997–98 Asian crisis. Rather, imbalances in the private sector were at the core of the crisis, and currency and banking crises (“twin crises”) were clearly connected. Some interpreted the Asian crisis largely as a self-fulfilling “liquidity run” and built on earlier work that emphasized the risk of short-term debt by formally modeling the role liquidity mismatches play in triggering runs on banks and governments. Others emphasized, in various ways, the vulnerabilities in the corporate and financial sectors of these economies. Certain third generation models stressed how the balance sheet effects of private-sector currency mismatches can contribute to runs and how the erosion of capital that

(box 2.1 continues next page)

Box 2.1 Recent academic literature on currency and financial crises *(continued)*

follows a currency depreciation can lead to the loss of external market access, credit constraints, and large losses in output. Others emphasized how implicit and explicit government guarantees, poor corporate governance, and absence of a credit culture distort economic and investment decisions (moral hazard distortions) and showed how these distortions can lead to overinvestment, a private sector–driven boom, and eventually a currency crisis. This literature has looked generally at different financial mismatches and distortions to broadly analyze “capital account” crises, “twin crises,” sovereign debt crises, or all, not just currency, crises. (See Dornbusch [2001] for an early interpretation of the 1990s crises as “capital account” crises.)

1. Note that, formally speaking, multiple equilibria and fundamental crises can occur both in first (Obstfeld 1986) and second generation models, while some second generation models have unique equilibria (Drazen and Masson 1994) rather than multiple equilibria. What distinguishes the first and second generation models is not whether multiple equilibria can occur but rather whether the policymaker is passive and a mechanical rule (i.e., reserves falling below a certain threshold) triggers a peg’s collapse or whether the policymaker actively decides to drop a peg based on a payoff function (for example, the relative costs and benefits of a move to float that increases output but may also increase inflation). Many loosely interpret first generation models as models of fundamental crises and second generation models as models of self-fulfilling multiple equilibria.

strong, and capital inflows are plentiful. Short-term debt rolls over not only without difficulty but also often at a lower interest rate. Expectations that interest rates will fall over time make economic actors reluctant to lock in today’s interest rates. Large capital inflows fuel a real appreciation of the currency, which in turn reduces the real burden of foreign-currency debt. The positive dynamic feeds on itself.⁹ Unfortunately, the same factors also work in reverse. Forms of financing that let emerging economies benefit strongly from a virtuous circle also leave them particularly exposed to the risk of a vicious circle.

Doubts about Policy Credibility. A close relationship exists between “stock” problems—the difficulties a large stock of external or government debt creates—and ongoing “flow” deficits—the current account and fiscal deficits. A large stock of debt usually is the product of large past deficits, and countries with important macroeconomic imbalances often have difficulty financing themselves in ways (long term and local currency) that limit their risk of crises. Moreover, ongoing fiscal and current account

9. A country that has found a model for successful growth often attracts additional capital from abroad, fueling faster growth and a bigger boom. The desire to profit from Asia’s economic miracle, for example, fueled capital flows in the mid-1990s. A successful exchange rate–based stabilization program and the introduction of economic reform also can usher in a period of high growth and booming credit. See Calvo and Vegh (1999).

deficits eventually lead to concerns about the country's ability to reduce these imbalances in time to avoid an unsustainable accumulation of debt.¹⁰

Long-term solvency requires, at a minimum, that the country's external debt to GDP ratio—or the government debt to GDP ratio for public-sector solvency—not increase without bound over time. It does not require that the current account or the overall fiscal balance go into a surplus. A stable external debt to GDP ratio, however, does require the country to run a surplus in its noninterest current account (for most countries, the country's trade balance plus any remittances or transfers).¹¹ Similarly, a government has to be able to generate large enough primary surpluses over time—the primary balance is the gap between what a government collects in revenue and what it spends on items other than interest—to stabilize its debt ratio. A large existing stock of debt, slow growth, or a high average real interest rate all increase the size of the primary or trade surplus that eventually will be needed to avoid an ever-increasing debt burden.¹²

This analysis of long-run solvency raises a broader point. Because a country's—or a government's—solvency hinges on fairly intangible assets—its future ability to run trade and primary surpluses—policy credibility is often a policymaker's most important asset. A credible government can run larger fiscal deficits in the face of a temporary adverse shock without creating concerns about its future solvency. A government with large debt stocks, large fiscal deficits, and a primary balance insufficient to assure long-term debt sustainability may be able to lower its borrowing

10. A broad econometric literature exists on the determinants of sovereign debt crises which is based heavily on data drawn from the 1980s debt crises. However, a new generation of studies is starting to look at episodes of default and near defaults in the 1990s. Detragiache and Spilimbergo (2001) were the first to note the role of liquidity measures, in addition to traditional measures of debt sustainability, in explaining recent debt crises. Manasse, Roubini, and Schimmelpfening (2003) found that external debt ratios (measuring solvency and debt sustainability), measures of illiquidity or refinancing risk (such as short-term debt relative to reserves), and other measures of external imbalance (current account deficits) all influence the probability of entering into a debt crisis. Some studies—namely Reinhart (2002)—have found a direct correlation between currency and debt crises.

11. Intertemporal solvency formally requires that the discounted value of trade balances (or undiscounted sum of current account balances) be at least as large as the initial stock of a country's foreign liabilities and that the discounted value of primary balances (or undiscounted sum of fiscal deficits) be at least as large as the stock of net government debt. This is a necessary, but quite loose, condition for solvency; closing primary or resource gaps is a sufficient, but more binding, condition for solvency. See Roubini (2001c) for a more detailed analysis of solvency and debt sustainability.

12. The primary balance needs to be at least equal to the public debt ratio (to GDP) times the differential between the real interest rate and the growth rate of the economy for the government's debt-to-GDP ratio not to increase over time. On the external side, the noninterest current account—typically close to the trade balance—must be at least equal to the external debt ratio (to GDP) times the differential between the real interest rate and the growth rate of the economy.

costs if it can credibly commit to future fiscal adjustments that will assure its long-term solvency. On the other hand, doubts about a country's commitment to future adjustments can immediately increase borrowing costs, and higher borrowing costs in turn make future solvency more difficult. If a country loses market access because creditors doubt its commitment to make the adjustments needed to service its debts, it almost always will eventually run out of funds and be forced to default, absent a rescue loan or emergency restructuring.

Fixed and Semifixed Exchange Rates. There is little doubt that fixed—or heavily managed—exchange rates have contributed to the vulnerabilities that have led to recent financial crises.

Exchange rate pegs and other heavily managed exchange rates often contributed to the emergence of current account deficits. Many emerging economies adopted pegged exchange rates as part of a program to reduce high inflation—so-called exchange rate-based stabilization programs.¹³ However, inflation typically fell slowly—or at least more slowly than the programmed rate of depreciation, if any, in the exchange rate. Domestic prices rose, and the exchange rate was either fixed or did not depreciate by a comparable amount, leading to real appreciation, loss of competitiveness, and current account deficits. Countries that peg their currency to a single anchor currency also can experience a currency appreciation when the anchor currency appreciates relative to a range of other currencies. For example, many countries pegged their currencies to the US dollar and saw them rise when the dollar appreciated relative to the yen, the euro, and the euro's precursors between 1995 and 2001. The eventual currency crisis has many potential triggers: a fiscal deficit that cannot be financed by selling new debt and that has to be financed by printing money, leading to an unsustainable reserve loss; a current account deficit that is no longer financed by inflows from external investors; or a country that simply concludes that the costs of raising interest rates to defend the peg exceeds the benefits of currency stability (see box 2.1 for a review of the standard models of currency crises).

Pegs also can create financial vulnerabilities by distorting the borrowing decisions of private firms, banks, and households, as a period of currency stability can lead economic actors to underestimate future currency risk and borrow too much in foreign currency. For example, a period of nominal exchange rate stability in Asia led many firms (and the banks who lent to them) to conclude that the lower nominal interest rate on dollar, yen, or euro debt was worth the additional exchange rate risk. Similarly, most Argentines effectively bet that the one-to-one parity between the dollar and peso, which was embedded in Argentina's currency board,

13. See Calvo and Vegh (1999) for an analysis of such exchange rate-based stabilization programs.

would last indefinitely, and so they borrowed in dollars, not in pesos. Private firms and banks often interpret the government's promise to maintain a fixed rate as a promise to protect the private borrower from currency risk either by selling currency at a fixed rate or by providing a financial hedge or an effective bailout in the event of a currency crisis.¹⁴ The free insurance against currency risk can be revoked at any time, but the promise itself often seems to result in the excessive accumulation of foreign-currency debt.

Pegged exchange rates can lead to crises in more subtle ways as well. Governments often believe that their exchange rate peg is the pillar of their macroeconomic policy framework, the anchor of financial stability, and the source of their economic success. Consequently, they defend a peg that comes under pressure. Raising domestic interest rates alone may not work: Higher rates on domestic-currency deposits and debts alone may not be enough to induce foreign capital to return to the country or to convince domestic residents to keep their money in domestic currency-denominated assets rather than seek the safety of a foreign currency (Berg et al. 2003). While higher interest rates increase the return on some local financial assets, their negative impact on the government's budget and on the health of the financial system as well as the risk that higher rates will lead to a politically unacceptable slowdown in economic activity all can undermine the credibility of an interest rate defense.¹⁵ Governments often respond to pressure on the exchange rate in two additional ways: They sell their reserves to defend the exchange rate and increase their issuance of debt denominated in a foreign currency, often the dollar. Such debt is a form of indirect foreign-exchange intervention: By increasing the supply of local dollar-linked or dollar-indexed debt, the government hopes to persuade its own citizens to opt for local dollar-linked assets rather than move their funds abroad.¹⁶ Such intervention, however, risks creating

14. Formally, a fully credible peg should lead to less borrowing in foreign currency, as debts denominated in local currency should be as safe as those denominated in foreign currency. If the peg is not fully credible, it should not lead firms to borrow in foreign currency, as the lower rate on foreign-currency relative to local-currency debt represents the expected depreciation risk (Krugman 1998a). Thus, if all economic actors were perfectly rational, an implicit guarantee of a bailout in the case of a currency crisis that reduces the cost of borrowing in foreign currency would be needed to explain the high reliance on foreign-currency debt. An alternative explanation is that economic actors are myopic and infer the future by looking at the past: A period of exchange rate stability consequently leads borrowers to expect the same in future.

15. See Vegh and Lahiri (2000) on whether interest rate defenses of pegs can work.

16. Foreign-currency assets issued by a local government are not a perfect substitute for true foreign assets (for example, the debt of the US government). First, exchange controls risk blocking the conversion of local payments on foreign currency-denominated local assets into foreign exchange. Second, the government may default—or forcibly restructure—its local debt.

additional financial weaknesses, as investors holding foreign-currency debts—whether foreign-currency debt of the government or short-term claims on the banks—start worrying about whether the government has sufficient reserves to cover its short-term debts. Mexico, for example, both increased its issuance of dollar-linked debt (tesobonos) and spent its reserves trying to defend the peso in 1994, laying the foundations for its subsequent debt crisis.

