4 The Benefits and Risks of Short-Term Borrowing

THE RECENT FINANCIAL CRISES IN EAST Asia, Russia, and elsewhere, and the earlier crisis in Mexico, have heightened interest in the subject of short-term borrowing by developing countries and the benefits and risks associated with such debt.[1] This chapter examines the growth and determinants of short-term debt from international banks, the behavior of such debt during economic shocks, and its association with financial crises in the 1990s. The chapter's key messages are the following:

- In the 1990s, the maturity structure of bank lending flows to many developing countries shortened. Between 1990 and 1997, the outstanding short-term claims by Bank for International Settlements (BIS) banks on developing countries nearly tripled, from $176 billion to $454 billion. Short-term claims held by banks reporting to the BIS rose from 12 percent of total developing-country debt in 1990 to 20 percent in 1997, at the onset of the recent financial crises. Short-term lending by international banks increased rapidly despite a falling share of international bank lending in total private debt flows to all developing countries, and despite flat or declining indebtedness of developing countries relative to their exports and GDP. The fastest growth in short-term debt occurred in East Asian countries, followed by Latin American countries.
- A combination of factors—on both the lenders' side and the borrowers' side—caused this rapid buildup in short-term bank lending. Although this lending was associated with some significant benefits, such as the financing of growing trade, policy-induced distortions and cyclical influences also contributed to the buildup and to higher risks. The recession of the early 1990s and lower interest rates in industrial countries encouraged international banks to lend more short-term to developing countries. Source-country policy factors such as capital adequacy regulations tended to favor shorter-term lending by banks, and international rescue efforts (as in Mexico in 1994) tended to give precedence to short-term banking claims. In developing countries, cyclically rapid growth in the 1990s (in East Asia, in particular) contributed to rapid growth in short-term financing that was linked to unsustainable domestic asset booms. Domestic policies, especially the rapid opening and liberalization of financial sectors (such as in the Republic of Korea and Thailand) without strong prudential regulations, together with sterilization efforts in support of pegged exchange rates and imbalances in macroeconomic policies, also encouraged domestic banks to borrow short-term from abroad.
- Short-term bank lending to developing countries is procyclical, rising during favorable periods and reversing more sharply in times of adverse shocks. This pattern is observed across cyclical domestic demand shocks as well as external terms-of-trade shocks. While the procyclical response of short-term debt to changes in demand from a borrowing country need not be a cause for concern, such behavior in response to external shocks can substantially accentuate the impact of the shock. The evidence contradicts the conventional wisdom that external financing may help countries smooth consumption or temporarily

adjust to economic shocks. While longer-term debt (and perhaps equity) flows may also tend to be procyclical, such response is more pronounced in the case of short-term banking debt. And credit ratings, which influence the quantity and price of capital flows, tend to be downgraded more rapidly during adverse shocks than they are upgraded during favorable ones, exacerbating crises.

- Short-term debt in excess of short-term liquidity (as measured by holdings of foreign reserves) increases developing countries' vulnerability to financial crises. The risk of crises also appears to rise with the share of short-term borrowing by domestic banks. The interaction of deteriorating fundamentals (such as overvalued currencies and excessive public borrowing) and high levels of short-term debt appears to have played a significant role in recent crises. For countries with open capital accounts and high levels of financial intermediation, the level of broad money, and high levels of domestic short-term debt, relative to international reserves is also important, because of the potential for domestic capital flight.
- Given these risks, close monitoring and effective management of short-term debt (in particular, of that intermediated by domestic banks) are essential in developing countries to avoid currency and liquidity crises. Existing reporting systems fail to capture a significant part of potentially reversible short-term components of capital flows.[2] Therefore, developing countries need to make a greater effort to monitor short-term borrowing by their banks and financial institutions. Chapter 5 discusses some incentives and controls designed to limit vulnerability to crisis in the short term.

Growth of short-term debt in the 1990s

The 1990s marked a boom in short-term lending by international banks to developing countries that lasted until the series of crises that began in 1997. The total debt of developing countries rose around 60 percent, from about $1.5 trillion in 1990 to $2.3 trillion in 1997. During the same period, outstanding short-term debt by remaining maturity (the BIS definition of short-term debt)[3] grew nearly 160 percent, from $176 billion to $454 billion. Consequently, the share of short-term claims by BIS-reporting banks in total debt increased from 12 percent in 1990 to 20 percent in 1997, before declining to 15 percent in 1998, as short-term debt flows reversed dramatically in the aftermath of the recent financial crises (table 4.1). Short-term debt also rose relative to other critical variables indicating liquidity and debt-servicing capacity, namely, exports and reserves. The ratio of short-term debt to exports in developing countries increased from 21 percent to 27 percent during the 1990–97 period. And whereas the average ratio of short-term debt to reserves declined markedly in the late 1980s for all developing countries and remained relatively stable in the 1990s—largely because of the decline in short-term debt to Latin America after the Brady bond conversions, and higher additions to reserves—it remained precariously close to 1 (the critical safe threshold as will be discussed later in this chapter). In East Asia, in contrast, short-term debt not only exceeded the safe threshold but increased dramatically during the 1990s until the crisis of 1997.

The fastest growth in short-term debt occurred in East Asia and Pacific, where the share of short-term debt in total debt outstanding rose from 20 percent to a peak of about 32 percent between 1990 and 1996. The rapid buildup of short-term debt by this region is also evident from the ratio of short-term debt to exports, and even more dramatically from the ratio of short-term debt to reserves. The latter ratio increased from 124 percent in 1990 to 214 percent in 1997. Short-term debt also grew rapidly in Latin America between 1990 and 1997, although at a slower pace than in East Asia. But unlike in East Asia, larger additions to reserves in Latin America helped to hold down the ratio of short-term debt to reserves there. During 1994–97, East Asia and Pacific received 45 percent, and Latin America and the Caribbean received 31 percent, of all short-term debt flows to developing countries. The top 10 recipients of short-term loans during this period were Korea (with 15 percent of the total), Thailand (11 percent), Brazil (10 percent), Indonesia (8 percent), Mexico (8 percent), China, Argentina, Russia, South Africa, and Malaysia.

Short-term lending by international banks to developing countries increased rapidly despite a falling share of their lending in total private debt

Table 4.1 Short-term debt of developing countries, 1986–98

	1986	1990	1994	1995	1996	1997	1998
Short-term debt, GDF definition *(billions of U.S. dollars)*	154.2	244.6	360.5	424.4	460.8	469.3	411.9
Short-term claims by BIS-reporting banks, BIS definition *(billions of U.S. dollars)*	159.9	175.6	293.9	351.9	410.6	454.1	369.1
Short-term debt (GDF) as percent of total debt	14	17	18	20	21	20	16
Short-term debt (BIS) as percent of total debt	14	12	15	16	18	20	15
East Asia and Pacific	16	20	25	29	32	30	18
Latin America and the Caribbean	19	14	17	17	19	22	20
Short-term debt (BIS) as percent of exports	33	21	25	25	26	27	23
East Asia and Pacific	26	24	28	30	33	29	. .
Latin America and the Caribbean	76	39	44	39	42	45	44
Short-term debt (BIS) as percent of reserves	198	119	91	91	88	91	68
East Asia and Pacific	181	124	123	143	153	214	92
Latin America and the Caribbean	257	143	101	86	84	91	93
Memo items (billions of U.S. dollars)							
Total debt outstanding of low- and middle-income countries	1,132.4	1,460.3	1,969.1	2,139.5	2,229.4	2,326.4	2,536.1
Exports of goods and services of developing countries	483.7	818.2	1,154.6	1,414.1	1,566.0	1,693.4	1,633.0
Gross international reserves of developing countries	180.5	245.4	433.9	543.0	624.2	650.6	699.1

Note: The GDF definition uses the original maturity concept of short-term debt, while BIS uses remaining maturity. The GDF estimate of short-term debt also includes suppliers' credits.
Source: World Bank; Bank for International Settlements.

flows, and despite flat or declining ratios of indebtedness to exports and GNP in the developing countries.[4] This was very different from the 1970s, when borrowing from international banks was the main source of private capital flows to all developing countries, and bank lending rose sharply in the years of the oil price increases as international banks recycled petro-dollars from oil-exporting to oil-importing countries (see box 4.1). Following the collapse of such lending in the wake of the debt crisis in the early 1980s, international bank lending to developing countries fell precipitously. The 1990s witnessed a renewed upsurge in private capital flows, but this time in the form of foreign direct investment (FDI), international bond placements, and portfolio equity flows (see World Bank 1993, chapter 1; Mussa and others 1999). As a result, the share of bank lending in total debt outstanding to developing countries fell continuously until about 1995 (figure 4.1). Developing-country indebtedness surged in the 1970s and the first part of 1980s, but the debt-to-GNP ratio has remained virtually flat since 1988, whereas the debt-to-exports ratio has declined sharply since the mid-1980s. The growth in the short-term debt of developing countries in the 1990s thus reflected the fact that international banks were lending more short-term even as they were reducing their overall loan portfolios to developing countries and even as they were reducing their exposure in terms of their capital at-risk.

