Annex VI

Capital Flows to Emerging Markets— A Historical Perspective

In early 1989, the secondary market price of the external bank debt of the initial Brady plan countries stood at only 40 cents on the dollar, and private capital flows were largely limited to concerted lending or arrears. Indeed, some observers argued that the heavily indebted emerging market countries might not be able to regain access to private international financial markets for a generation. Instead, the 1990s have witnessed a movement of capital to emerging markets on a scale (when measured relative to their GDPs) not seen since the gold standard era of the late 1800s and early 1900s. This growing integration of emerging markets into the international financial system is viewed by a number of observers as reestablishing the type of relationships between capital-importing and capital-exporting countries that existed in earlier periods of high mobility, such as 1880–1914 and the 1920s.[1]

Clearly, close international linkages offer benefits associated with directing capital to its most productive uses and providing investors with improved opportunities for portfolio diversification. However, the past two and a half decades have demonstrated that integration carries risks as well: access to international markets can be lost abruptly or exchange rate arrangements can be subject to speculative attacks, especially if there are doubts about the sustainability of a country's macroeconomic policies.[2]

These considerations raise two questions: how does the cyclical nature of capital flows to emerging markets since 1973 compare with that of earlier periods of high capital mobility, and why has there been such a strong renewal of private capital flows to emerging markets in the 1990s, given the dismal experience of the 1980s?[3]

This annex examines these questions, putting the recent flow of capital to emerging markets in historical perspective. It starts by comparing the nature and scale of capital flows to emerging market countries in the past two decades with those experienced in two earlier periods of high capital mobility: the gold standard period (1870–1914) and the 1920s. In these historical periods divergent macroeconomic developments in capital-exporting and capital-importing countries often generated a boom-bust pattern of flows that was sometimes accentuated by crises in capital-importing countries. Next, the factors that have influenced the scale, composition, and geographic distribution of the capital flows to emerging market countries since the mid-1970s are examined and the recent attempts at identifying the key developments in both emerging market and industrial countries, as well as the changes responsible for the resurgence of flows in the 1990s, are reviewed.

Earlier Periods of High Capital Mobility

The classical gold standard era, which lasted from roughly 1870 to 1914, is typically regarded as the longest period of high capital mobility between a set of major capital-exporting countries, the United Kingdom and to a lesser extent France and Germany, and a set of "emerging markets."[4] The key features of global capital markets during this period were as follows:

- The scale of total capital flows, as measured by the average of the absolute values of current account deficits relative to GDP for the major capital-exporting and capital-importing countries, was higher during 1870–1930 than it has been in subsequent decades (Figure 57). This index averaged 3.3 percent over 1870–1914 and has as yet reached only 2.6 percent in the 1990s.

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[1]See, for example, Obstfeld and Taylor (1997).

[2]Appendices 1 and 2 to this annex examine the recent theoretical and empirical literature on the determinants of balance of payments and banking crises that often accompany reversals in capital inflows and speculative attacks on exchange rate arrangements.

[3]We focus on the period after 1973 because between 1945 and 1972 flows among industrialized countries dominated international capital movements; the volume of capital flowing to emerging markets was marginal.

[4]There were two major capital importing-country groups. One group, consisting of the countries in North America, Latin America (principally Argentina, Brazil, and Mexico), and Oceania (Australia), received capital primarily from the United Kingdom and used it in large part for development finance. The other group, consisting of countries in Eastern and Central Europe, Scandinavia, the Middle East, and Africa, was provided finance mainly by France and Germany, often of a nondevelopmental nature to cover fiscal gaps. See Bayoumi (1989) and Taylor (1996) for statistical evidence on high capital mobility in the late 1800s and early 1900s.