Microeconomic Distortions. Poor banking regulation, large implicit and explicit government guarantees, and other microeconomic distortions can create macroeconomic and financial imbalances that can contribute to crises. For example, such distortions can lead to excessive borrowing and investment by private borrowers, resulting in the accumulation of short-term, foreign currency–liabilities.

Particularly in Asia, the expectation of government guarantees encouraged domestic banks to take risks that they otherwise would have shied away from, whether lending to favored firms and sectors (directed lending) or taking on the risks associated with short-term external debt. Such guarantees can combine with poor regulation and supervision to fuel excessive borrowing and reckless lending. Distorted incentives in the financial sector can be particularly dangerous when combined with the early stages of capital account liberalization, as the opportunity for domestic financial and nonfinancial institutions to borrow from abroad can result in lending/credit booms¹⁷ and asset price bubbles.

Poor corporate governance and cronyism, while never immediate triggers of crises, can distort incentives and otherwise contribute to a financial environment that creates financial risks and vulnerabilities.¹⁸ Connected lending—large corporations who borrow from financial institutions they control—can fund investment activities with low returns. Crony capitalism and weak corporate governance more generally can lead investors to prefer debt to equity (since insiders can exploit equity investments by outsiders) and short-term to long-term debt.

These microeconomic and structural distortions were an important source of vulnerability in Asia,¹⁹ but they do not fully explain Asia's cri-

17. See Gourinchas, Valdez, and Landerretche (2001) for evidence of excessive credit booms and eventual busts in many crisis episodes.

18. For “third generation” models of crises that emphasize how microeconomic distortions and moral hazard from bailout guarantees generate crises, see Krugman (1999); IMF (1998); Corsetti, Pesenti, and Roubini (1999a); Burnside, Eichenbaum, and Rebelo (1999, 2001); and Schneider and Tornell (2000). See also the evidence in Wei (2001) of how domestic crony capitalism affects capital flows and their composition.

19. See Corsetti, Pesenti, and Roubini (1999a, 1999b) for analytical models and empirical evidence supporting the view that government policies exacerbated such structural problems, which caused the Asian crisis.

sis. China had and still has some of the same underlying domestic financial weaknesses as other Asian economies—a very shaky banking system, large domestic debts, and cronyism. Yet China's large reserves, current account surpluses, limited external debt, and tightly managed capital account insulated it from a crisis. Moreover, structural weaknesses did not inhibit an enormous increase in external bank lending to Asian economies in the mid-1990s; thus, they cannot be held solely accountable for the reversal of these flows.²⁰

Yet even if these structural weaknesses do not fully explain Asia's crisis, they clearly sapped the resilience of Asian economies when the tide turned. High debt-to-equity ratios imply that firms have a smaller buffer against all shocks, including capital account shocks. Heavy reliance on short-term interbank borrowing rather than on equity at the national level similarly fails to provide a built-in buffer against shifts in capital flows. It increases the country's risk of facing a rush to exits and a rollover crisis. More subtly, the scale of the government's contingent liabilities from weak banking systems heavily exposed to overleveraged firms made it difficult to assess the fiscal health of most Asian countries and thus may have made it harder for a government guarantee to stop bank runs. So long as the ultimate cost of bailing out weak financial systems was substantially uncertain, it was hard to assess the government's own solvency.²¹

Political Shocks. Unexpected political developments have often been the immediate trigger for trouble. Doubts about a government's commitment to the policies to maintain macroeconomic stability will result in an increase in the premium that investors demand to hold the country's financial assets; falls in the prices of the country's stocks, bonds, and currency; a desire to shift funds into safer foreign assets; and an inclination not to roll over claims as they mature.

Consequently, it is not surprising that crises are often closely correlated with elections, which raise doubts about policy continuity. Mexico's 1994 crisis, Korea's 1997 crisis, and Brazil's crises in 1998 and 2002 all coincided with elections. Conversely, the introduction of a new government that demonstrates the ability to define and carry out a coherent economic pol-

20. Short-term lending by international banks to Thailand, Malaysia, Korea, and Indonesia nearly doubled from \$89.4 billion to \$167.2 billion between mid-1994 and mid-1997, even though most of the structural weaknesses present in 1997 were also present in 1994 (data from the *Quarterly Review: International Banking and Financial Developments*, Bank for International Settlements, 1998).

21. In retrospect, the underlying solvency of Korea's government hardly seems to have been at risk. Yet it was hard to know the true scale of Korea's potential contingent liabilities in the midst of a crisis. Both Korea and Indonesia were widely considered to be in better shape than Thailand at the early stages of Asia's crisis. While Korea turned out to be fine, Indonesia did not.

icy often plays a key role in ending the crisis. For example, fears that a left-leaning presidential candidate would be unwilling to make the primary fiscal adjustment Brazil needed to honor its debts led to a sharp fall in the Brazilian real's value in 2002, but President Luiz Inacio Lula da Silva's subsequent commitment to fiscal stability contributed to a rally in 2003.

Elections, though, are not the only sources of political turmoil and uncertainty. Political violence (the Chiapas revolt and two political assassinations) played a role in the Mexican peso crisis. Doubts about the continued viability of Suharto's regime fueled a vicious circle of economic and financial decline in Indonesia. Argentina's 2001 crisis was marked by persistent doubts about the central government's ability to reign in provinces controlled by the opposition and about a fragile coalition's ability to deliver appropriate policies. Turkey's crawling peg collapsed in February 2001 after a public spat between the president and the prime minister. Ecuador's class cleavages and divisions between the coast and the highlands have made it very difficult to govern.

External Shocks. Many shocks—like the failure to pass needed legislation or the belated disclosure of bad news—are in part self-inflicted. Yet there is little doubt that many emerging economies are also exposed to shocks stemming from events beyond their control. Certain emerging economies depend heavily on the export of a single commodity—often oil—and thus are exposed to commodity price shocks. Many emerging economies also depend on access to external capital markets, whether to fund a current account or a fiscal deficit or to refinance a portion of their existing debt stock. International investors are more willing to lend to emerging economies or buy their existing bonds when interest rates in the largest economies are low than when they are high. Emerging economies are also at risk if a crisis in one emerging economy triggers a broad reduction in investors' willingness to hold the financial assets of a broad range of emerging economies, not just those of the crisis country. This phenomenon, referred to as contagion, itself has a number of potential triggers (box 2.2).

However, emerging economies are not passive victims of external shocks. Their resilience is determined in part by their own policies—both the choices they make in the face of the shock and their past policies. Countries running large current account deficits will likely have less scope to borrow and to run a larger current account deficit in the face of an adverse commodity price shock. Countries running large fiscal deficits before an adverse shock in the capital markets will have less scope to absorb higher interest costs by running a larger budget deficit, just as countries with large accumulated debts will have less scope to take on additional debt in the face of an adverse shock. Countries that have financed themselves with short-term debt may find that their borrowing costs increase sharply precisely at those points in time when their capacity to pay is reduced, just as

Box 2.2 Contagion

Contagion is notoriously difficult to define and measure.¹ Clearly, crises do not arise unless an underlying financial weakness leaves the country vulnerable to various capital account shocks. Yet international contagion, in some form, can play a role in the transmission of crises. A crisis in one country can trigger difficulties in another for several reasons:

- *Trade linkages and pressure for competitive devaluations.* If country A devalues, its trading partner, country B, will lose competitiveness. Investors will put pressure on B's currency as well, or policymakers in country B may decide that they need to devalue to prevent losing export market share. Such pressures were present in Asia in 1997–98, in Argentina after Brazil's devaluation in 1999, and in Uruguay after the Argentine peso collapsed in 2002.²
- *Wake-up calls.* A crisis in one country can highlight the risks a certain financial vulnerability poses. Investors, like countries, learn from experience. They may decide to preemptively seek to reduce their exposure to countries with similar financial vulnerabilities, such as a similar dependence on short-term interbank debt. If the country is not prepared for such an adjustment, it can be tipped into a vicious circle.
- *Common creditor linkages.* A bank, portfolio manager, or hedge fund may have exposure to many different emerging markets. Losses in one country may lead the financial institution to pull back from others for a host of reasons. Losses—or its prospects—may eat into a bank's capital and lead the bank to cut back on its exposure to other risky borrowers (including other emerging economies). Losses in an emerging market may lead investors to pull their money out of emerging-market bond funds, forcing fund managers to sell their holdings of other emerging markets. Losses by a leveraged hedge fund may lead its creditors to call in their loans and demand that the hedge fund deleverage. To raise the needed cash, the hedge fund may need to sell its most liquid assets. Selling drives prices down and spreads up. This produces losses for all financial institutions with similar positions and may therefore trigger further selling. Japanese banks which were already fragile given the economic crisis in Japan, felt these common creditor effects during the Asian crisis; so did US banks after the Mexican peso crisis. Similarly, dedicated emerging-market debt fund managers may cut back their exposure to a wide range of emerging markets if they incur losses in one emerging market. Russia's collapse led to a sell-off of Brazil's debt in 1998.
- Sophisticated models of risk management, paradoxically, tend to lead investors to respond to turmoil in one market with rapid cutbacks in exposure to other markets. The "value-at-risk" (VAR) models used by many banks and fund managers imply that a loss in the portfolio should be associated with an immediate increase in capital or reduction of risk. Investors who mark-to-market and book losses immediately are more inclined to sell losing positions rather than exercise 1980s-style forbearance.
- The risk of contagion increases if investors have difficulty picking out a buying opportunity from a warning signal. If a sophisticated but leveraged investor is forced to dump its holdings of Brazilian assets to raise funds to meet a margin call after taking losses in a country like Russia, the price of Brazilian assets should not change, in spite of this margin-triggered sale. Nothing fundamental has happened to Brazil, and other investors should be prepared to step in and buy. But uninformed investors may not know whether the informed investor is dumping Brazil because of a margin constraint or because he or she has superior information and knows that Brazil is

(box 2.2 continues next page)

Box 2.2 Contagion (continued)

also in trouble.³ Thus, Brazilian asset prices fall even if, based on fundamentals, they should not. Investors may rationally decide not to acquire costly information about a country's conditions because portfolio diversification tends to reduce the portfolio's overall risk.

Portfolio adjustments by one market participant—or by a set of market participants with similar positions—will have an immediate impact on the secondary market price of long-term bonds and the country's ability to roll over its short-term debt. If the country is prepared to weather temporary periods of instability and capital-market droughts, such portfolio adjustment will not have an enduring economic impact. Lower prices mean higher yields, and other investors will eventually move in. But if the country's balance sheet is shaky, the initial portfolio adjustment may trigger a cascading crisis—the unwillingness of one group of creditors to roll over their maturing debts leads others to pull out, pushing a country into a deep crisis.