Figure 4.2 shows the shortening of maturity of international bank lending to all developing countries during the 1990s, at least until the spate of global financial crises that began in 1997. (The data on remaining maturity of bonds also show a rising trend in the proportion of short-term bonds for all regions between 1985 and 1998; see Mussa and others 1999.) By 1997 close to 60 percent of all outstanding international bank claims on developing countries had a remaining maturity of less than 1 year, and some 50 percent of all new loans from international banks were being contracted on original maturity terms of a year or less. Among other factors, regulatory distortions and cyclical influences were important reasons for this shift (see the next section). The result was that developing countries, especially in East Asia, became increasingly reliant on short-term external debt flows being rolled over, and, therefore, became particularly susceptible to liquidity crises originating from any sort of shock to international investors' confidence.

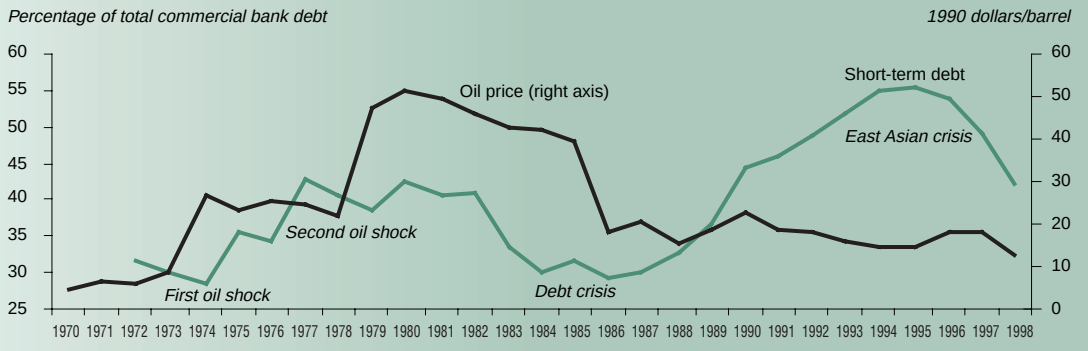
The other noteworthy trend in flows of bank debt in the 1990s was a substantial increase in the share of private sector borrowings, especially interbank transactions. Unfortunately, although the BIS publishes the allocation of total bank claims to public agencies, commercial banks, and the private nonbanking sector in developing countries, very little information is available on the sectoral alloca-

Box 4.1 Déjà vu? Surges in short-term bank lending and crises in the 1970s and the 1990s

An association between excessive growth in short-term banking debt and subsequent financial crises can be observed in the late 1970s as well as in the 1990s. In both episodes there was a rapid shortening of maturities of international bank lending to developing countries prior to the crises (see figures).

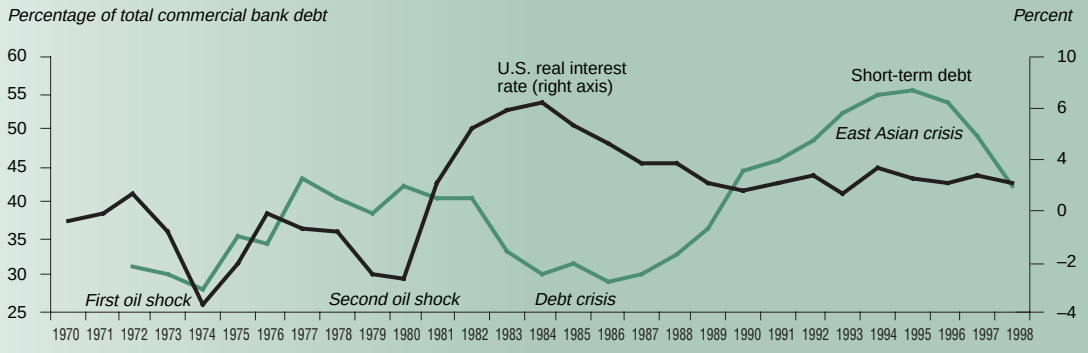
There were also important differences, however. The surge in short-term lending in the late 1970s to a large extent reflected the recycling of petro-dollars that could not find higher returns in the industrial countries; in the 1990s, in contrast, the cyclical downturn in interest rates in industrial countries was only one driving force behind the surge in short-term lending. Second, lending in the 1970s was primarily from private banks to the public sector in developing countries for the purpose of financing fiscal deficits and state enterprises. The short-term debt of the 1990s, on the other hand, went primarily to the private sector in developing countries and was largely intermediated by local commercial banks. Third, whereas in the 1970s international banks became highly exposed in terms of capital at risk in their lending to developing countries, international banks in the 1990s carried much less risk capital exposure. This was largely the result of their divestment of such risks during the 1980s, but also because of BIS prudential banking regulations and in part the substitution of bonds, equity, and FDI flows for bank loans. However, domestic banking systems in developing countries now became exposed to significant currency and liquidity risks through their short-term borrowing in foreign currency and their onlending to domestic corporations to finance longer term investments.

Shortening of debt maturity and oil price



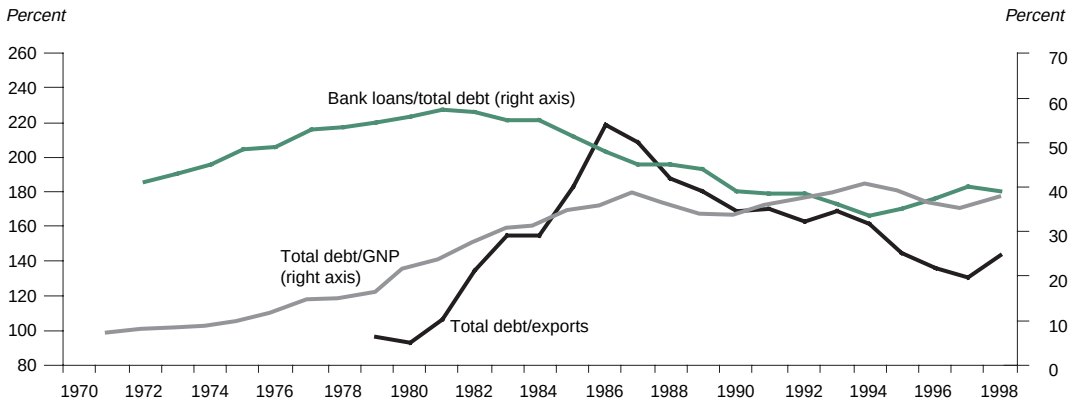
Source: World Bank staff estimates.

Shortening of debt maturity and U.S. real interest rates



Note: U.S. real interest rate is the rate on the 10-year U.S. Treasury bond minus inflation.
Source: World Bank staff estimates.

Figure 4.1 Debt stock of developing countries, 1971–99

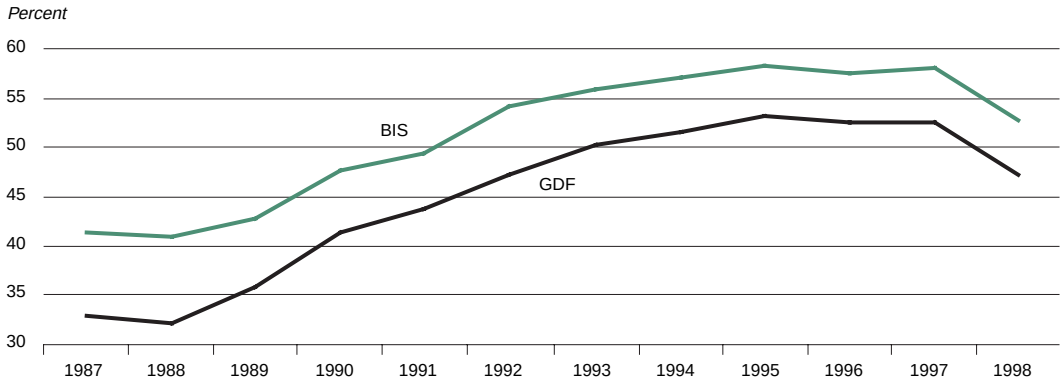


Source: World Bank Debtor Reporting System.

tion of short-term debt. However, an examination of the subset of syndicated loan transactions reveals that, in recent years, more than 42 percent of short-term syndicated loans to emerging markets went to financial institutions (table 4.2). Almost one-third of short-term syndicated debt was contracted by commercial banks. Compared with a decade earlier, the shares of short-term debt contracted by oil and gas enterprises and by government agencies fell significantly, while that of financial institutions increased.