Figure 57. Capital Mobility Index[1]
*(In percent of GDP)*
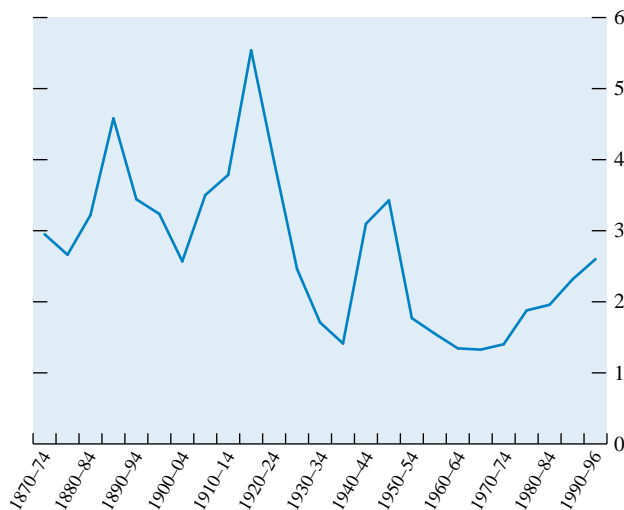
Source: Taylor (1996).

[1]The index is defined as the average of the absolute values of current accounts relative to GDP for major capital-importing and capital-exporting countries. The countries include Argentina, Australia, Canada, Denmark, France, Germany, Italy, Japan, Norway, Sweden, the United Kingdom, and the United States.

- When measured relative to GDP, private capital flows of the earlier era were at least as large as in the 1990–96 period and in many instances considerably larger. The main capital exporter, the United Kingdom, saw annual capital outflows averaging almost 5 percent of GDP over 1880–1914, with levels at times reaching 7 percent and even 9 percent in the years before World War I. France and Germany saw smaller flows relative to GDP that, on average, were about 3 and 2 percent, respectively, over the same period (Figure 58). Among capital importers, between 1881 and 1890 annual inflows to Australia averaged 9.5 percent of GDP and about 2.5 percent of GDP in the next decade; Canada had annual inflows amounting to over 6 percent of GDP in the 1880s, about 4.5 percent in the 1890s, 7 percent in the first decade of the twentieth century, and over 14 percent between 1910 and 1913 (Figure 59).
- Foreign capital was an important source of finance for investment in the 1870–1914 period—for example, it financed over a third of domestic investment in New Zealand and Canada and about a quarter of that in Australia and Sweden (Figure 60). In comparison, capital inflows have amounted to about 10 percent of domestic investment in emerging markets during the 1990s.

Figure 58. Net Capital Outflows, 1880–1913
*(In percent of GDP)*
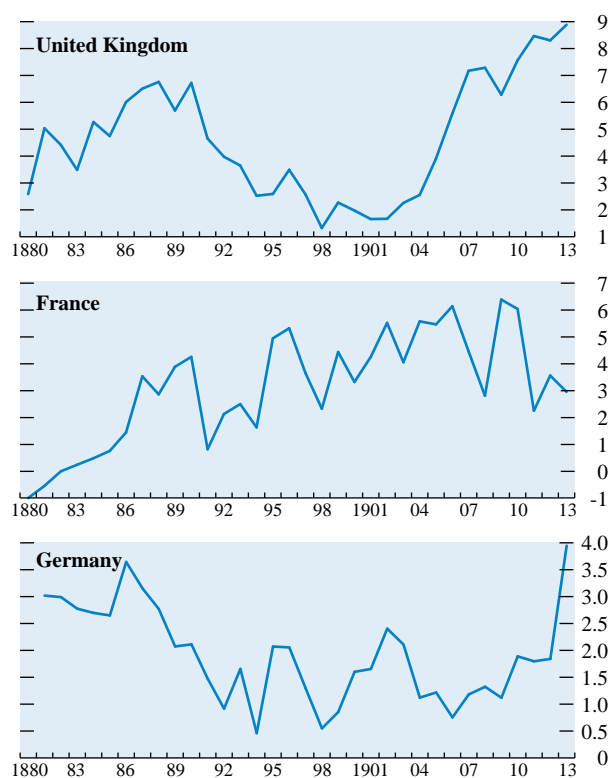
Source: Bloomfield (1968).