1. See Claessens and Forbes (2001) for a systematic overview of contagion.
2. See Corsetti et al. (2000) for a formal model.
3. See Calvo (1999) and Calvo and Mendoza (1999) on the role of information asymmetries.

countries that finance themselves with foreign-currency debt will find that an adverse shock that leads to a real depreciation in their currency increases their overall debt burden.

Take, for example, an emerging economy that depends on oil both to finance imports and to cover the government's own expenses. A negative oil price shock is a direct shock to the country's income: The country will earn fewer dollars on its exports, the government's revenues will fall, and its currency will likely depreciate. The effect of that shock, though, will be magnified if the country has borrowed in a foreign currency, as the country's debt servicing burden will increase as a result of the depreciation even as its revenues are falling.

The “Balance Sheet” Framework

A formal way of thinking about the risks of an emerging economy experiencing a “capital account” crisis is to look in an organized way at the strengths and weaknesses of its financial balance sheet. Balance sheet analysis adds to traditional economic analysis—which typically emphasizes flow variables like the size of current account and fiscal deficits—a focus on the risk created by mismatches between a country's existing debt stock and its assets. The size of a country's—and its government's—outstanding debt is an obvious “stock” variable. But two countries with identical government debt-to-GDP ratios will not be equally vulnerable to crises if all of one coun-

try's debt is short-term and denominated in a foreign currency and all of the other country's debt is long-term and denominated in the local currency. Balance sheet analysis therefore emphasizes the debt's maturity structure, the currency in which the debt is denominated, and the availability of equity-like buffers that may help cushion against some shocks.

Maturity Mismatches. The amount of short-term debt determines how much existing debt a country needs to refinance, how quickly the interest rate the country has to pay on its debt can increase during financial distress, and how quickly investors can run if they lose confidence. Assessing a country's—or a government's—full maturity mismatch, though, requires looking at both the structure of the country's liabilities and its assets. A maturity mismatch arises when there is a gap between the term structure of debts and the term structure and liquidity of the corresponding assets. If short-term debts exceed liquid assets, a government, bank, or firm risks not being able to roll over its short-term debt, thus being forced to seek a restructuring or default.²² Mexico faced default at the end of 1994 because it had nearly \$29 billion in dollar-linked short-term debt (tesobonos) maturing over the next year and only \$6 billion left in reserves, and Korea got into trouble because its banking system's short-term external liabilities largely exceeded the government's foreign-currency reserves.

Currency Mismatches. A currency mismatch arises when the currency that debts are denominated in differs from the currency that the firm, government, or household earns revenues in, or has assets in, or both. Usually, a mismatch arises because a firm or government borrows in foreign currency but earns revenue in domestic currency. Standard textbook economics teaches that a currency depreciation stimulates the local economy: Exports increase and imports fall as locally produced goods substitute for foreign goods. This dynamic, however, only dominates in the short run if the debts of local firms and the local government are denominated in the local currency. If a substantial portion of debts is denominated in foreign currencies, as is often the case in emerging economies, a mismatch be-

22. Many recent “third generation” models of currency crises build on the emphasis that “second generation” models place on self-fulfilling, “nonfundamental” crises by stressing the role of maturity mismatches in triggering crises. These papers and models (for example, Chang and Velasco 2001, Sachs and Radelet 1998, and Rodrik and Velasco 1999) reinterpret the financial crises of the 1990s as international variants of “bank run” models (Diamond and Dybvig 1983). An insight from some of these models is that the feedback between the depreciation of the currency and the deterioration of the balance sheet of the bank or the government (if it has not matched foreign-currency assets and liabilities) or those who have borrowed from the bank can contribute to the risk of a self-fulfilling run (Jeanne and Wyplosz 2001, Schneider and Tornell 2000).

tween foreign-currency debts and revenues can lead to an increase in real debt burdens without a commensurate increase in the ability to pay.²³

This balance sheet effect does not mean that the currency depreciation is not needed: Exchange rate adjustment is almost always necessary to close a current account deficit that can no longer be financed by borrowing from abroad. But the process of exchange rate adjustment is likely to be more contractionary in economies that have lots of external—or domestic—debt denominated in a foreign currency. Currency mismatches have been a consistent source of financial fragility in emerging economies. Many governments have encountered financial difficulty after a currency depreciation increased the local currency value of their foreign-currency debts, as did private borrowers throughout Asia and in Argentina.

Capital Structure Mismatches. A country that has financed itself in a way that “shares” downside risk (as well as upside gains) with its creditors and investors will be in better shape than one that itself has assumed all the downside risk. For example, debt payments are fixed even in bad times like recessions while dividends on equity can be reduced in bad times. Equity consequently acts as a buffer against shocks while debt does not, though in principle it is possible to design debt contracts that have “equity-like” features, such as state-contingent coupon payments (i.e., coupons that are lower in bad times and larger in good times). In the corporate or financial sector, capital structure risk arises when debt is large in relation to equity, or in the case of banks, loans are large in relation to capital. For the government, capital structure risk arises when senior debt is large in relation to junior debt or if privatization revenue is not used to reduce the accumulation of public debt. For the country as a whole, capital structure risk arises when the country relies on debt rather than FDI and equity portfolio investment to finance a current account deficit.²⁴ Many Asian economies, for example, financed external deficits with debt

23. Much of the “third generation” literature on crises has stressed the role of balance sheet imbalances deriving from currency mismatches (Krugman 1999; Cespedes, Chang, and Velasco 2000; Gertler, Gilchrist, and Natalucci 2000; Aghion, Bacchetta, and Banerjee 2000 and 2001; Cavallo et al. 2002). Some of these models posit that concerns about the impact of a depreciation on balance sheets can create a self-fulfilling crisis of expectations. Fears that a depreciation will devastate private-sector balance sheets lead to a run on the currency, and the resulting collapse in output and investment validates the loss of confidence. Other models emphasize shocks to fundamentals that in turn prompt adverse balance sheet effects. Any overshooting of the real exchange rate (beyond what fundamentals warrant) exacerbates the balance sheet effects of foreign-currency liabilities.

24. Balance sheet analysis draws heavily on corporate finance theory in order to better explain the vulnerability of emerging markets to financial crises. Pettis (2001) puts particular emphasis on “inverted” capital structures that magnify a shock: Debt-servicing costs increase as payment capacity decreases. Gray’s (2002) “macrofinance” approach also draws on corporate finance theory, particularly on “contingent claims analysis” to assess the risk of a banking crisis leading to a sovereign crisis.

rather than equity, and at a micro level, firms and financial institutions were extremely highly leveraged with very large debt to equity ratios.²⁵

Maturity, currency, and capital structure mismatches all increase the risk of a shock leaving a firm, bank, household, government, corporate sector, banking sector, or even the country with more debt than it can pay. Of course, a company that borrows to invest in a project that fails to generate enough revenue will also go bankrupt, and a government that borrows to invest in an economic model that fails to generate growth will also likely experience trouble. Weaknesses in a firm's—or a government's—financial structure are not the only source of risk. But recent experience suggests that balance sheet weaknesses can be an important independent source of risk, and that financial weaknesses can overwhelm other sources of strength.

Balance sheet weaknesses also can augment the economic contraction associated with a shock. For example, the balance sheet effects of a devaluation, particularly when there is excessive reliance on debt relative to equity, often lead to a real economic contraction. Aggregate supply falls as firms with weakened balance sheets are unable to borrow to finance production, and aggregate demand falls as the credit crunch limits the ability of consumers and firms to borrow to finance consumption and investment.²⁶

The Dynamics of Crises

Balance sheet analysis is particularly helpful for understanding the dynamics of crisis. It explains both how a crisis in one sector of the econ-

25. FDI is usually considered among the most stable sources of financing. But FDI stability can be deceptive at times. FDI investors cannot close factories or halt fixed investments overnight. But they can take steps to hedge their exposure, which can add to pressures on the country during times of crisis. For example, FDI investors who are producing goods for the local market are taking on currency risk. They may not hedge this currency exposure in normal times. But as the risks of a crisis builds, FDI investors who do not usually hedge that risk ex-ante may have a strong incentive to hedge, whether by covering forward their local-currency positions, by buying local foreign currency-denominated debt that would pay off if the exchange rate fell, or by making outright purchases of foreign currency. This can add to the speculative stampede against the crisis country's currency. A recent example is that of Brazil, where new FDI dried up during the 2002 crisis, and legal capital outflows through "C5A accounts" were a source of significant pressure.

26. In many recent "third generation" models, financing constraints that capital structure mismatches generate interact with currency mismatches to generate crises after a real devaluation. In some models, a "financial accelerator effect" magnifies the impact of a currency depreciation on investment, as investment depends on the net worth of the firm/country, and a real depreciation interacts with foreign-currency debt to reduce the borrowers' capital and ability to borrow to invest (see, for example, Cespedes, Chang, and Velasco 2000; and Gertler, Gilchrist, and Natalucci 2000). In other models, when the stock of external debt relative to capital hits a binding constraint, a "margin call" is triggered, and assets/capital need to be liquidated in a "fire sale" to reduce the debt to equity ratio (Mendoza and Smith 2002; Cavallo et al. 2002; and Mendoza and Arellano 2002).

omy can snowball and lead to a broader crisis and how the financial weaknesses created by large stocks of short-term debt and foreign-currency debt or the twin negatives of large stocks of short-term foreign-currency-denominated debt interact in a dynamic way with policy weaknesses as stress mounts. The risk that a crisis will spiral out of control depends both on the country's willingness to make needed policy adjustments early on and on the size of the imbalances on a country's financial balance sheet.

How Intersectoral Linkages Transmit Financial Vulnerabilities across Sectors. Understanding how trouble in one sector of the economy can lead to trouble in other sectors requires looking beyond the maturity, currency, and capital structure risks of a country's overall balance sheet and looking at the risks that arise from domestic debts and the financial links between the economy's major sectors.²⁷ The domestic debts of one sector are the assets of another sector. These debts do not show up in the country's overall balance sheet, yet they create financial linkages between the key sectors, notably the government, financial, and private nonfinancial (firms and households) sectors. These financial interlinkages increase the risk of one sector's difficulties snowballing and leading to a deeper and more generalized crisis.

Looking closely at intersectoral linkages inevitably highlights the importance of the *domestic banking system* in the propagation of a crisis. This is not surprising. Banks are highly leveraged institutions and thus inherently vulnerable to financial instability. Moreover, their financial health is highly correlated with the financial health of the sectors that they lend to, whether the corporate and household sectors or the government. An imbalance on the balance sheet of a country's private firms can create problems for the banking system, just as the banking system's need to match the currency denomination of its assets and liabilities can create difficulties for firms. In many emerging economies, for example, the domestic banking sector takes in domestic foreign-currency deposits. It needs to make foreign-currency-denominated loans to limit its direct foreign-currency risk. However, if it lends to firms that lack export revenues, a currency depreciation risks bankrupting the country's corporate sector. The

27. Constructing sectoral balance sheets requires more data than constructing national balance sheets. A sectoral balance sheet provides more information about potential sources of vulnerability than just the country's external balance sheet. The needed data are often available for the government and the financial sectors (at least the regulated banking sector), and the data on the financial sector usually provide important information about the balance sheet of firms and households. The aggregated balance sheet of the financial, corporate, household, and government sectors net out debts between, say, various financial institutions. They do show, though, how a financial sector that borrows (by taking deposits) from the households lends those funds to the corporate sector, the government, back to households (through the mortgage market), or to nonresidents.

distress of the country's firms, in turn, creates problems for their creditors: Currency risk gets turned into credit risk for the banks. A government that borrows heavily from the domestic banking system similarly puts the system at risk if the government should ever prove unable to honor its debts.