Interestingly, external short-term debt (as a share of international bank lending to developing countries) going directly into the property sector has always been small, even though there was rapid growth in domestic credit to this sector in recent years. This is consistent with the view that intermediation by international banks across borders to high-risk property sectors is very rare, because of information and enforcement problems. Instead, domestic banks in emerging markets—especially in East Asia—borrowed short-term foreign debt at relatively low interest rates and onlent to property companies (and others) at significantly higher rates. Such borrowing and lending activities involved risks of currency devaluation and maturity mismatch between assets and liabilities, but these were indirectly encouraged by pegged exchange

Figure 4.2 The share of short-term loans rose in the 1990s



Source: Bank for International Settlements; World Bank Debtor Reporting System.

Table 4.2 Sectoral composition of short-term syndicated lending to emerging markets, 1980–99
(percentage of total)

Borrower	1980–84	1985–89	1990–94	1995–99
Financial institutions	8.1	24.7	32.7	42.2
Commercial banks	7.8	23.8	19.2	29.5
Commercial and industrial	55.7	53.4	46.2	36.3
Oil and gas	15.8	31.4	17.2	12.7
Property	0.3	0.0	0.9	0.7
Agribusiness	5.5	10.5	10.8	3.5
Utilities	14.1	0.0	3.2	7.2
Transportation	2.7	3.8	7.1	2.3
Government/agencies	11.1	18.0	10.2	11.8
Other	8.4	0.0	0.6	0.2

Source: Capital Data Loanware.

rates and the belief that economic growth and asset booms would continue for a long time.

Causes of the shortening of banking debt maturity in the 1990s

A number of factors may have influenced the shortening maturity structure of international bank lending to developing countries in the 1990s. An examination of these factors allows an evaluation of the relative benefits and risks of the growth in external short-term debt. The clearest benefits flow from the ability to match the maturity of an asset and the currency in which it is denominated (for example, inventories of imported raw materials or export accounts receivable in foreign currency). But if short-term debt is used for investments of longer maturity and in domestic currency, the liquidity and currency risks associated with such borrowing rise correspondingly. Furthermore, it is the final use to which the money is put at the margin that determines the ability to repay the debt and is therefore relevant for risk assessment.

Many factors may influence international banks' preference to lend at shorter maturity and borrowers' willingness to borrow on such terms. One reason for banks in industrial countries to lend short-term to emerging markets is that longer maturities carry greater risks. (This is true from the standpoint of an individual bank, but there is an externality: bank loans may become collectively more risky if their maturity becomes excessively short relative to uses.) This is reflected in the pricing of debt: typically, the shorter the term of a loan, the lower the interest rate. Short-term lending by banks may also simply reflect the fact that a large share of the liability side of a bank's balance sheet consists of short-term deposits. From the perspective of borrowers in a developing country, short-term borrowing provides the advantage of lower interest rates. And to the extent that such short-term borrowing is used to finance short-term working capital needs—such as trade financing—the associated risks are low. Short-term lending then provides both benefits to borrowers and reasonable returns to lenders. But in practice, lending and borrowing decisions may also reflect the influence of policy-induced distortions and cyclical factors that may lead to excessive risk-taking and short-term borrowing.

The analyses of this section suggest three central messages:

- The growth of short-term debt in the 1990s seems to have accompanied some desirable developments in borrowing countries, such as higher incomes, stronger GDP growth, and greater opening to trade. But these factors explain only a part of the rapid growth in short-term debt flows in the 1990s.
- Short-term borrowing by developing countries from international banks was also strongly associated with high levels of borrowing by domestic banks and financial institutions, which may have fueled speculative asset booms in Asia and elsewhere. Domestic policy factors, especially accelerated financial deregulation and capital account liberalization without stronger prudential regulations, contributed to the shortening of maturities and to overborrowing by banks and financial institutions. Short-term borrowing was also encouraged by sterilization of inflows to support pegged exchange rates. Other macroeconomic imbalances may have also contributed potentially to a shortening of maturity.
- External "push" factors were also responsible for higher levels of short-term lending to developing countries. Cyclically lower interest rates in industrial countries in the 1990s pushed international banks to lend more short-term, exposing borrowing countries to greater liquidity risks. And policy factors such as capital adequacy regulations (and the moral hazards created by past international regulatory behavior) favored rising short-term lending by international banks.

Table 4.3 Possible determinants of the shortening maturity of bank lending to developing countries

	Structural factors	Cyclical factors	Institutional and policy factors
Push factors	New technology and telecommunications improve information sharing and reduce transactions costs. Technical innovation and new financial instruments improve risk monitoring and management of complex portfolios.	*Low interest rates and slow growth in industrial countries encourage investment in developing countries. Regional push factors may also play a role, as in the case of bank lending to East Asia.	*BIS regulation on capital adequacy encourages short-term exposure. *Rescue packages (as in Sweden in 1992 and Mexico in 1995) target short-term loans first, leading to moral hazard.
Pull factors	Greater openness to trade increases trade volumes and leads to higher trade credits. Deregulation of domestic sectors permits foreign investment and leads to greater requirements for working capital. Rising incomes per capita and declining indebtedness improve market access. Financial development leads to a deeper domestic debt market.	*High interest rates and rapid growth in emerging markets, often accompanied by high returns from asset booms, attract short-term capital inflows. Larger current account deficits and faster economic growth lead to increased demand for external debt. *Substitution of foreign borrowing for domestic loans allows borrowers to take advantage of lower interest rates.	*Tax and other incentives (e.g., the Bangkok International Banking Facility) encourage short-term borrowing. *Rapid capital account liberalization enables domestic borrowers to access international capital markets. Deregulation of domestic banks prompts borrowing from abroad. *Sterilization of capital inflows maintains a high interest rate differential while preventing nominal currency depreciation.

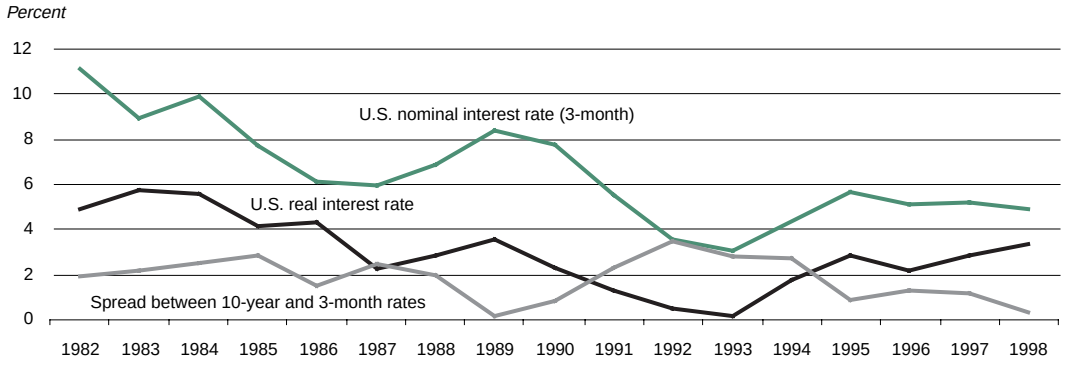
Note: Asterisks denote policy-induced distortions or cyclical influences that may have contributed to overborrowing short-term.