- Portfolio investments were far more important than direct investment. In the 1870–1914 period direct investment represented about 10 percent of the United Kingdom's foreign investments.[5] By contrast, foreign direct investment has accounted for 39 percent of net private capital flows to emerging markets in the 1990s.
- Some capital-importing countries accumulated a part of the inflows as official reserves (gold and foreign exchange). Available estimates indicate that international reserves quadrupled in Russia and Belgium, doubled in India and Sweden, and increased substantially in the United States during 1870–1914.[6] As mentioned in Annex I, emerging market reserve accumulation amounted to almost half of total net flows during 1990–96

[5]In 1913, the three main creditors, the United Kingdom, France, and Germany, held 80 percent of the US$35 billion stock of securities issued by capital-importing countries. This was six times larger than their holdings in 1874 and indicates a net capital outflow of some US$30 billion (Bloomfield, 1968; United Nations, 1949).

[6]Bloomfield (1963).

Figure 59. Net Capital Inflows, 1880–1913
(In percent of GDP)
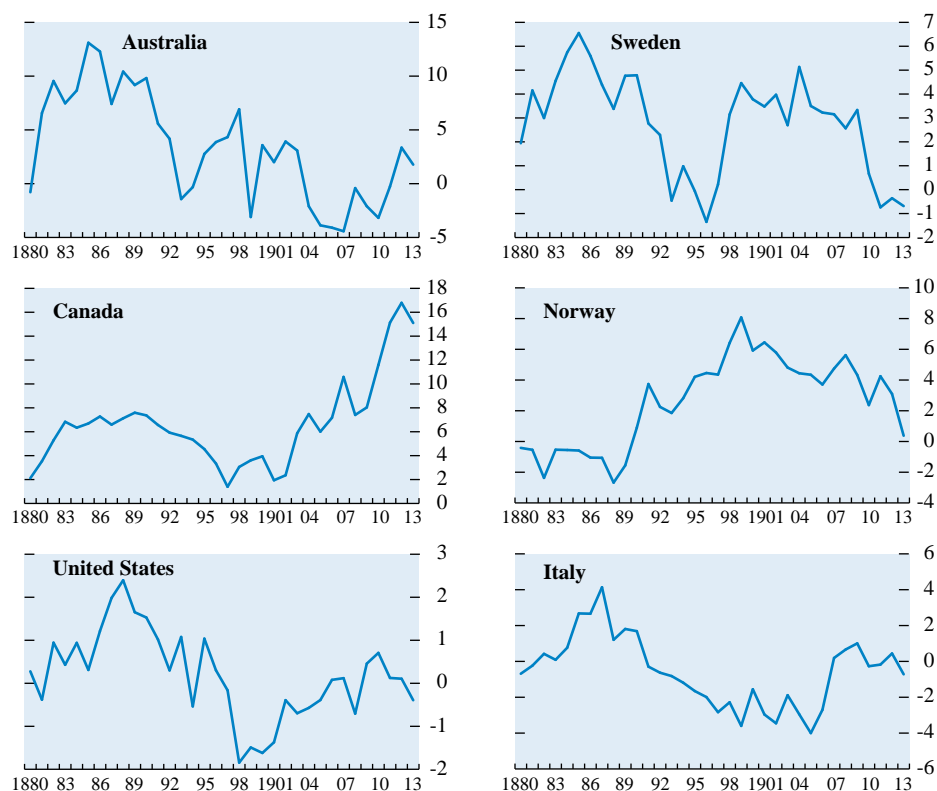
Source: Bloomfield (1968).

and as a consequence reserve holdings more than tripled over the period.

• Although lending was mostly financed by private sources, the bulk of international borrowing for investment depended directly or indirectly on government action. Most of the borrowing was undertaken by governments, primarily for railway construction, utilities, and public works. The private borrowing was largely done by railroad companies with the assistance of government guarantees.