One result of these financial interlinkages is that it is often difficult to distinguish between a domestic and an external financial crisis. When residents lose confidence in domestic dollar debt—or in the domestic banking system's ability to honor its dollar deposits—they typically do not move in mass into other local assets. They move into external assets. It is equally difficult to prevent an external crisis from spilling over into the domestic economy. Domestic banks often hold large amounts of the country's external-law debt, so an external debt default leads directly to a domestic banking crisis. Efforts by domestic residents with most of their assets in domestic currency to diversify their financial holdings during an external debt crisis only adds to pressure on the country's reserves and the exchange rate. A domestic crisis rarely remains purely domestic, and an external crisis almost always becomes a domestic crisis.

To illustrate how weaknesses in one sector of the economy eventually give rise to some form of external vulnerability, suppose a government budget deficit does not crowd out domestic investment and therefore leads to a current account deficit of equal magnitude. The government could finance the country's budget and current account deficits directly by selling long-term foreign currency-denominated bonds to foreign investors (non-residents). The government takes on the currency risk and directly raises the financing needed to cover the current account deficit. Alternatively, the government could finance its fiscal deficit by selling long-term domestic currency-denominated bonds to the domestic banking system.²⁸ In our thought experiment, though, all domestic savings is already financing private investment, so the banking system has to borrow from abroad to finance its acquisition of government bonds. If the banks take out short-term, cross-border, foreign-currency interbank loans to lend to the government, they are assuming the currency risk that the government would have otherwise taken. The country as a whole now has a large maturity mismatch: The banking system is raising the needed external funds with short-term debt. Should the government ever be unable to honor its debts to the banks, it may make the banking system insolvent.²⁹

28. Domestic bank regulation and, at times, capital controls often either make government bonds an attractive asset or restrict other assets that the banks can buy or both.

29. This example—quite relevant for the cases of Argentina and Turkey—shows why the development of domestic capital markets does not mechanically reduce the vulnerabilities that foreign-currency external debt borrowing generates. If local capital markets become a way of forcing the financial system to intermediate the financing needs of the government via international markets (rather than the government relying more on direct financing from non-residents), they may increase intersectoral financial vulnerabilities.

Interaction Between Policy and Financial Weaknesses in a Crisis. If a country does not have a large buffer of reserves, the unwillingness of some short-term creditors to roll over their debt can lead other creditors to decide to pull out as well. Once a run starts, creditors may pay more attention to the country's declining reserves than to its efforts to improve its macroeconomic policies. If all creditors believe others will stay in, they won't run, and a good outcome is possible. If all creditors run, a bad outcome is guaranteed (Sachs 1995). In the extreme case, fears of a crisis may trigger a race among short-term creditors to get out, which itself causes the crisis.³⁰

However, runs usually don't happen entirely by accident. Investors run in part when they have reason to worry about the country's capacity to take the actions to assure its long-term solvency. Moreover, the speed of the run—and the time the country will have to take corrective action—depends on the extent to which the country has relied on short-term debt for financing. Countries with close-to-perfect policies and little debt sometimes can get away with lots of short-term debt. The credibility of a country's policies allows it to retain the confidence of investors even in times of stress, preventing potential financial weaknesses from transforming into serious problems. Conversely, countries with truly awful policies usually cannot survive for long if they rely on short-term financing. The biggest risk comes from countries with real but correctable problems—problems that may only come to light in the face of adverse shocks—that have relied heavily on short-term debt. Here, a run can overwhelm a country before it has the time to take action to reestablish its policy credibility.

Heavy reliance on foreign currency-denominated debts also can trigger a self-reinforcing downward spiral that turns an otherwise manageable problem into a deep crisis. As in the case of a run, these pressures can be strong enough to overwhelm even a significant effort to improve policies. For example, firms that borrowed in foreign currency without having offsetting foreign-currency assets (as well as FDI investors that made unhedged local-currency investments financed from abroad) often will want to take steps to protect themselves, or hedge, as the risk of the currency

30. The dynamics of a run are captured in many models that allow for multiple equilibria. Both the good no-run equilibrium and the bad-run equilibrium are possible. Such models, however, usually fail to explain what leads investors and creditors to start to run. Recent analytical contributions suggest that the risk of a run is directly linked to the strength of the country's economic fundamentals: the weaker the signals that investors receive about the strength of the country's fundamentals, the greater the fraction of investors who run rather than roll over their claims and the higher the likelihood of a crisis. In the technical jargon of economic models, an economy can end up in the region where a self-fulfilling currency or bank run is possible only if economic fundamentals and policies are weak enough. See Corsetti, Guimaraes, and Roubini (2003) and Morris and Shin (2003).

peg breaking increases. If firms start hedging by buying foreign exchange before the exchange rate peg breaks, they put additional pressure on the government's reserves. If they wait until after the peg breaks, they put additional pressure on the nominal exchange rate and can contribute to the overshooting of the exchange rate. The net result can be very sharp and disruptive moves in the currency, massive financial difficulties in sectors with foreign-currency debts, a severe banking crisis, a credit crunch, and a very sharp fall in economic activity.³¹ The same destabilizing dynamics can also occur, though typically with less virulence, if a floating exchange rate comes under unexpected pressure. The steps private banks and firms take to protect themselves from further falls themselves put more pressure on the exchange rate.³²

Labels abound for the complex dynamics of flow imbalances, accumulation of stocks of liabilities, and financing of these stocks in forms—short-term, in foreign currency, and debt rather than equity—that make countries vulnerable to sudden stops and capital flow reversals.³³ Former Treasury Secretary Lawrence Summers and other officials talked of “21st century financial crises” to differentiate the 1990s’ crises from the 1980s’ bank debt crisis. The IMF prefers the greyer term “capital account” crises, noting the difference between pressures that stem from rapid swings in capital flows rather than those that stem from a slow increase in a current account deficit.³⁴

31. See Kaminsky and Reinhart (1999) for a seminal empirical contribution to this “twin” currency and banking crisis literature. See Cavallo et al. (2002) for a study of the output effects of financial distress after currency crises: They find that output contraction are larger when balance sheet effects from large stocks of foreign-currency debt are more significant.

32. Brazil’s recent experience is an obvious example. A fall in inflows and difficulty refinancing debt before the 2002 election led to a real depreciation that made all of Brazil’s financial indicators look worse. Conversely, a return of confidence and the resumption of (limited) inflows, together with a large catalytic IMF package, triggered a currency rally in 2003 that made all financial indicators look better.

33. See Dornbusch (2001) for an early academic study of how the “capital account” crises of the 1990s differed from the previous decade’s crises.

34. Calvo (1998) has called these sharp swings “sudden stops,” alluding to the saying that it is not speed that kills but the sudden stop. The term “sudden stop” is often used to suggest that the change in capital flows is justified not by any fundamental weaknesses in the emerging economy but rather by investors’ fickleness, contagion, sudden changes in investors’ appetite for risk, and more generally conditions in the financial markets of advanced economies. This suggestion is way too strong. Investors can overreact, but usually the crisis country’s own macroeconomic weaknesses and policy mistakes play a key role in creating its underlying vulnerability. For a fuller discussion of sudden stops and models combining a number of financial vulnerabilities to explain financial crises, see Calvo (1998), Calvo and Mendoza (1999), Mendoza (2001), and Schneider and Tornell (2000).

Interpreting Recent Crises

This section draws on the analytical framework described in the previous section to look at how policy weaknesses and financial vulnerabilities interacted in major crisis cases. We highlight what we think were the key sources of the country's vulnerability, paying particular attention to the financial imbalances that gave rise to the need for a bailout or a debt restructuring (see part A of table 2.1 for a summary of such vulnerabilities). This section both illustrates many of the key themes of this chapter and provides the background for the later chapters. In several cases, we take time to go through particularly interesting examples illustrating how interlinked domestic balance sheets gave rise to crises.

Mexico

The elements of Mexico's 1994 crisis are familiar:

- An effectively fixed exchange rate resulted in significant real appreciation of the peso and a large and growing current account deficit. Fiscal deficits were moderate and not the primary drivers of the current account deficit, though a tighter fiscal policy might have helped restrain the domestic boom and election-driven quasi-fiscal credit expansion in 1994 that exacerbated the credit cycle.
- A number of political shocks buffeted the country: the Chiapas revolt; the assassination of the anointed presidential candidate of the government, Luis Donaldo Colosio Murrieta, on March 23, 1994; the electoral uncertainty; and another high-profile political murder (of José Francisco Ruiz Massieu) in the fall of 1994.
- External shocks, notably, a sharp increase in US interest rates reduced investors' willingness to finance the current account deficit.
- The government exacerbated the country's vulnerability to crises during 1994 by replacing domestic peso-denominated debts (cetes) with domestic dollar-linked bonds (tesobonos), in part because it was having difficulty selling peso debt in the face of concerns that its exchange rate was overvalued. As discussed, dollar-indexed tesobonos provided a substitute for dollar-denominated foreign assets, and thus increasing tesobono issuance acted as a kind of hidden intervention in the foreign exchange market. The stock of tesobonos increased from 6 percent of domestic debt in early 1994 to 50 percent at the end of November, just before the devaluation.

Mexico compounded the problems it created by shifting into dollar-indexed debt by selling off most of its reserves to avoid a peso devalua-

tion, thus creating a large maturity mismatch on the government's balance sheet. Reserves fell from around \$30 billion at the beginning of 1994 to about \$17 billion in early November and to \$6 billion at the end of December. By the end of 1994, a clear mismatch existed between Mexico's \$6 billion in reserves and around \$29 billion in tesobonos coming due in 1995. With nearly \$10 billion coming due in the first quarter of 1995, Mexico was facing imminent default—even though Mexico's overall government debt, at about 25 percent of precrisis GDP, was not exorbitant.

Mexico also illustrates how balance sheets interconnect. Some tesobonos were sold directly to foreign investors, but domestic Mexican banks held many tesobonos. However, many of the banks borrowed in the international interbank market to finance tesobono purchases: International banks lent short term in dollars to Mexican banks, and Mexican banks used these dollars to finance the purchase of short-term domestic dollar-linked securities. When international banks wanted to reduce their exposure to the Mexican banks, the Mexican banks needed to liquidate their offsetting tesobono positions. Consequently, Mexico's rollover crisis has aspects of both an international and a domestic rollover crisis. International banks did not want to roll over their loans to Mexican banks (as well as their own tesobono holdings), and Mexican banks did not want to roll over their domestic claims on the government.