Table 4.3 outlines a number of factors that in principle may affect the maturity structure of lending by international banks and borrowing by developing countries. Within each of these categories, the table identifies those policy-induced distortions or cyclical influences that may have led to excessive and more risky forms of short-term borrowing, as distinguished from other factors that were more structural and market-driven. Many of these push and pull factors have been shown to have influenced the *level* of debt and nondebt capital flows to developing countries.[5] The following discussion shows that these factors may have also affected the *maturity* of bank debt flows to developing countries, by causing a larger change in short-term debt than in longer term debt.[6]

(a) *Structural and market factors:* Since the mid-1980s, many emerging market economies have undergone significant structural changes, including greater opening to trade, rising incomes, and financial deepening. These changes induced greater short-term borrowing. Increased opening to trade was an especially important factor, and a strong positive (and beneficial) relationship between trade openness and short-term debt is expected and supported by the recent evidence.[7] Faster growth, rising incomes per capita, and financial deepening were other factors structurally associated with rising short-term borrowing in the 1990s. Public borrowing (viewed as more secure) also gave way to private debt, as a number of public enterprises were privatized and as governments in emerging markets, particularly East Asia, began to pay off debt out of their fiscal surpluses. This switch from public to private borrowing reduced longer-term borrowing; it also involved a more decentralized decisionmaking and increased the chances of over-borrowing. At the same time, financial innovation and competition may have induced more short-term lending by international banks. These banks faced greater competition from FDI, bonds, and portfolio equity at the long end of the maturity spectrum. They also shifted away from more traditional, relationship-based business to the use of new financial instruments that enabled portfolio diversification to a wider range of asset classes and encouraged wholesaling. This, too, favored shorter-term investments. New technology and telecommunications improved information sharing, risk monitoring, and management of complex portfolios on a real-time basis with reduced transaction cost, thus enabling and encouraging frequent, short-term trading in financial instruments.

(b) *Cyclical influences:* The early 1990s saw a fall in inflation and interest rates in industrial countries (figure 4.3), accompanied (and partly caused) by recession in 1991. Lower interest rates were an important push factor for short-term

Figure 4.3 U.S. interest rates declined and the spread between 10-year and 3-month rates widened in the early 1990s



Note: U.S. real interest rate is the nominal interest rate minus CPI inflation.
Source: Bloomberg.

lending to developing countries. A scarcity of opportunities at home and high short-term interest rates in emerging market economies prompted rapid growth in short-term cross-border bank flows. Conversely, many developing countries used short-term credit from abroad to finance cyclically high investment rates (which were in excess of already high savings rates, particularly in Asia), taking advantage of the relatively low interest rates in the industrial countries.

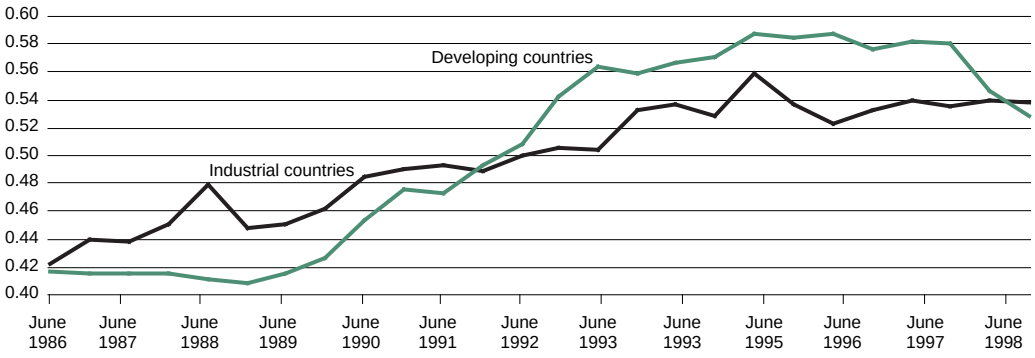
(c) *Policy-induced distortions:* Domestic policies in developing countries and developments in prudential regulation in the Group of 10 (G-10) industrial countries also affected the maturity structure of debt. The deregulation of financial sectors and the liberalization of capital accounts in the absence of sufficient prudential regulation and supervision may have prompted more short-term borrowing by domestic banks, reflecting their shorter-term lending patterns (to domestic customers) and the unwillingness of international banks to lend long-term to these new borrowers. Tax and other incentives (such as Thailand's BIBF facility) further encouraged this.[8] The potential for maturity and currency mismatches and systemic risks was also encouraged by the tendency of many central banks in developing countries to *peg exchange rates and engage in sterilization efforts* (World Bank 1998; Calvo 1991, 1998; Montiel and Reinhart 1999). In source countries, the moral hazard associated with recent experiences (Swedish banking crisis, Mexican crisis) may also have encouraged excessive risk-taking by banks, especially with regard to short-term loans to other banks. The maturity structure of debt may also have been influenced by BIS regulations on minimum capital adequacy for banks which uses a risk weight of 20 percent for short-term lending to non-OECD countries compared to 100 percent for lending of over one year maturity (figure 4.4).[9]

The response of short-term capital flows to economic shocks

One potential advantage from financial integration is consumption smoothing (Obstfeld 1994, 1998). The estimates of the benefits of consumption smoothing in industrial countries vary widely, from nearly 0 percent of lifetime consumption (Cole and Obstfeld 1991; Backus, Kehoe, and Kydland 1992; Mendoza 1995; Tesar 1995) to a very significant fraction of lifetime consumption (van Wincoop 1994; Obstfeld 1995)—indicative of the methodological problems in measuring such gains. Still, when the global capital market allows countries to smooth consumption, one would expect that the growth path of aggregate consumption is less volatile than that of aggregate income. Secondly, growth of consumption across countries that are financially integrated should show a much higher correlation than growth of income. These two implications of models of

Figure 4.4 Debt maturity shortened in non-OECD countries after the BIS regulations in 1988

Short-term debt/total BIS bank claims (percent)



Source: Bank for International Settlements.

international risk-sharing are, however, rejected in practice, which sheds some doubt on whether financial markets are sufficiently integrated to allow consumption smoothing through a countercyclical response of international capital flows.[10]

From the standpoint of a borrowing country, the benefits of integration discussed above arise mainly when short-term debt is countercyclical and determined by demand side (pull) factors. However, if lender decisions and other factors make access to short-term capital flows procyclical, a favorable shock may attact large capital inflows and encourage consumption and investment that are unsustainable in the longer term (see World Bank 1993, p. 20); or, on the downside, countries may be forced to overadjust to adverse shocks when capital flees. This is also consistent with findings in the literature that public debt (and fiscal policy) in developing countries, especially in Latin America, tends to be highly procyclical (in sharp contrast to industrial countries) because access to international borrowing is tighter under adverse conditions and vice-versa (Easterly, Islam, and Stiglitz 1999).

Do short-term capital flows to developing countries, in particular, behave more procyclically than countercyclically? Is this behavior exacerbated in the face of different types of shocks? And how do risk-ratings (which influence the quantity and price of capital flows) change in the face of favorable or adverse economic shocks? The evidence in answer to these questions is examined below, using data on short-term capital flows to 20 major developing-country borrowers between 1987 and 1998. The principal findings:

- Short-term capital flows appear to be procyclical in developing countries, growing when economic growth is cyclically faster, and slowing when growth rates falter. This, by itself, is not necessarily a cause for concern, as it may be responding to changes in demand from developing countries. Short-term capital flows tend to be more procyclical than medium- and long-term capital flows.
- However, when the procyclicality arises from external supply-side factors, it can substantially accentuate the impact of a shock. A procyclical response is found when countries face adverse external economic shocks, such as external terms-of-trade shocks. The procyclical response is typically twice as large when a developing country faces adverse shocks than when it faces favorable shocks. And creditworthiness ratings are downgraded more rapidly during adverse shocks (than they are upgraded during favorable ones), thereby exacerbating effects.

Short-term capital flows are procyclical to growth. The relationship between growth in short-term debt and growth rates in developing countries is positive and significant in virtually all developing countries, although this relationship is stronger in some countries than in others (see figure 4.5).

Box 4.2 The determinants of maturity structure of borrowing from international banks

The main text has identified a number of factors that may influence the maturity structure of borrowing by developing countries from international banks in the 1990s. This box provides an empirical assessment of the significance of some of these factors. There are a number of well-known problems with such an exercise. In particular, the cause and effect relationships between maturity structure and some of the explanatory variables (such as growth, income levels, and trade) are often difficult to discern, demand and supply factors are both involved, and measures of some of the policy variables (for example, capital account openness or effects of prudential regulations) are problematic. Therefore, these results need to be treated with caution and as indicative.