A combination of push and pull factors explains the movement of capital during 1870–1914. An important institutional feature was the role of investment banks in providing a stimulus to global flows. Given the high fees and commission, it was in the interest of merchant and investment banks to provide information about the profitability of ventures in the newly developing areas and persuade representatives of foreign governments and railroads to issue bonds. The financial intermediaries had considerable bargaining power vis-à-vis both bondholders and the borrowers because of their advantage in collecting and processing information and their ability to raise vast sums of money. In general, investors earned relatively high returns on their portfolio investment. After adjusting for losses due to defaults, Edelstein (1982) estimates that investors earned returns between 160 and 390 basis points over domestic portfolio investments in relatively safe instruments.

The period from 1870 to 1914 was characterized by high variability in capital flows between capital-exporting and capital-importing countries. Investment flows from the United Kingdom were buoyant in the early 1870s, most of the 1880s, the early 1890s, and then again in the years before World War I. It is widely accepted that capital flows from the United Kingdom were countercyclical in nature.[7] A decline in investment demand and thereby interest rates in the United Kingdom would stimulate a capital outflow as investors sought higher returns abroad. This outflow

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[7]Cairncross (1953), Cardoso and Dornbusch (1989), Dunning (1970), Thomas (1967), Kindleberger (1982), Vos (1994).

Figure 60. Contributions of Capital Flows to Investment, 1870–1914 versus 1980–90s
(Ratio of capital flows to investment)
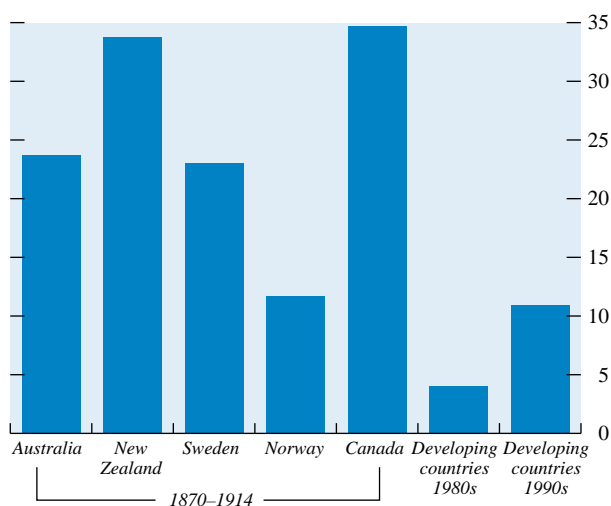
Sources: Bloomfield (1968); and International Monetary Fund, *World Economic Outlook.*

most often took the form of purchases of bonds issued by borrowers in the capital-importing countries. These funds were used to finance various types of investments, including the expansion of export-related industries. At some point, a recovery in the United Kingdom and/or an increase in the discount rate by the Bank of England to stem its loss of gold reserves would lead to higher interest rates in the United Kingdom and hence a reduced capital outflow. The balance of payments positions of the capital-importing countries would not necessarily deteriorate, however, if the investments funded by earlier inflows led to increased exports to a buoyant United Kingdom economy. The higher export revenues would then offset the decline in capital inflows.

Two factors would at times disrupt this counter-cyclical interaction between trade and capital flows. First, as capital outflows from the United Kingdom declined, in some cases the export-related projects in borrowing countries were incomplete or otherwise incapable of producing enough exports to offset the decline in capital inflows. Second, even if borrowing countries were in a position to increase their exports, the rise in interest rates in the United Kingdom sometimes led British companies to sell off or otherwise reduce their inventories of imported goods. This would often lead to a sharp decline in the terms of trade of the capital-importing countries at the same time that capital inflows were declining. In some cases, the combination of slowing capital inflows and stagnant or falling export receipts would lead to slower economic growth and, as a result, stagnant or falling domestic revenues and expanding fiscal deficits. Occasionally, this situation would not be corrected quickly enough, and the borrower would have to suspend debt-service payments or abandon its gold standard commitment or both (Table 70). At times, such turning points were accompanied by institutional failures, including banking crises, in the capital-importing and (less frequently) in the capital-exporting countries.