Mexico's currency was doubtless overvalued before the crisis, and a fall in the real value of the peso was needed to balance the current account. However, households with foreign currency-denominated mortgages, as well as firms that had dollar liabilities but lacked export revenues, were not able to service their foreign-currency debts after the devaluation. The financial distress of many private borrowers was one reason why Mexico's banking system had a severe crisis: The resulting bank bailout cost Mexico's taxpayers over \$50 billion. Fortunately, the Mexican government went into the crisis with a relatively low level of debt, and it was able to bear the costs of the bank bailout and the higher real burden of its own foreign-currency debt after the devaluation.

East Asia

In East Asia, fiscal deficits and the governments' own debts were clearly not the source of the crisis: A private sector-led investment boom fueled Asian current account deficits. The specific vulnerabilities of each East Asian crisis country differed, but all shared certain common characteristics. The crisis hit Thailand, Indonesia, and Korea the hardest; Philippines, Singapore, Taiwan and Hong Kong saw their rates of growth slow but avoided a widespread payments crisis. Malaysia was something of an intermediate case. All Asian-crisis countries had effectively, even if not formally, fixed or semi-fixed exchange rates. Most of them favored financing

these deficits with debt rather than equity: The external borrowing, often at short maturities and in foreign currency, of domestic banks and firms provided the capital inflows needed to finance ongoing current account deficits.

Close ties between banks and firms and expectations that well-connected banks would not be allowed to fail created distorted incentives, with too much borrowing from abroad and too much investment in marginal projects. These distorted incentives became particularly dangerous when combined with partial capital account liberalization in the 1990s, as domestic banks neither had the skills nor the incentives to manage the new risks that they were free to take on, and domestic supervision and regulation were poor. Finally, a credit boom, financed in part by external borrowing, contributed to a broader asset price bubble.

Thailand

Thailand provides a particularly compelling example of both how maturity, currency, and capital structure mismatches in the country's private sector created serious vulnerabilities in the country's balance sheet and how financial linkages between different sectors of the economy can lead to a cascading crisis. Thailand was running an unusually large current account deficit before its 1997 crisis, and its domestic economy showed clear signs of overheating. Many questioned the sustainability of Thailand's exchange rate peg. But relatively few predicted how the subsequent crisis would unfold. In retrospect, this is surprising because Thailand's national balance sheet suffered from every imbalance in the book.

Thailand increased its outstanding stock of short-term external inter-bank borrowing to finance its current account deficit: Between June 1994 and June 1997, Thailand's stock of short-term debt increased from \$27.2 billion to \$45.6 billion—an increase of \$18.4 billion.³⁵ Thailand's short-term external debt exceeded 25 percent of GDP—an unusually high ratio.³⁶ Thai domestic banks—and very loosely regulated finance companies—typically borrowed foreign currency from abroad and then matched their short-term external liabilities with short-term foreign-currency loans to domestic Thai firms. The net result: The financial sector's short-term debt

35. Thailand's reserves increased at a much slower pace, rising from \$27.4 billion only to \$31.4 billion. The \$18.4 billion increase in short-term debt during three years financed a large fraction of the cumulative current account deficit during the same period.

36. Countries like Chile that had financed comparable current account deficits with FDI, not by a surge in cross-border borrowing, were in much better financial shape. Chile's short-term debt increased by only \$2.1 billion over the same period, rising from \$5.5 billion to \$7.6 billion. Chile's reserves increased by much more, going from \$10.8 billion to \$17 billion (data from the *Quarterly Review: International Banking and Financial Developments*, Bank for International Settlements, 1998).

exceeded the liquid foreign-currency reserves of the government (as well as the banks' own liquid reserves), creating a classic maturity mismatch, and heavy overall reliance on debt rather than FDI to finance current account deficits left Thailand as a whole with a smaller buffer against adverse shocks.

The Bank of Thailand compounded this maturity mismatch by selling its dollar reserves forward (in effect, offering investors insurance against the risk of devaluation) to defend the baht-dollar peg. This scale of its forward book was hidden from the public. In the end, the central bank's commitment to sell dollars in the future exceeded the amount of dollars that it actually held in reserve.

Thailand's external borrowing ended up creating a substantial currency mismatch as well. Local Thai banks and finance companies needed to offset their external borrowing with dollar-denominated loans to local companies. Some loans went to companies with export revenues, but many went to companies that were constructing office buildings and investing in local real estate (a part of the nontraded goods sector).³⁷ This created a real estate bubble. When Thailand could no longer finance its large current account deficit by taking out additional short-term loans—or by selling its reserves—it had to abandon its peg. As the real value of the baht fell and the real value of foreign-currency debts increased, much of the economy fell into deep financial distress.³⁸ When Thai firms went belly-up, the banks and financial institutions that lent to them also experienced financial distress.

The end result was substantial pressure on the finances of Thailand's government, even though the government itself entered the crisis with relatively little domestic or external debt. The government guaranteed payment on the cross-border liabilities of commercial banks, though not the finance companies, during the crisis. This guarantee, combined with the size of the Bank of Thailand's forward sales, put pressure on the government's reserves. The cost of protecting depositors from the banking system's large losses also significantly increased the government's domestic debt.

37. Allen et al. (2002), drawing on the Bank of Thailand's work, estimate that the Thai banking system held \$7.6 billion in foreign assets (\$2.6 billion in liquid foreign assets) against its \$32 billion in short-term foreign loans. The banking system's domestic lending to Thai firms in foreign currency closed the "gap" between its external liabilities and external assets.

38. Allen et al. (2002), drawing on the Bank of Thailand's work, estimate that \$94 billion of the Thai nonfinancial sector's \$268 billion in precrisis total liabilities were denominated in foreign currency—\$62 billion in loans to nonresidents and \$32 billion in loans to domestic banks. The baht's devaluation dramatically increased the burden of these debts. The debts were fixed in dollar terms, but Thailand's GDP fell from \$182 billion in 1996 to \$151 billion in 1997 and \$112 billion in 1998.

Indonesia

Indonesia's current account deficit and currency overvaluation were not large relative to those of Thailand and Malaysia. Indonesia's banks also had comparatively little external debt, not because they were unusually virtuous but because their weaknesses were widely known. Most international banks preferred to lend directly to Indonesian firms. The state banks in particular had accumulated large, unrecognized losses before the crisis.

Consequently, the core mismatch in Indonesia arose in the corporate sector. International banks lent, in foreign currency and at short term, to many Indonesian firms,³⁹ creating a large maturity mismatch both in the corporate sector and on the national balance sheet. Indonesia was a major exporter, but during the period of currency stability that preceded the crisis, many firms without export earnings took out foreign-currency loans. For example, an infamous Indonesian taxi firm that Suharto's daughter owned took on large dollar debts. The firms with export revenues were not necessarily the ones with the dollar debts.

Indonesia offers a powerful example of two phenomena: (1) the pressure on the currency that can come from firms' hedging demands and (2) the broad economic collapse that is possible if an external crisis is combined with a domestic bank run and political instability leading to policy uncertainty. After Indonesia let its currency float, Indonesian firms—as well as some banks that also needed foreign exchange—entered the currency market to buy dollars both to hedge against further falls in the rupiah and to repay their short-term debts, which put additional pressure on the currency. This hedging demand fueled a vicious circle: in thin markets, the demand for hedges resulted in large currency movements, which made hedging imperative. Finding a solution to these problems was more difficult than in Korea: An outright government guarantee would have made negotiating a rollover easier, since it would have avoided the need to negotiate agreements with a number of different firms with different financial positions. It also would have been an enormous bailout of Suharto's cronies who had borrowed from abroad. This is discussed in more detail in later chapters.

Domestic capital flight added to the pressure that the need to hedge foreign currency debt placed on the exchange rate. Initial bank closures were handled poorly and no doubt contributed to the development of a domestic bank run (Sachs and Radelet 1998).⁴⁰ Indonesia's problems, how-

39. Indonesian firms owed \$39.7 billion to external creditors, roughly thrice the \$12.4 billion banks owed. In contrast, Korean banks had taken out \$67.3 billion in external loans, more than twice the \$31.7 billion nonbanks owed (see Sachs and Radelet 1998).

40. The Independent Evaluation Office of the IMF (IEO 2003) concluded that the risks of bank runs were not properly assessed.

ever, were more profound: The crisis called into question the continued viability of Indonesia's political and economic model, which was based in large part on close ties between the president, the president's family, and a group of wealthy and often ethnically Chinese businessmen. Concerns about the political viability of Suharto's government and growing ethnic tensions contributed to large-scale domestic capital flight as well—those who had profited most from the old political and economic order wanted to move their savings out of the country.⁴¹

The Bank of Indonesia lent large quantities of rupiah to distressed banks facing pressure from the domestic run, fueling the currency's collapse. A substantial real depreciation was necessary to swing the current account from a deficit to a substantial surplus, but the rupiah went into free fall and ended up overshooting its equilibrium value. This increased the real burden of the debts of Indonesian firms that had borrowed from abroad and the real burden of the government of Indonesia's own debts, owed largely to the multilateral development banks. Widespread corporate distress augmented the preexisting weaknesses in the banking system and resulted in an extremely costly (56 percent of GDP) bailout, further adding to the government's debt. Indonesia's public debt to GDP ratio rose from 25 percent of GDP in 1997 to over 83 percent of GDP by 2002.

Korea

Korea had a smaller current account deficit than Thailand, and its currency was less overvalued. Korea's external debt burden was also substantially smaller than that of either Thailand or Indonesia. Korea had two core sources of financial fragility. First, its domestic banks had lent heavily to often overleveraged *chaebol*, threatening the banking system with large losses: By mid-1997, even before the currency crisis and investor run exacerbated the crisis, 7 out of the top 30 *chaebol* were bankrupt or in severe financial distress. Second, Korea, like other Asian economies, had financed current account deficits with short-term external debt, not through equity or FDI. The bias toward debt and against FDI was a product of policy: The government of Korea had opted to allow local banks to borrow from abroad before it lifted restrictions on FDI, a particularly dangerous way of sequencing capital account liberalization. The result was a clear mismatch between the short-term external borrowing of the financial sector and the liquid foreign-currency reserves of both the financial sector and the government.

When foreign creditors began cutting back on their interbank lines in the fall of 1997, the central bank started depositing its foreign-currency

41. See Chua (2002) on the role of economically dominant ethnic minorities in some financial and political crises.

reserves in the local banking system. These deposits supplied the banks with the foreign currency they needed to avoid default for a while. However, the government lacked the reserves to back all maturing bank lines on its own and, as more of the government's reserves were committed to the banking system, the run only accelerated. At the end of 1997, Korea had only \$5 billion in reserves and more than \$20 billion in remaining short-term interbank debts. The fact that most external borrowing was channeled through the banking system, however, did make it easier to resolve Korea's crisis. A government guarantee of all cross-border lines allowed the government to negotiate for the entire banking system. This experience is covered in detail in Chapter 4.