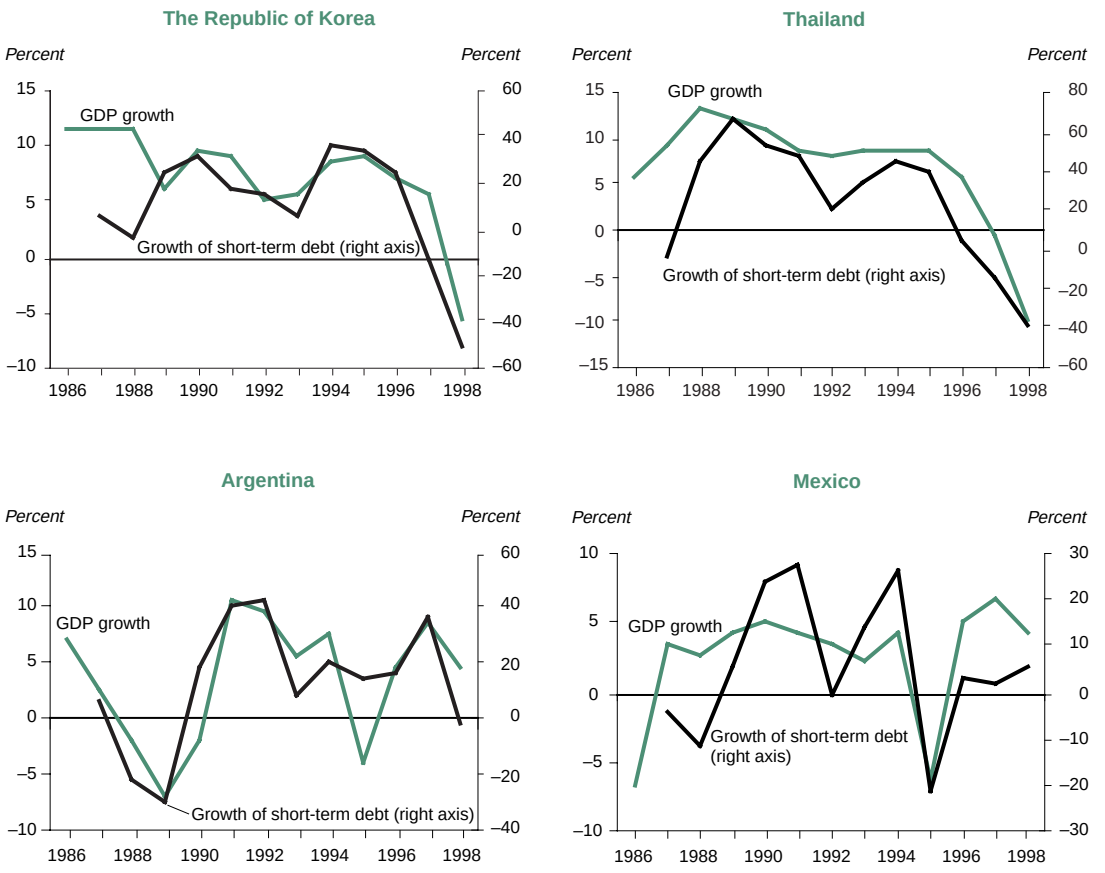
The analysis (following Rodrik and Velasco 1999) is based on panel data for 33 developing countries that accounted for over 80 percent of short-term borrowing by developing countries between 1986 and 1998. The share of short-term debt (based on the BIS remaining maturity concept) in total claims by BIS-reporting banks on these countries is regressed against a set of variables: (a) *structural*—the (log of) per capita GNP as a proxy for the level of development and trade openness; (b) *cyclical*—the difference between the growth rate of each developing country and that of industrial countries as a group, U.S. dollar 3-month LIBOR; and (c) *institutional and policy factors*—borrowing by domestic banks (reflecting, imperfectly, effects of financial deregulation), capital account restrictions (a variable that takes the value 1 in the presence of restrictions and 0 otherwise, based on IMF 1997), and a variable for BIS capital adequacy regulations (that takes the value 1 during 1992–98 when it became effective, and 0 earlier). Results are presented in the box table. Inclusion of a time trend was not significant. The evidence tends to support the discussions in the main text. Per capita incomes and trade structural variables appear to account for about half of the increase in short-term borrowing, suggesting the beneficial association of short-term debt with these factors; the other half appears to be accounted for by policy and cyclical factors (approximately 30 percent and 20 percent respectively). Among cyclical variables, faster GDP growth in borrowing countries seems to attract more short-term flows, while a decline in interest rates in industrial countries appears to provide an incentive for short-term lending and borrowing. Among policy factors, an increase in short-term loans tends to be associated with the growth in interbank lending (reflecting financial deregulation), the opening of capital accounts, and with the effect of BIS regulations. When borrowing by domestic banks is replaced by a more direct financial liberalization indicator, the results are again significant for seven major countries for which information is available; this is consistent with other findings that financial liberalization shortened the maturity of corporate debt in these countries (Schmukler and Vesperoni 2000).

Determinants of the maturity structure of debt, 1986–98

	(A)	(B)
Per capita income (log GNP)	10.439***	10.952***
Trade openness (trade/GDP, lagged)	0.0905*	0.119**
Borrowing by domestic banks from BIS banks as a share of GDP (reflecting financial deregulation)	0.792***	0.740***
Borrowing by public sector from BIS banks as a share of GDP	–0.270**	–0.281**
Difference between growth rate of each developing country and that of industrial countries as a group	0.281***	
International interest rates (U.S. dollar LIBOR)		–0.543*
BIS/capital adequacy regulation dummy (1992–98=1)	1.936*	
Capital account restrictions dummy	–3.473*	–4.619**
Adjusted R^2	0.31	0.30
Number of observations	413	414

*** significant at the 1 percent level; ** significant at the 5 percent level; * significant at the 10 percent level.
Note: The dependent variable is share of short-term claims (using remaining maturity) in total BIS bank claims. Results are from fixed effects specification. Columns (A) and (B) report alternative specifications to account for some collinearity between cyclical variables (growth and interest rates). The panel covers the period 1986–98 and includes 33 countries—Algeria, Argentina, Bangladesh, Brazil, Bulgaria, Cameroon, Chile, China, Colombia, Ecuador, the Arab Republic of Egypt, Ghana, Hungary, India, Indonesia, Jordan, the Republic of Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Panama, Peru, the Philippines, Poland, Romania, South Africa, Thailand, Tunisia, Turkey, Republica Bolivariana de Venezuela, and Zambia.
Source: Botman, Dasgupta, and Ratha 1999.

Figure 4.5 Short-term debt is procyclical to growth



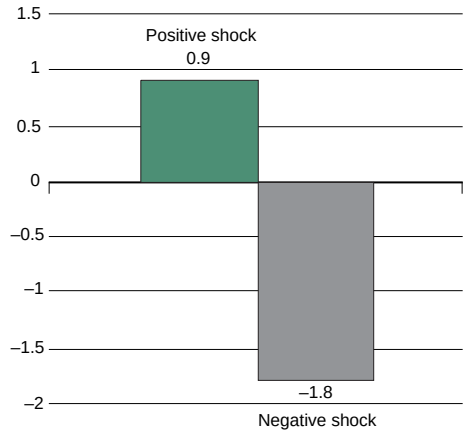
Source: Bank for International Settlements; World Bank *Global Economic Prospects*, various years.

This appears to be partly a function of the importance of the domestic banking system and its relative openness to foreign flows, although other factors may also be important. Short-term flows are usually more procyclical than medium- and longer-term debt flows. The finding here is consistent: elasticity of short-term debt with respect to GDP growth rate is 2.1 compared to 0.9 for long-term debt.

Short-term flows are procyclical to economic shocks, especially adverse shocks. For the purposes of measuring the behavior of short-term flows during good or bad times, economic shocks are defined as periods of either favorable or adverse outcomes relative to the mean values of the economic variable under consideration. This involves partitioning the sample into good or bad times and then looking at the behavior of short-term debt flows within each partition.[11] Two types of economic shocks, in turn, are considered: (a) shocks to GDP growth and (b) shocks to terms of trade facing a country. The key indicator used is the estimated elasticity of short-term debt with respect to GDP growth rate. Cyclical response of short-term debt to the different types of shocks is then inferred from the size and sign of this estimated elasticity during favorable or adverse times.[12] The behavior of risk perception by foreign investors (such as credit ratings) in response to economic shocks is also investigated.