Reaction to failures in contractual obligations depended on the motivation for the lending. When borrowers of development finance did default, assistance was given at the same time as some "conditionality" or accommodation was imposed by the creditors. While it was in the interest of the newly developing countries to have access to the London capital market and the political and economic dominance of Britain assured that international debt contracts were honored, it is worth noting that the British government generally followed a policy of laissez-faire and the capital market operated virtually free of any intervention. As Fishlow puts it, "The government offered friendly offices but no intervention, diplomatic or more forceful, on behalf of bondholders."[8] By contrast, the reaction of capital-exporting nations to defaults on sovereign loans raised to close fiscal gaps was, at times, quite drastic. It could involve direct intervention to restructure public finance and its administration.

High capital mobility after World War I lasted only until the advent of the Great Depression and represented an attempt to reestablish the capital market relationships that had existed before the war. But three major shifts had changed the environment: (1) the United States had become a major capital-exporting country; (2) the United Kingdom's lending had become more focused on its colonies, while the United States took up the role of major purchaser of bonds issued by Latin American and European borrowers; and (3) a much greater share of international lending went to finance public sector nondevelopment expenditures rather than investments.

The United States saw its holdings of foreign assets rise from $6.5 billion in 1919 to $14.8 billion in 1929. External investment by the United States was, on average, 1 percent of GNP in the 1920s, while that of the United Kingdom, which had been 4 to 5 percent of GNP in the first half of the 1920s, fell to below 2 percent in the second half. The limited information available about the distribution of capital among individual capital-importing countries suggests that some countries were more affected than others by the changes in the international environment. In Canada, external debt payments exceeded capital inflows between 1923 and 1926, but there were net inflows amounting to 2 percent of GNP in the late 1920s. By comparison, in

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[8]Fishlow (1985), p. 398.

Table 70. Selected Crises, 1870–1914

	Description	Cause
Turkey (1875)	Debt default	Fiscal deficits were funded by foreign borrowing that eventually could not be sustained.
Peru (1876)	Debt default	Falling guano exports and stagnation of other revenues combined with increasing fiscal deficits to generate a crisis.
Egypt (1876)	Debt default	Increased foreign borrowing to finance consumption led to unsustainable debt growth.
Argentina (1890)	Debt crisis and institutional failure	Argentina's inability to meet debt-service payments led to the bailout of Baring Bros.
United States (1873)	Financial crisis	Bank runs and failures and fears about U.S. commitment to gold parity followed a stock market crash.
Greece (1893)	Debt default	Increased borrowing to finance consumption led to unsustainable debt growth.
United States (1894–96)	Speculative attack	Speculation against the U.S. gold standard parity followed the Sherman Act (1890) and increasing fiscal deficits.
Brazil (1898)	Debt default	A decline of 64 percent in coffee prices over the preceding five years generated an external crisis.
United States (1907)	Financial crisis	Banking panic and suspension of cash payments followed interest rate hikes and bank failures.
Canada (1907)	Speculative attack/banking crisis	High interest rates in Canada (in response to hikes in the United States) led to excessive credit expansion that generated speculation against the Canadian dollar.
Brazil (1914)	Debt default	A sharp decline in coffee prices in the preceding two years generated a debt crisis.

Sources: Fishlow (1985); Bordo and Schwartz (1996); and Rich (1989).

Argentina net capital inflows were around 3 percent of GNP, only slightly below those in the gold standard era.

Of crucial importance was the fact that, in contrast to the earlier classical gold standard era, the capital flows of the 1920s were procyclical rather than countercyclical and made the system far less stable and more prone to crisis. Increases in domestic investment in the United States coincided with increases in capital exports.[9] This procyclicality in foreign lending was in part associated with the fact that an upswing in investment in the United States was typically accompanied by a sharp rise in domestic savings as well. In addition, the capital outflows also occurred during periods of rising commodity prices, which increased the perceived creditworthiness of the capital-importing countries. On the upswing, increased creditworthiness of capital importers coincided with greater availability of capital. On the downswing, reduced capital flows combined with declining export demand, as the United States economy slowed, reinforced the spiral. To make matters more difficult for the emerging markets of the time, while the United Kingdom had financed countries that produced goods that it imported, U.S. capital exports were directed to countries that produced goods that competed with its exports. And, whereas the United Kingdom's policy during the period 1870–1914 was generally one of laissez-faire and free trade, the United States followed a more protectionist policy in the 1920s.