Malaysia

Like other East Asian crisis countries, Malaysia had a soft peg, little public debt, a large current account deficit without a large fiscal deficit, and a domestic credit boom. However, in other ways, it was somewhat less vulnerable than other East Asian crisis countries. A larger fraction of its current account deficit had been financed with FDI and portfolio equity investments rather than with external debt, and less external debt meant both a smaller currency mismatch and a smaller maturity mismatch. Malaysia's ratio of short-term debt to reserves was 94 percent, well below the ratios in Thailand, Indonesia, and Korea.

While Malaysia experienced a sharp currency crisis, its banking and corporate crisis was less severe than in other crisis countries.⁴² It was able to avoid defaulting on its smaller stock of short-term external debt without borrowing from the IMF. However, Malaysia was not immune from the region's broader troubles: Like other countries, a boom in local lending had fueled a general boom in local asset prices, and the country experienced a sharp recession when capital inflows dried up. Pressure on the exchange rate continued well after Malaysia let the ringgit float. In response to renewed currency pressures in the summer of 1998, the government repegged its currency to the US dollar in September 1998 and imposed draconian—and controversial—capital controls.⁴³

42. The estimated fiscal cost of its banking crisis was 14 percent of its GDP, relative to 21 percent in Korea, 19 percent in Mexico, and 56 percent in Indonesia.

43. For a sympathetic view of the Malaysian controls, see Rodrik and Kaplan (2001) and Krugman (1998b). Others have argued that those controls do not explain the successful stabilization of markets and reduction in domestic interest rates, as external conditions in late 1998—the deleveraging of international investors after Russia's default and Long-Term Capital Management's troubles—eliminated the downward pressures on most East Asian currencies and asset markets. We consider the merits of capital controls in chapter 6.

Russia

Russia's crisis is unique for several reasons. First, it was the only country to experience a combined currency, banking, and sovereign debt crisis in spite of the absence of a current account deficit. Rather than going from a current account deficit to a current account balance or surplus, Russia went from an overall balanced current account—with substantial inflows from external investors offsetting substantial capital flight by local residents—to a significant surplus. Second, Russia was hardly booming before its crisis: Its debt problems emerged in the context of the prolonged economic slump associated with its transition to a market economy. Third, Russia's financial crisis, despite being a combined currency, banking, and sovereign debt crisis, did not result in further severe fall in output. The downturn was less sharp than in other episodes, and Russia's real economy started recovering in early 1999.

Russia's vulnerability had many sources:

- *an oil price shock.* Asia's crisis reduced world oil demand and the market price of oil. This had a significant impact on Russia, given its concentration in oil and energy exports.
- *persistent fiscal problems.* Revenues never matched expenditures during the transition, resulting in large fiscal deficits. Russia's precrisis government debt was not as high as some other crisis countries, but its revenues were low, and its debt stock was growing particularly rapidly.⁴⁴ Russia sold very high-yielding domestic debt securities—the GKO's—to finance its fiscal deficits.
- *a pegged exchange rate.* Russia's exchange rate peg turned high-yielding, short-term domestic-currency debt into high-yielding, short-term foreign-currency debt so long as investors got out before the peg collapsed. This resulted in a severe mismatch between Russia's actual reserves and the potential demands on them if nonresident investors in the local debt market (and domestic investors fleeing local assets) wanted to exit.

While Russia was running large fiscal deficits before its crisis, it did not experience a classic first generation-style crisis where a fiscal deficit fuels a domestic boom and inflation, which then produces an overvalued real exchange rate. The fiscal deficit occurred in the context of shrinking domestic demand and was financed by selling government debt, not print-

44. Russia's debt to GDP numbers (52 percent in 1997) did not make Russia look obviously insolvent. The debt to revenue ratio is often a better measure, though, which was above 147 percent in 1997.

ing money. This resulted in a bubble in the government debt market, not a booming domestic economy. However, Russia's precrisis equilibrium hinged on its ability to attract external inflows, largely "hot money" invested in short-term government debt, to offset ongoing capital outflows stemming from very large capital flight by domestic investors. This capital flight was one of the key elements of the Russian crisis. During the 1998 crisis, external inflows turned into outflows, and resident capital flight accelerated, triggering a race to get out of the country's government debt market and a run on the currency.

Russia's difficulties provide an interesting example of how balance sheet risks interlink. In Brazil and Turkey, the local banking system held a large part of the domestic-currency debt. Since the banks financed these positions by taking in local-currency deposits, they did not need to hedge against currency risk. The foreign investors that invested in Russia's short-term ruble debt (the famous GKO's), however, often wanted to hedge against the risk that the ruble would be devalued. Russia's private banks met this demand and sold insurance against a fall in the ruble to foreign investors. The resulting forward contracts obligated the Russian banks to sell dollars on a given date at a fixed price, even if the ruble had been devalued. Unfortunately, the banking system was in no position to take on this currency risk. In effect, the Russian government had a maturity mismatch in domestic currency, and the Russian banking system had a maturity (as well as a currency) mismatch in foreign currency, as the local banks lacked liquid dollar assets that would enable them to honor their commitment to provide dollars to external investors at a fixed price if the currency collapsed. The government of Russia imposed capital controls to protect the local banking system after its default, as the banking system was clearly unable to honor these contracts.⁴⁵

The absence of a severe contraction in output after Russia's triple crisis has a simple explanation: Russia's banking crisis did not have an impact on output because Russian banks never were in the business of providing loans to productive corporate firms. Many of them were investment, rather than commercial, banks. And most did little more than make speculative bets on the exchange rate and the government debt market (GKO's).⁴⁶ Since Russia's banks were effectively hedge funds speculating in government paper rather than lenders of funds to real firms, most Russian firms were self-financed. The devaluation helped them more than

45. Sixty percent of Russia's government debt was in foreign currency or foreign currency-linked; the debt to GDP ratio sharply rose to over 92 percent in 1999 after the currency crisis. Before the crisis, Russian banks had a net open foreign position close to 10 percent of total deposits.

46. See Freeland (2000) for a superb account of Russia's transition and the 1998 crisis as viewed from Moscow.

the collapse of the banking system hurt them. A strong rebound in world oil prices in late 1999 and 2000 also helped: Among other things, higher oil prices made it easier for the government to balance its budget after the crisis.

Brazil

Brazil experienced two crises: one in 1998 and 1999 and a second in 2001–02. Brazil's choices in its 1998–99 crisis created the vulnerabilities that led to its 2001–02 crisis, so they are worth examining together.

Brazil's vulnerability in 1998 stemmed from features that should be familiar: A semi-fixed exchange rate (formally a crawling peg) plus inflation inertia had led to an overvalued currency; the resulting current account deficit was financed in part by FDI and also in part by increased cross-border bank borrowing; and a large fiscal deficit both contributed to the current account imbalance and led to the accumulation of domestic and external debt. The eventual collapse of Brazil's peg in 1999 should not have been a surprise: The capital flows needed to support an overvalued currency had disappeared. What makes Brazil's 1999 currency collapse interesting is that it did not lead to a banking crisis, an ensuing credit crunch, and a severe recession. Output recovered soon after Brazil's 1999 crisis.

In the summer of 1998, both Brazil's banks and firms had large maturity and currency mismatches on their balance sheets. Domestic bank deposits and bank loans were largely denominated in the local currency, but both banks and firms had taken on large amounts of cross-border debt. There is little doubt that a currency crisis in the summer of 1998 would have had a severe impact on private-sector balance sheets. However, in the months leading to the collapse of the peg, the central bank sold more than \$40 billion in reserves to defend the peg. This allowed most private financial and corporate firms to hedge their currency exposure—whether by increasing their holdings of foreign assets or by paying down their external debt. The government also increased its issuance of domestic dollar-linked debt, helping banks and firms hedge against the risk of a devaluation.

However, selling the government's reserves (its key foreign-currency asset) and increasing its foreign-currency debt sharply increased the government's own currency mismatch. Brazil's devaluation, consequently, resulted in a large increase in the government's debts. In effect, Brazil bailed out its banks and corporations before the crisis by using taxpayer resources to let them hedge their currency exposure. Indeed, many banks had bet that the real would fall and obtained large profits out of the crisis. This avoided a banking/corporate crisis—a crisis that in all probability

would have led to larger liquidation and output costs and required an even larger ex-post bailout.

Because a private-sector “balance sheet” crisis did not accompany Brazil’s devaluation, it experienced a smaller fall in output than most of the crisis countries. Its currency did not overshoot, and it continued to run a current account deficit. To the surprise of many, Brazil’s devaluation did not lead to the reemergence of inflation, thanks to the adoption of a credible inflation targeting regime.⁴⁷ Brazil took advantage of years of relative calm after 1999 until 2001 to start retiring its domestic foreign currency-denominated debts. The government balance sheet improved (both in the share of foreign currency-linked debt and the maturity of the public debt) until the 2001 Argentine crisis.⁴⁸

But Brazil also retained significant vulnerabilities that set the stage for its 2001–02 crisis. It lost about half its foreign exchange reserves in the 1999 crisis (it started with around \$70 billion in net reserves), and it was not able to replace most of those reserves in 2000 or 2001. The stock of public debt to GDP rose from 40 percent of GDP in 1997 to over 72 percent of GDP in 2002, despite a significant fiscal adjustment. The maturity and currency composition of its debt improved slightly after its crisis, but most of Brazil’s debt was still indexed either to the overnight rate or the dollar. As Argentina’s crisis deepened, Brazil renewed issuance of large amounts of foreign currency-linked debt to meet the demand for hedging products and, effectively, to intervene in the foreign exchange market. The combination of investor jitters following Argentina’s worse-than-expected crisis and concerns about a victory of the left’s presidential candidate, Luiz Inacio Lula Da Silva, resulted in a significant fall in foreign financing and the real’s value. Brazil responded first by drawing on a “precautionary” credit line it had set with the IMF in 2001, and when that proved insufficient, it obtained a second major—\$30 billion—IMF rescue in 2002.

The ultimate success of Brazil’s decision to avoid a financial crisis in its private sector in 1998 by transferring key risks to the government remains an open question so long as Brazil’s debt levels remain high. The combination of strong demand for important Brazilian exports (soybeans and iron ore) from China, low interest rates in major economies, and a sound fiscal policy by President Lula may allow domestic rates to come down and allow Brazil to both rebuild its reserves and slowly unwind its dollar debts. But the fiscal cost of the exchange rate insurance that the govern-

47. See Truman (2003) for a systematic study on the experience with inflation targeting in emerging-market economies.

48. The share of foreign currency-linked debt in public debt rose from 9 percent at the end of 1996 to 15 percent in 1998 and 24 percent in 1999. It fell to 22 percent in 2000 and rose again to 28 percent in 2001. It remained at this high level through the fall of 2002.

ment offered Brazil's private sector during the 1999 and 2002 crises and the high domestic interest rates risk contributing to some form of government debt crisis. Brazil's government debt has risen to potentially unsustainable levels—ratios of both debt to GDP and debt to revenues are high. The high external debt to exports ratio continues to be a concern as well.