Short-term debt is procyclical, and especially so during adverse growth shocks. When GDP growth experiences a positive shock (one-half standard deviation higher than mean growth rate),

Figure 4.6 Short-term declines more during adverse shocks to GDP growth than it increases during favorable shocks



Source: World Bank staff estimates.

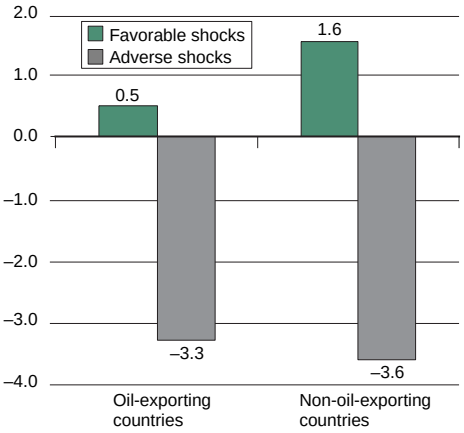
the elasticity of short-term debt growth with respect to GDP growth is about 0.9, but in adverse shock (when GDP growth is lower than the mean by one-half standard deviation), short-term debt growth falls twice as fast with an elasticity of 1.8 in the latter case (figure 4.6). By way of contrast, the elasticity of medium- and long-term debt with respect to GDP growth rate is negative (although statistically not significant) for both positive and negative shocks to GDP (at –0.41 and –0.3 respectively), suggesting weak countercyclical behavior to shocks to GDP. However, it is difficult to distinguish between demand and supply effects in the procyclical response of short-term debt to growth shocks. Therefore an examination of terms-of-trade shocks is important, since they tend to be more exogenous.

An analysis of terms-of-trade shocks reveals a similar pattern of procyclicality as in the case of growth shocks, and greater procyclicality during adverse shocks. The panel data is once again partitioned according to positive and negative terms-of-trade shocks, which are defined respectively as greater than the mean growth rate plus half the standard deviation of terms-of-trade growth, and less than the mean minus half the standard deviation. The estimated elasticity of short-term debt with respect to GDP for the partition with positive terms-of-trade shock is 0.8, compared to 1.8 for the partition with negative terms-of-trade shock.[13] Separating the oil-exporting countries from the others in the panel of 20 countries does not alter this conclusion—the elasticity of short-term debt to growth in either case is higher during below-average growth in terms of trade than during above-average growth—although procyclicality in short-term flows is greater in the non-oil-exporting countries (table 4.4 and figure 4.7). This asymmetry in procyclicality between oil-exporting and non-oil-exporting developing countries may be explained in terms of the generally better access of the former countries to international capital markets.

Finally, there is evidence of a nonlinear relationship between risk perception by creditors and economic shocks in developing countries, which lies at the heart of the greater procyclical response of short-term debt to adverse shocks. Perceived risk may increase more during a large adverse shock than it may decline during a small adverse or even positive shock. The following table presents estimates of the responsiveness of one measure of risk perception, the Institutional Investor Risk Rating, to shocks in GDP growth.

The responsiveness of risk ratings is significantly adverse during times when GDP growth is below the average than it is positive when growth is

Figure 4.7 Short-term debt declines more during adverse shocks to terms of trade than it increases during favorable shocks



Source: World Bank staff estimates.

Table 4.4 Elasticity of short-term debt with respect to the GDP growth rate during terms-of-trade shocks

Country group	Periods with above-average growth in the terms of trade	Periods with below-average growth in the terms of trade
Oil-exporting countries	0.52	3.29*
Non-oil-exporting countries	1.58**	3.62***

*** significant at the 1 percent level; ** significant at the 5 percent level; * significant at the 10 percent level.
Note: Results are from a panel of 20 countries for the period 1987–98. For list of countries, see note to figure 4.8.
Source: World Bank staff estimates.

above average. This is also consistent with other findings (see chapter 2) that credit rating downgrades are associated with high volatility in loan spreads, and that the behavior of credit rating agencies aggravated the East Asian crisis—by downgrading countries more than would have been justified by fundamentals alone, and thereby raising spreads and reducing access to capital sharply (Ferri, Liu, and Stiglitz 1999). Risk rating goes up (creditworthiness improves) if GDP growth is above the mean, but it falls even more (that is, creditworthiness worsens) when the growth rate dips below the average. This nonlinear response to change in growth rates is more pronounced in East Asia than in Latin America. Although not shown in the table, this relationship has become more important during the period 1993–98 compared to 1986–92 (table 4.5 and figure 4.8).

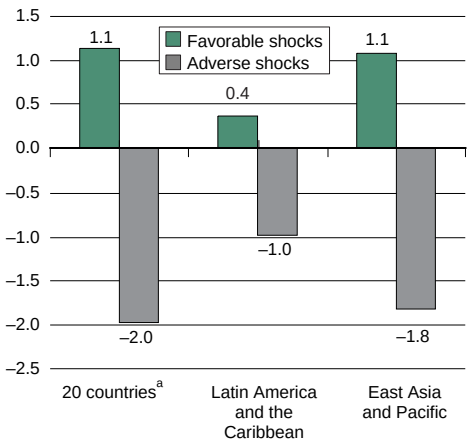
There may be two principal reasons behind the finding of procyclical behavior of short-term capital flows: (a) the prevalence of large and frequent economic shocks in developing countries; and (b) information asymmetry problems between lenders and borrowers. Economic shocks tend to be larger and more frequent in developing countries (figure 4.9), reflecting their narrower economic bases and greater dependence on primary commodity exports, and often resulting in marginal creditworthiness. Thus, changes in risk perception and rating down-

Table 4.5 Elasticity of risk rating with respect to shocks to the GDP growth rate

Country group	Periods with above-average growth in GDP	Periods with below-average growth in GDP
All 20 countries[a]	1.14	1.98***
Latin America and the Caribbean	0.38	0.99**
East Asia and Pacific	1.09**	1.83***

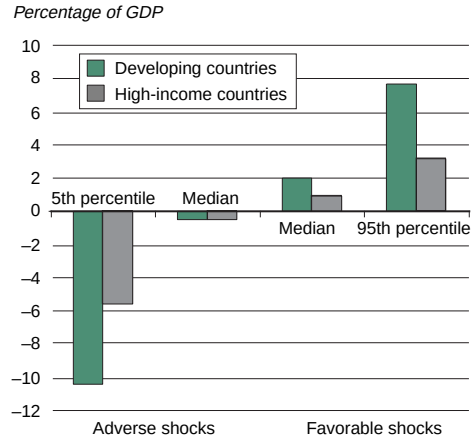
*** significant at the 1 percent level; ** significant at the 5 percent level.
Note: The dependent variable is the growth rate of the Institutional Investor risk rating.
a. For the list of the 20 countries, see the note to figure 4.7.
Source: World Bank staff estimates.

Figure 4.8 Risk ratings are downgraded more during adverse shocks than the upgrades during favorable shocks to GDP growth



a. Argentina, Brazil, Chile, China, Colombia, Ecuador, Arab Rep. of Egypt, Hungary, India, Indonesia, Rep. of Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, South Africa, Thailand, and Republica Bolivariana de Venezuela.
Source: World Bank staff estimates.

Figure 4.9 Developing countries are prone to bigger external shocks, 1973–91



Source: World Bank, *Global Economic Prospects 1993*.

grades under adverse shocks can lead to credit-rationing to such marginally creditworthy borrowers with such changes worsening, rather than smoothing, their adjustment (Dadush and Dhareshwar 1993; World Bank 1993). Such negative effects are exacerbated in the presence of information asymmetry problems between borrowers and lenders, which may cause herding and panic withdrawal of capital in response to an adverse shock.

Short-term debt and vulnerability to crises

Short-term flows are potentially the most reversible component of private capital flows. This is because shorter maturity enables the investor to withdraw quickly, and because withdrawal of other types of capital can be costly during difficult times. For example, liquidating FDI may involve selling plants and machinery, and selling stocks or bonds usually involves loss for the investor. In contrast, short-term bank loans can be reversed at relatively minimal costs.[14] Many countries suffered large reversals in short-term capital flows during the recent financial crises, precipitating external liquidity crises. Short-term debt flows to all developing countries from BIS banks declined from an inflow of $43.5 billion in 1997 to an outflow of $85 billion in 1998 (table 4.6).[15] Quarterly data suggest an even more dramatic swing.