The experience in 1870–1914 and 1919–30 highlights three key features: (1) in both periods the flow of capital to emerging markets was highly variable, with sharp increases in flows regularly followed by sharp downturns; (2) in both periods the downturns in capital flows often involved some combination of divergent macroeconomic conditions between the major capital-exporting countries and the larger capital-importing countries and economic or political crises in individual capital-importing countries; and (3) both periods of high capital mobility were ended by major economic or political events (i.e., World War I and the Great Depression, respectively).

International Capital Flows After the First Oil Shock

While it is clear that there have been enormous structural changes in the international financial system and the global economy, the cyclical pattern of capital flows between emerging markets and the international financial centers in recent times does have similarities

[9]Vos (1994).

Table 71. External Financial Resources to Developing Countries

(Percent shares)

	1960–61	1970–72
Aid	56	47
Bilateral	54	37
Multilateral[1]	2	10
Other official flows	13	9
Private flows	31	44
Direct investment	19	17
Bank sector	6	16
Bonds	n.a.	2
Private export credits	6	9
Total flows	100	100
Memorandum item:		
Total flows (in billions of		
U.S. dollars; 1983 prices)	34.8	53.6

Source: Vos (1994).
[1]Includes grants by private voluntary agencies.

with earlier periods, especially regarding the role of divergent macroeconomic and structural developments between lenders and borrowers in producing sharp changes in capital flows.

Capital Flows in 1973–89

The renewal of private capital flows to emerging markets that began in the early 1970s followed a nearly 40-year hiatus. The segmentation of capital markets between mature and emerging market countries reflected both the disruptions associated with the Great Depression and World War II as well as the maintenance of comprehensive systems of capital controls in many countries throughout the 1950s and 1960s. As a result, official capital flows and foreign direct investment dominated the limited flows of financial resources between mature and emerging market countries (Table 71).

In contrast to the limited flows in the 1950s and 1960s, the period since 1973 has witnessed net private capital flows to emerging markets amounting to nearly US$1.32 trillion. Nonetheless, the pattern of flows has been highly uneven, with an initial surge of inflows in the 1973–82 period ($163 billion), followed by a collapse of flows during the rest of the 1980s ($103 billion), and then a renewed surge in the 1990s.

The capital flows that took place between the first oil crisis of 1973 and 1982 were closely associated with the recycling of oil revenues. Bank loans were the principal instruments for intermediating these flows, and balance of payments data suggest that such loans (including trade credits) accounted for 57 percent of total flows. Geographically, the movement of capital was concentrated on borrowers in Asia and Latin America.

In many ways, the second recycling effort, in the late 1970s, initially seemed less problematic than that following the earlier shock of 1973–74. In part, this reflected the view that the international financial system had played an important role in facilitating the first recycling. The optimism, however, was not borne out by events. According to James (1996), the problems that arose as a result of the second wave of recycling were related to the global imbalances that developed in the aftermath of the second oil price shock. After the first oil price shock, many countries, concerned about the fragility of their economies, had attempted to postpone adjustment and maintained a relaxed monetary stance. The inflationary consequences of such policies had undermined stability even further. After the second oil price shock, most countries tightened monetary policy but many were still unwilling to make the necessary but painful fiscal adjustments. As a result, real interest rates rose and borrowing became expensive and more difficult to service.