Ukraine

Ukraine's 1998 crisis has many parallels with the Russian crisis. Before 1998, it maintained a pegged exchange rate and, like Russia, was able to finance its budget deficits in part by attracting external investors to buy its high-yielding local-currency debt (and was even able to issue foreign-currency debt in international markets). Its overall economic management hardly won plaudits: Like other former Soviet states, output fell during the first phase of its economic transition. Following the Russian crisis in 1998, the exchange rate peg became unsustainable, and Ukraine clearly was not going to be able to convince its external investors to refinance, at least not voluntarily, the government's maturing external debts. Ukraine tried to obtain cash relief through selective ad hoc restructurings in 1998–99, before launching a more successful comprehensive restructuring in early 2000. Ukraine's overall debt was moderate—only 40 percent of GDP—not so much because of Ukraine's fiscal virtue but because Ukraine lagged behind Russia in obtaining access to external financing, and Russia's crisis occurred before Ukraine had time to run up a large debt stock. Government debt was a relatively small share of bank assets (about 14 percent): This helped Ukraine avoid a bank holiday during its sovereign restructuring.⁴⁹

Pakistan

Pakistan's problems were in many ways distinct from those of other emerging economies with payments crises.⁵⁰ The country was certainly heavily indebted—its 1998 public debt to GDP ratio was over 100 percent—and like many emerging economies, it had to support this debt off a low revenue base (debt was over 600 percent of revenues in 1998). It typically ran large budget deficits, and its overall economic performance was poor. However, Pakistan was not a major player in international capital

49. The corresponding shares were 31 percent in Russia, 30 percent in Pakistan, and 21 percent in Argentina. This intersectoral linkage (large share of banks' assets in government paper) is an essential link between sovereign and banking distress in many crises.

50. Many details on these two episodes can be found in IMF (February 2002), a study of the experience with four sovereign debt-restructuring cases (Pakistan, Ukraine, Russia, and Argentina).

markets: It owed most of its sovereign external debt to other governments (the Paris Club) and multilateral financial institutions. Pakistan's decision to perform a nuclear test in May 1998, and the economic crisis stemming from the ensuing sanctions, triggered its financial crisis. To stem outflows, the government froze all foreign-currency deposits, including nonresident deposits (Pakistan, like India, tried hard to attract deposits from Pakistanis working abroad), and generally tightened its extensive capital controls. Following its nuclear test, Pakistan was unable to meet its external debt payments to the Paris Club group of creditors, and the Paris Club conditioned its own restructuring on the restructuring of Pakistan's modest stock of eurobonds.

Ecuador

Ecuador has many of the typical problems of a small, heavily indebted, and poorly managed economy beset by persistent political conflict. Low government revenues (only 14.6 percent of GDP in 1997) contributed to persistent budget deficits. While Ecuador's Brady restructuring was slightly more generous than most, it still left Ecuador with a large debt hangover from the 1980s crisis. Public debt stocks were relatively high overall (60 percent of GDP in 1997) and very high (412 percent) relative to government revenues. External debt was also very high even after the Brady debt restructuring.

The combination of a large debt stock and heavy dependence on a few commodity exports left Ecuador vulnerable to external shocks. A series of such shocks hit the economy in 1998: The weather phenomenon El Niño reduced the output of Ecuador's fisheries (hurting banks based in the coastal provinces) at the same time that a fall in global oil prices reduced Ecuador's export revenues. Currency mismatches were widespread: All of the external public debt was denominated in foreign currency, banks had large net open foreign-currency exposures, and by 1997 two-thirds of the nonfinancial private-sector debts (many in nontraded sectors) were in foreign currency. The banks also lacked sufficient access to dollar liquidity to match their dollar deposits.

These external shocks pushed an economy with few buffers into a crisis: They led to a banking crisis in 1998, widespread capital flight, and sharp falls in the value of the exchange rate. A bank run in March 1999 forced the authorities to freeze bank deposits. The cost of the bank bailout (the fiscal cost of the bailout eventually amounted to more than 24 percent of GDP) added to the financial troubles of the government, which was simultaneously feeling the pinch from lower oil revenues and the increase in the real debt burden that followed the sharp depreciation of the currency. The government fell behind on domestic payments and eventually defaulted on its domestic and external debt in mid-1999. The default only

added to pressures on the currency, and in desperation, the president (soon to be pushed out of power given the persistent political instability of the country) decided to phase out its local currency and dollarize, i.e. formally adopt the US dollar as its currency in 2000.⁵¹

Turkey

Turkey combined most of the classic sources of vulnerability:

- A quasi currency board introduced as part of a plan to use a forward-looking crawling peg exchange rate—to anchor an anti-inflation exchange rate-based stabilization program—went wrong as wage and price inertia in 2000 led to a real appreciation and a growing current account imbalance.
- The banking system bet on continued exchange rate stability and borrowed heavily from abroad, worsening the gap between the banking system's short-term foreign-currency debts and available foreign-currency liquidity.
- Severe fiscal problems led to the rapid accumulation of public debt. A large share of the government's debt took the form of very short-term treasury bills that were placed in the domestic financial system, leaving the government's debt-servicing costs vulnerable to surges in domestic interest rates.
- Hidden losses in parts of the banking system, whether from state banks used well before the crisis to provide low-cost credit to favored sectors or from shady credit practices and connected lending in private banks.

In February 2001, a public spat between the president and prime minister—as political conflicts simmered on how to deal with the banking crisis—triggered a run on the currency. In three days, Turkey lost one-third of its foreign exchange reserves as domestic and foreign investors dumped Turkish lira in a stampede to buy dollars and euros. The break in the peg triggered a banking and corporate crisis, a credit crunch, and a sharp output contraction in 2001. A new large IMF loan replenished the government's foreign reserves and allowed the banking system to repay its cross-border credit lines.

However, the combination of the exchange rate depreciation's balance sheet impact, the cost of cleaning up the banking system, and the high real rates needed to attract investors—mostly local—into the government debt market threatened to quickly generate a government debt crisis. Some of

51. See Jacome (2004) for a detailed account of Ecuador's crisis.

the increase in Turkey's debt during its 2001 crisis stemmed from the delayed realization of losses in the state banking system; another portion of the increase came from the need to recapitalize private banks that had incurred large losses speculating on the Turkish lira and the government bond market. The combination of an IMF program and an impressive fiscal adjustment avoided default in 2001 and 2002. Conditions stabilized in 2003 and 2004, but real risks remain. Debt ratios are high, particularly in relation to government revenue; the sharp primary adjustment may not be sustainable over time; and future shocks to growth and the real interest rate may make the debt dynamics unsustainable again.

Argentina

Argentina's crisis stemmed from four major vulnerabilities:

- The currency board tied the dollar to the peso, resulting in an increasingly overvalued currency as the dollar appreciated and particularly after the Brazilian real tumbled. Some of the significant overvaluation stemmed from inflationary inertia in the currency board's early years; but in the period immediately preceding the crisis, Argentina was experiencing deflation, not inflation, as a way to undo the currency overvaluation.⁵²
- The external imbalances the overvalued currency created were increasingly difficult to finance. The burst of privatization in the first part of the 1990s had faded by 1998, in part because many of the best assets had been sold off. The government's external debt issuance was increasingly financing the current account deficit. Argentina's current account deficit was not large on an absolute scale but was very large in relation to the country's small export sector—the more relevant measure.
- Persistent fiscal deficits (and a partially botched social security privatization) led to an accumulation of a large stock of public debt, particularly as the economy began to shrink and interest rates rose after 1998.
- Pervasive liability dollarization produced an enormous currency mismatch. Almost all of Argentina's domestic and external government debt was denominated in dollars. Most domestic Argentine bank deposits were in dollars, and Argentine firms and households usually borrowed from the banking system in dollars. The scale of these cur-

52. See Hausmann and Velasco (2002) for an argument that Argentina's real exchange rate was not enormously overvalued. See Perry and Servén (2003) for an argument that Argentina's exchange rate was overvalued by as much as 40 percent.

rency mismatches was so large in relation to Argentina's small export sector that it was effectively impossible for most borrowers in Argentina to hedge against exchange rate risk. The banking system's underlying currency mismatch was disguised, not eliminated, by transferring currency risk to the private and government sectors, even though the banks were formally matched, currencywise.⁵³

These intrinsic vulnerabilities made it extremely difficult for Argentina to adjust to a series of unexpected external shocks. Argentina depended more than most other emerging economies on the international sovereign bond market, so it was hurt more than most by the Russian shock in 1998. External bonds were both more difficult and more costly to issue. Global commodity prices were weak, and the country's terms of trade worsened. Brazil's 1999 devaluation made Brazil's products more competitive than Argentina's in the markets of Europe, the United States, and Buenos Aires. New FDI tended to go to Brazil rather than Argentina. The appreciation of the US dollar from 1998 to 2001 resulted in a nominal and real appreciation of the peso relative to Argentina's other trading partners. The 175 basis point increase in US short-term interest rates from mid-1999 to mid-2000 also hurt when the Argentine economy was contracting.⁵⁴

It slowly became clear that Argentina was unable to adjust to these shocks. Its macroeconomic hands were tied: It could not adjust its currency peg without bankrupting many firms and the government, it lacked an independent monetary policy, and its high existing debts left it unable to run a countercyclical fiscal policy. Adjusting to these shocks through deflation was slow and painful: Labor markets were relatively rigid, and the domestic regulatory regime of many utilities allowed them to index their prices to the dollar, introducing another rigidity into the economy. Domestic deflation effectively increased the real burden of domestic dollar debts: Firms that had borrowed in dollars but sold domestically to Argentines saw their domestic revenues fall while their debt load stayed constant.⁵⁵ Most real investment headed toward sectors sheltered from external competition (and often from deflation because of dollar-indexed pricing), such as energy utilities and telecoms, not toward the traded sectors that needed to grow to help Argentina reduce its underlying currency

53. Goldstein and Turner (2004) have developed a new measure of currency mismatches that includes mismatches from domestic liability dollarization. According to this indicator, Argentina had the largest currency mismatch among all emerging-market economies.

54. See Mussa (2002b) for a systematic analysis of the Argentine crisis and the role the IMF played in this crisis.

55. Roubini (2001a) noted that real depreciation through domestic price adjustment produces the same increase in the real debt burden of foreign-currency debt as real depreciation through a fall in the nominal exchange rate. However, domestic prices tend to adjust more slowly, and thus the increase in real debt burdens occurs more gradually.

mismatch and external imbalance. And the coalition government that emerged from the 1999 election was fragile with a weak and indecisive leader in President Fernando de la Rúa. Thus, the government's macro and structural reform program was only partially enacted.