The potential reversibility of short-term debt predisposes borrowers to the phenomenon of liquidity runs (and also to greater effects of contagion, as discussed in Kaminsky and Reinhart 2000). The risks of such liquidity runs are greater the higher the level of short-term debt relative to international reserves. Such runs and expectations can be self-fulfilling, because the chances of a borrower being repaid declines rapidly once a run has started.[16] High levels of short-term liabilities involving the financial system also involve risks of bank runs and systemic crisis. Therefore, the risk of financial crisis is greater where the level of short-term debt to reserves is excessive and the banking system is heavily involved in intermediating such flows.[17] Since residents may opt to liquidate their short-term assets in the banking system and move them abroad in the event that risks rise, the level of broad money relative to reserves is also an additional vulnerability indicator.

Table 4.6 Short-term debt flows to developing countries, 1997 and 1998
(billions of U.S. dollars)

Country or region	1997	1998
All developing countries	43.5	–85.0
East Asia and Pacific	0.8	–68.0
Korea, Rep. of	–8.0	–29.9
Thailand	–6.9	–15.1
Indonesia	1.1	–11.8
Malaysia	3.4	–5.3
Latin America and the Caribbean	24.1	–5.7

Note: Negative numbers denote outflows.
Source: Bank for International Settlements.

Evidence

Some early studies on crisis prediction did not find any strong evidence that maturity profile of external debt mattered for a crisis.[18] More recently, however, evidence is accumulating to the contrary (Furman and Stiglitz 1998)[19]—both because the influence of liquidity crises has become stronger in recent years and because of greater methodological attention to the subject. Radelet and Sachs (1998a), for example, find that the ratio of short-term debt to reserves is significantly associated with nine cases of crisis between 1994 and 1997 for a sample of 19 emerging markets. Using a larger sample, Rodrik and Velasco (1999) find that when the ratio of short-term debt to reserves exceeds one, there is a 10-percentage point higher probability of crisis than when the ratio is below that level. They also find that the probability of crisis increases with total debt, the current account deficit, and real appreciation of the currency, suggesting that both liquidity and fundamentals factors play a role in inducing crises. This conclusion is also supported by Bussiere and Mulder (1999a). Their study finds that the ratio of short-term debt to reserves is not only a strong indicator of crises (table 4.7), but also significantly superior to alternative liquidity risk specifications such as the ratio of imports to reserves and three different specifications of the ratio of money (M0, M1, and M2) to reserves.[20]

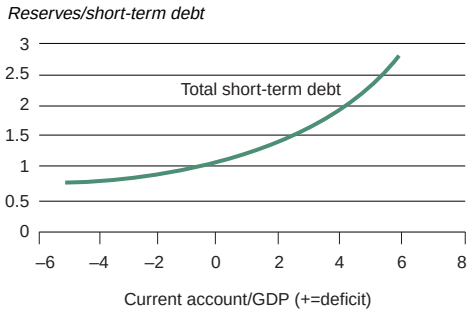
There are potential tradeoffs between liquidity and fundamentals factors (figure 4.10).[21] A safe threshold of short-term debt to reserves appears to be about one: the crisis index would be zero with that level of short-term debt to reserves, no overvaluation of the currency, and the current account in modest surplus. But countries that have signifi-

Table 4.7 Determinants of financial crises

Variable	Specification 1	Specification 2
Constant	–15.38**	–17.22***
	(–2.06)	(–2.80)
Real exchange rate index	–0.32*	–0.33*
	(–1.9)	(–1.98)
Current account as a percent of GDP	1.65**	1.55**
	(2.03)	(2.05)
Short-term debt as a percent of reserves	0.27***	0.28***
	(4.23)	(4.75)
Export growth	–0.10	
	(–0.70)	
Change in reserves	0.00	
	(0.05)	
R^2	0.43	0.43
Adjusted R^2	0.36	0.38

*** significant at the 1 percent level; ** significant at the 5 percent level; *significant at the 10 percent level.
Note: The sample includes 20 developing countries for the 1994–97 period. The dependent variable is the crisis index, defined as the weighted average of a loss in reserves and exchange rate depreciation. *t*-statistics are in parentheses.
Source: Bussiere and Mulder 1999a.

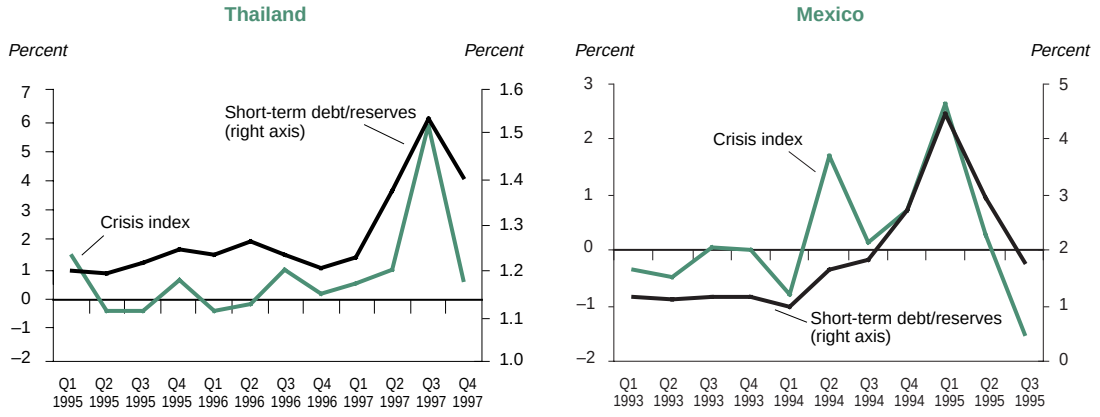
Figure 4.10 Tradeoff between liquidity and fundamentals



Note: The figure shows the equilibrium relationship between the ratio of reserves to short-term debt and current account deficit as a share of GDP when the crisis index is zero and the real exchange rate is not overvalued.
Source: Bussiere and Mulder 1999b.

cant current account deficits, some overvaluation of the currency, or both, need much larger reserves. Any country whose ratio of short-term debt to reserves significantly exceeds unity appears to be much more vulnerable to the onset of financial crises. These vulnerability windows are particularly important for private-to-private capital flows intermediated by the banking systems of the 1990s (Bussiere and Mulder 1999b). These findings are robust to an extension of the analysis using a broader definition of the crisis index and a larger number of countries, both developing and developed (Dasgupta and Narain 1999).[22] The crisis index is found to be strongly associated with the ratio of short-term bank debt (under the BIS definition) to reserves (figure 4.11, note the case of Thailand in the third quarter of 1997 and Mexico at the beginning of 1995).

Figure 4.11 The liquidity ratio and the crisis index peak at the same time in Thailand and Mexico



Source: World Bank staff estimates.

Box 4.3 Shortcomings in the reporting of short-term debt

Given the large risks that developing countries run when borrowing short-term, improvements are needed in the reporting systems for short-term debt flows. Incomplete and partial information can provide a false sense of security. The three main debt reporting systems—operated by the BIS, the OECD, and the World Bank—report the short-term debt positions of developing countries. The BIS collects information on the international positions of banks in the reporting areas from the national banking authorities in 18 major industrial countries plus six offshore centers[23] that report their claims on a worldwide consolidated basis. The creditor reporting system of the OECD provides semi-annual data on *official and officially guaranteed nonbank export credits from 21 OECD member countries,* aggregated at the borrowing-country level. The World Bank uses this information to obtain its own estimates of short-term debt outstanding for some countries. The World Bank debtor reporting system obtains debt information from 129 debtor countries; this information is published annually in *Global Development Finance* and relies heavily on BIS and OECD information.

However, existing reporting systems may significantly understate the true extent of reversible short-term liabilities. Existing information systems rely primarily on BIS banking statistics and do not adequately capture short-term flows outside the banking sector. Significant omissions include investments in developing-country assets by international mutual funds, and non-BIS banks, cross-border deposits held by nonresidents, and interfirm cross-border flows. Off-balance-sheet exposures are also omitted from the BIS definition, which may be especially significant with the rapid growth of derivatives transactions in developing countries in foreign exchange and interest rates.

During the Mexican peso crisis of 1994, swap and forward contracts on tesobonos (short-term local-currency bonds) increased by 40 percent before the end of 1994, at which point Mexican institutions held some $16 billion in swaps (Nussbaum 1997). Similarly, before the Russian debt moratorium, both foreign and domestic creditors traded in over-the-counter derivatives amounting to perhaps as much as $90 billion. And U.S. data for nine East Asian countries suggest that, as of June 1997, before the onset of the crisis in that region, off-balance-sheet claims represented some 9 percent of total U.S. bank claims. They had risen to 28 percent of total claims by December 1997, clearly illustrating the importance that such transactions can have in crisis countries (BIS 1999). In addition to these factors, a serious challenge to estimating the potentially reversible component of capital arises from the use of "put" options in debt contracts, which allows investors to reduce or recall loans prior to maturity.

A second shortcoming is that the current system does not provide information on the nonresident holders of short-term liabilities owed by the private sector and, in particular, by the domestic banks. Without such information, national authorities have no way of forestalling potentially excessive growth of such cross-border liabilities. Consequently, improvements in national debt reporting systems, especially with regard to short-term liabilities of the national banking system, are equally important. But the role of hedge funds, offshore financial centers, and cross-border derivatives transactions will limit the extent to which national authorities can fully measure short-term liabilities.

Conclusions

Rapid growth in short-term bank debt to developing countries in the 1990s was associated with some significant benefits, such as the financing of growing trade. But this growth was also associated with policy-induced distortions and cyclical influences, leading to riskier accumulation of high levels of short-term borrowing. Short-term debt is also procyclical to economic shocks, aggravating rather than smoothing adjustment. Excessive levels of short-term debt relative to liquid international reserves raise the vulnerability of countries to liquidity crises and were a major factor in the recent crises. Developing countries need to monitor their short-term debt closely, and existing reporting systems for short-term debt may tend to underestimate the size of potentially reversible capital flows (box 4.3). Chapter 5 discusses the policy challenges of managing short-term debt and avoiding a liquidity crisis.

Notes

1. International policymakers have concluded, for example, that "countries are courting trouble when they reach for short-term capital . . . (as) in Mexico and Russia. Longer-term debt is the simplest and best kind of insurance . . . and when the subject of excessive and destabilizing capital flows comes up (it is evident that) . . . many of the countries that have experienced financial crises have in fact sought and reached for the very short-term capital flows that prove to be destabilizing" (Summers 1999). Similarly, others have concluded that "virtually any country that has excessive levels of

short-term debt relative to reserves can suffer a self-fulfilling balance of payments crisis if its creditors refuse to roll over these loans" (Furman and Stiglitz 1999)

2. An Inter-Agency Task Force on Finance Statistics (with participation by the BIS, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the World Bank) has recently been established to improve the quality, frequency, and coverage of debt information. See also box 4.3.

3. Short-term international debt is defined as all cross-border debt that has less than or equal to 1 year maturity. Currently, there are two conventions for defining short-term debt. The BIS uses the *remaining maturity* concept, by which all cross-border debt becoming due within a year is counted as short-term debt. This includes liabilities with an original maturity of one year or less, plus repayments falling due within the next 12 months on liabilities with an original maturity of more than a year. This concept is useful for evaluating a country's total short-term external payments obligations (in other words, the liquidity position). In the definition adopted by this report, on the other hand, short-term debt comprises all cross-border liabilities with an *original maturity* of one year or less. This definition highlights the amount of short-term debt contracted at the margin. This definition also includes trade credits reported by the Organisation for Economic Co-operation and Development.

4. While external indebtedness remained flat or declined in developing countries in the 1990s, it increased significantly in most transition economies during the same period.

5. See Dasgupta and Ratha (1999), Eichengreen and Mody (1999), Chuhan and others (1993), Mussa and others (1999).

6. For example, the effect of cyclical drivers (international interest rates) on the share of short-term debt in total debt is much stronger than its effect on the level of longer-term debt in the 1990s (respective coefficients being –0.5 and –0.01). The remaining maturity definition of short-term debt used here complicates this conclusion, but does not alter it.

7. See also box 4.2. Just as short-term debt rose in association with growing trade during 1990–97—indicating the beneficial effects of trade credit—its reversal during the financial crisis and the lack of financing for critical imports was one of the reasons behind the exports slowdown and recession in Asia (in particular, Thailand) in 1998. This indicates that the behavior of private trade credit is not very different from that of other forms of private short-term debt.

8. In the case of Korea, corporations were not allowed to borrow long-term from abroad, so they borrowed from domestic banks that in turn funded the loans with short-term borrowing from foreign banks.

9. Thus, for example, a bank complying with BIS regulations could extend short-term debt up to five times the original amount of a longer-term loan (and realize significantly higher profits with much lower risk) by reducing the loan maturity from over 12 months to less than 12 months. This differential treatment of short-term debt was designed to reflect the greater risk associated with longer-term commitments. However, there is some evidence that this regulation may have encouraged short-term debt contracts (see also Demirgüç-Kunt 1992). Even though this effect is believed to be small, pair-wise comparisons of lending to equally rated OECD and non-OECD countries do indicate a greater concentration of short-term lending to the latter (BIS 1999a, p. 25). In table 4.2, the dummy variable for BIS regulation is positive and significant, lending some support to this argument.

10. Bayoumi (1997) studied consumption and growth paths in 21 OECD countries and concluded that there was little evidence in support of consumption smoothing in these countries.

11. See Botman, Dasgupta, and Ratha (1999) for details of the methodology. In the results reported below, those for all 20 countries relate to the partitions obtained using the mean plus or minus one-half standard deviation of the variable in question. However, the results for specific regions (East Asia and Latin America) relate to a broader partitioning rule using above or below the mean (to obtain sufficient degrees of freedom).

12. With the dependent variable as well as all explanatory variables expressed as annual growth rates, the elasticity with respect to a particular variable can be read directly from the estimated coefficient. The model specified is a variant of the one reported in the table in box 4.2 in the sense that, in addition to the variable of interest such as the terms of trade or the risk rating, other explanatory variables for short-term debt are drawn from that model. Again, it is worth noting the simultaneity bias that may arise, for example, from the two-way relationship between growth and short-term debt.

13. The direct relationship between short-term debt flows and terms-of-trade indices is not significant. The relationship seems to operate through the GDP growth variable.

14. Withdrawal of short-term bank lending may involve a setback in the relationship between the bank and its clients, which would impact the bank's business in the future, but the immediate pecuniary cost is relatively small.

15. The outflow of short-term debt reported here is based on the BIS remaining maturity definition. This results in higher numbers than those reported in chapter 2, which are based on the original maturity definition.

16. Furman and Stiglitz (1998), Diamond and Dybvig (1983), Rodrik and Velasco (1998), Eichengreen and Mody (1999).

17. Short-term borrowing by corporations also involves significant risks, but the implications of such risks for systemic crisis are typically less than in the case of banks. The reason is that, unlike a commercial bank, a typical private corporation tends to be small, and its foreign currency liabilities tend to be hedged by export receivables or by real assets. However, unhedged foreign currency borrowings by *large* corporations may pose more serious risks as was the case in the recent crises in Asia.

18. For example, Frankel and Rose (1996); Sachs, Tornell, and Velasco (1996); Kaminsky, Lizondo, and Reinhart (1998).

19. Furman and Stiglitz (1998) note that, at the end of 1996, 11 of the 42 developing countries for which data were then available had short-term debt to BIS-reporting banks that exceeded the level of reserves. Several countries from this group subsequently faced severe financial difficul-

ties, including Indonesia (with a ratio of short-term debt to reserves of 1.9), Korea (2.0), Thailand (1.2), South Africa (11.6), Pakistan (5.1), Russia (2.1), Bulgaria (2.1), and Zimbabwe (1.3).

20. It is also the case that a rise in short-term lending before an imminent crisis is partly endogenous to the rising risks of a crisis, so that more fundamental causes of a crisis remain important.

21. Since the probability of crisis is measured for a given year rather than over several years, these regressions may overstate the importance of proximate triggers as opposed to fundamental factors.

22. Dasgupta and Narain (1999) define the crisis index as a weighted average of the nominal depreciation and loss in reserves (similar to Bussiere and Mulder 1999a), as well as an increase in domestic interest rates, weighted by the inverse of the standard deviation of these series. Interest rates are introduced as an added factor, since a rise in domestic interest rates is also closely associated with financial crises. Their sample period is 1986 to 1997.

23. Industrialized reporting countries are: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and United States. Other banking centers are: Bahamas, Bahrain, Cayman Islands, Hong Kong (China), Netherlands Antilles, and Singapore. These offshore banking centers are not covered in the semi-annual or consolidated series.

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