Consequently, the real exchange rate adjustment needed as capital inflows faltered came slowly, through a painful process of domestic deflation, which increased the real burden of servicing the government's hard-currency debt even as the economy stalled and then slipped backwards. Adjusting fiscal policy more to prevent falling revenues and rising debt-servicing costs from generating a bigger deficit eventually became economically, socially, and politically unsustainable. Devaluation and default became unavoidable.⁵⁶

It is hard to say that Argentina experienced a "sudden stop" in international capital flows because of fickle international markets. Rather, Argentina's ability to access international markets gradually eroded from 1999 on, when external investors first declined to provide new financing as Argentina went through the slow process of deflation and then sought to reduce their exposure. However, Argentina's reliance on long-term bond finance made it difficult for many external investors to run quickly. The "sudden stop" in Argentina, if there was one, came when domestic residents were no longer willing to keep their savings in Argentina and started pulling their savings out of the domestic banking system in mass in mid-2001.

Argentina's maturity mismatch is worth exploring in some depth, in part because standard measures that compared short-term external debt to reserves did not capture it. While Argentina's government debt had a relatively long average maturity, at least by the standards of most emerging markets, a large debt stock meant that every year Argentina needed to refinance a certain fraction of its existing debt. Most of the central bank's reserves were pledged to back the currency in circulation through the currency board and were not available to help the government cover its maturing long-term bonds. Argentina's international short-term debt to reserves ratio consequently overstated the reserves that were actually available to cover the government's maturing external debts.

The international debt to reserve ratio also did not take into account the potential demands for foreign exchange that could arise from a dollarized domestic banking system. Argentina's banks held a large number of dollar deposits and, as is typically the case, the banking system's dollar loans—

56. The real depreciation associated with floating threatened to dramatically increase the real burden of firms' dollar debt, household's mortgages, and dollar-denominated utility contracts. Clearly these contracts needed to be renegotiated in some manner. Argentina opted for an across-the-board redenomination of all domestic contracts into pesos (pesification), and the government defaulted on its remaining international debts. Most firms also defaulted on their international debt and entered into negotiations with their creditors. These steps are discussed in later chapters.

its assets—were longer-term and less liquid than its liabilities. The ability of Argentina’s central bank to act as a lender of last resort was limited because most of its reserves were pledged to back the currency. The central bank was aware of this risk: It had insisted that the banks maintain significant liquid dollar reserves, and had arranged a “contingent repo line” that would allow the banks to “repo” or sell their holdings of Argentina’s international sovereign bonds to a consortium of international banks to obtain dollars (cash) in the event of a run. These defenses, however, did not prove to be robust. When the government had difficulty rolling over its external debt, it turned—not surprisingly—to the banking system for emergency liquidity, eroding the bank’s liquidity buffer. The contingent credit line proved to be a double-edged sword. The government was concerned that its use would be counterproductive, as drawing on it could be interpreted as a signal of trouble,⁵⁷ and it did not provide anywhere near enough liquidity to assure payment to most depositors in the event of a generalized run.⁵⁸

Uruguay

Uruguay had many of the same vulnerabilities as Argentina, as well as the disadvantage of being in a bad “neighborhood”: During its 2002 crisis, both its large neighbors—Brazil and Argentina—were experiencing financial difficulties. Uruguay maintained a fixed peg before its crisis—a peg that was unsustainable following the collapse of Argentina’s currency board and the sharp fall in the Brazilian real. Uruguay’s banking system was heavily dollarized. The country’s banks had taken in dollar deposits from both Argentines and Uruguayans, but neither the banks nor the Uruguayan government held enough liquid dollar assets to be able to assure payment to all depositors in the event of a run. Uruguay’s banks had a smaller exposure to the Uruguayan government than Argentine banks had to the Argentine government. They also held a larger share of their assets abroad. These comparative strengths were not enough to avoid a run: Argentine citizens started pulling their money out of Uruguay’s banks in mass after bank deposits in Argentina were frozen, and Uruguayans

57. The size of the repo line also shrunk dramatically during the summer of 2002. Only certain bonds were eligible to be “repoed” through the facility. Argentina retired many of those bonds through the Brady restructuring for eurobond exchanges and retired many more in the megaswap. Poor coordination between the central bank and the ministry of finance contributed to Argentina’s inability to make sure that the new bonds it issued in the megaswap were eligible to be repoed. Consequently, this facility was not able to provide significant emergency liquidity in late 2001. Argentina did draw on part of this facility in the summer of 2001 when it secured the augmentation of its IMF package.

58. See Lagos (2002) and IMF (October 2003) for a more detailed account of Argentina’s crisis.

started to pull their own deposits out as well. As in Argentina, financial dollarization created extensive currency mismatches: Banks generally lent in dollars to both local firms and the government, and the real burden of these debts increased sharply after the devaluation. The usual combination of a currency crisis, banking distress, and a credit crunch combined with a sharp recession in Uruguay's largest trading partner to produce a large output contraction in 2002.

Uruguay entered its crisis with a slightly lower debt to GDP ratio than Argentina, but its debt was still substantial, and it swelled rapidly after the devaluation.⁵⁹ The central bank clearly lacked the reserves needed either to cover the government's financing needs or to act as a lender of last resort to Uruguay's financial system, forcing Uruguay to seek very large financial support from the IMF and, eventually, to restructure the government's external debt.

Conclusions

The weaknesses that gave rise to last decade's currency, financial, corporate, banking, and sovereign debt crises have not disappeared from the world economy.

Many emerging economies have significant government debt burdens and large financing needs. The list of countries with large debts includes those that have already experienced a crisis, notably Argentina, Brazil, Turkey, and Uruguay, as well as those that have, to date, avoided crises. However countries with high levels of debt—like Jamaica with a public debt to GDP ratio in excess of 150 percent—and with an increasing public debt ratio (like Colombia with a ratio in excess of 50 percent of GDP), a large fiscal deficit, growing domestic and external financing needs, and uncertain political ability to make the adjustments needed to stabilize their debt ratios are intrinsically vulnerable.⁶⁰ Lebanon remains a crisis waiting to happen.⁶¹ Even a number of former transition economies in central Europe are slowly building imbalances that could create medium-term vulnerabilities: the Czech Republic, Croatia, Poland, and Hungary

59. The public debt ratio to GDP rose to a very high level increasing from 37 percent of GDP in 2001 to 76 percent in 2002 and from 191 percent of revenues in 2001 to 381 percent in 2002.

60. See Arbelaez, Guerra, and Roubini (2005) for an analysis of debt sustainability in Colombia.

61. Lebanon recently showed some signs of stabilization due to both to a French-led bailout package and, in all probability, a reallocation of Middle Eastern savings away from the United States to local financial centers after September 11, 2001. However, its extraordinary debt burden, fixed exchange rate, and dependence on domestic banks to finance the government still leave it exceptionally vulnerable, particularly as its government appears unable to generate the significant primary adjustment needed to stabilize its debt to GDP ratio.

all have fiscal and current account deficits. While these economies' public and external debt stock ratios are not very large yet, they are increasing rapidly and are increasingly being financed in ways that create future vulnerabilities.

Maturity and currency mismatches remain endemic in emerging markets. Emerging markets are defined in many ways by the difficulties they face in borrowing long term in the local currency and thus by the heavy use of either a foreign currency in financial contracts or very short-term domestic-currency borrowing. Whether the predominance of financial contracts denominated in a foreign currency is a product of hard to eliminate "original sin" or something that can be altered through sustained implementation of sound policies, it remains an important source of vulnerability in emerging markets (Goldstein and Turner 2004). Countries with relatively high debt burdens and significant maturity and currency mismatches on their balance sheets are constantly at risk of slipping into crisis.⁶²

There are fewer fixed pegs in emerging economies, but those that remain are vulnerable. The Dominican Republic provides the most recent example of the dynamics associated with the collapse of a fixed rate peg in countries with extensive liability dollarization: The currency adjustment aggravated the country's banking crisis (originally triggered by widespread fraud) and led to a sharp sudden increase in the public debt ratio. Floating no doubt helps emerging economies navigate shocks if the float is reasonably free; but pressure on a float, including pressure stemming from the need to hedge foreign-currency debt, clearly risks leading to exchange rate moves that push those actors that are unable to hedge their foreign-currency exposure (including the government) into bankruptcy.

Even the fast-growing superstars of the emerging world—India and China—have significant vulnerabilities. Both have pegged or heavily managed exchange rates and weak banking systems. India has relied on its domestic financial system to finance large, persistent fiscal deficits. Public debt comprises over a third of the assets of the banking system; as in Argentina, Turkey, Ecuador, and Russia, bank financing of public deficits risks eventually destroying the banking system. China's debt levels would increase sharply, should the banking system's losses ever be formally recognized: Nonperforming loans are officially estimated to be about 42 percent of GDP and are likely to be significantly larger. Both countries also have important strengths: little external debt, large stocks of reserves, and vibrant economies. Their strong external position mitigates their domestic financial weaknesses. Both countries also have relatively closed capital accounts, which has limited the risk of domestic capital flight triggering a run on the banks and the currency. However, success-

62. See Rogoff, Reinhart, and Savastano (2003) for an analysis of how high debt ratios lead to "debt intolerance" and eventually default.

fully transitioning from closed to more open financial systems poses real challenges for both countries.

No doubt, emerging economies find it more difficult than advanced economies to borrow in ways that provide a country with more time to adjust to a range of shocks—including shifts in investor sentiment—without falling into a crisis. A history of financial and monetary instability—perhaps supplemented by structure—makes it harder for many, though not all, emerging economies to borrow in their own currency for long terms.⁶³ The solution here is simple: Countries that cannot borrow in ways that provide a cushion against a crisis need to borrow less.

Crises and runs—whether on banks, governments, countries, or currencies—stem from a combination of policy vulnerabilities, financial vulnerabilities, and investor behavior. The risk of a crisis increases along with the size of the borrower’s existing debt, particularly its stock of short-term debt, and its need to take on new debt to cover ongoing deficits. So long as these vulnerabilities are present, unexpected domestic political developments, worse than expected economic data, a crisis in a neighboring country, or any of the myriad potential shocks all can trigger financial trouble. The withdrawal of some short-term creditors may lead others to want to pull out as well.

The risk of a reversal in capital flows cannot be separated from the strength of country’s economic policies, just as the impact of a sudden swing in capital flows depends on how well an economy is prepared to withstand such pressures. The risk is not so much that a run will bring down a fundamentally sound economy. Weaknesses obscured when global markets are more forgiving are still weaknesses. Rather the risk is of a run overwhelming a country with real but potentially correctable problems, leaving it—and its creditors—worse off.

63. See Eichengreen, Hausmann, and Panizza (2002) for the idea that imperfections in capital markets make it impossible for emerging-market economies to borrow abroad long term in their own currency (the “original sin” hypothesis) and Goldstein and Turner (2004) for a challenge to the argument that external liability dollarization is structural and irreversible.