The emergence of debt-servicing difficulties in many heavily indebted emerging market countries in mid-1982 brought to an abrupt halt the inflow of private capital. Net private inflows fell from a peak of nearly $49 billion in 1981 and $19 billion in 1982 to only a $9 billion inflow in 1983 and a $5 billion outflow in 1984. This abrupt slowdown in lending, and in some cases reversal of capital transfers, were even more dramatic for heavily indebted emerging markets in the Western Hemisphere, which together saw net private inflows decline, from a peak of $46 billion in 1981 and $16 billion in 1982, and then reverse, to outflows of $9 billion and $2 billion in 1983 and 1994, respectively. While net private inflows to all emerging markets recovered modestly in the 1986 to 1989 period (averaging roughly $20 billion a year), the Western Hemisphere experienced virtually no net private inflow during that four-year period.

In a number of respects, the sharp rise in capital flows to emerging market countries in the 1970s followed by the subsequent crash in the early 1980s was similar to the pattern of lending booms in the 1880s and the 1920s and the bust in the 1890s and 1930s. However, the international lending of the 1970s differed from that of earlier periods in the extent to which banks were directly exposed. By the end of 1981, it was calculated that the exposure of U.S. banks to Latin American debt amounted to 97 percent of capital and in many individual cases well above 100 percent. The combined exposure of U.S. banks to Mexico alone amounted to 34 percent of their capital.

The debt crisis that started in 1982 has been attributed to developments in the highly indebted countries and to changes in their external environment. First, a number of emerging markets pursued unsustainable macroeconomic and financial policies during the late 1970s and early 1980s. External borrowing was used to finance large fiscal imbalances, producing strong

inflationary pressures. In addition, some countries followed exchange-rate-based stabilization policies and liberalized their financial systems without setting up an appropriate prudential regulatory and supervisory framework, which led to lending and consumption booms that ended up in banking and balance-of-payments crises (see Appendix 1 at the end of this annex). In other countries, distortions in domestic financial markets, often a byproduct of restrictions on financial activities and on the payment of market-related interest rates, created strong incentives for the residents of some countries to place funds in offshore markets that offered more attractive financial returns and a more stable financial environment. Indeed, various estimates suggest that the large-scale capital inflows to the public sector in many of the heavily indebted emerging markets were matched to a large degree by corresponding private sector capital outflows.[10]

Second, the external environment facing many emerging market countries deteriorated at the beginning of the 1980s. Growth in the mature markets slowed sharply in the late 1970s, declining from an average rate of growth of 4 percent in 1978 to slightly more than 1 percent in 1981. This prolonged sluggishness of activity in the mature markets contributed to a decline in the growth of exports and a deterioration in the terms of trade for many non-oil emerging market countries. For that group, the volume of exports, which had expanded at 9 percent a year from 1976 to 1979, decelerated to 5½ percent in 1980 and 4 percent in 1981. The deterioration in the terms of trade initially arose from the oil price increases during 1979 and 1980 but was extended through 1981 by cyclical weakness in primary product prices. For the net oil importers as a group, the cumulative deterioration of the terms of trade from 1977 to 1981 exceeded 15 percent—equivalent to some $45 billion to $50 billion in terms of 1981 trade values. At the same time, as part of efforts to curb inflationary pressures in the mature markets, interest rates in major financial markets and in major offshore centers rose sharply from the late 1970s through 1981. For example, the three-month London interbank offered rate (LIBOR) on U.S. dollar deposits rose from an average annual rate of 9 percent in 1978 to nearly 17 percent in 1981. Since many of the syndicated loans that were made to emerging market borrowers carried interest rates that were tied directly to LIBOR, these countries experienced a sharp rise in their debt-servicing payments.

The decline in net private capital inflows in the 1980s was accompanied by a sharp deterioration in the macroeconomic performance of many emerging market economies. For example, the average rate of growth for all emerging markets fell from roughly 4¼ percent in 1977–81 to approximately 1½ percent in 1982 and 1983. Moreover, those emerging markets that experienced debt-servicing difficulties saw their rate of growth fall from roughly 4 percent a year during 1977–81 to a decline of 1 percent a year in 1982 and 1983. In addition, inflation accelerated in countries that experienced debt-servicing difficulties, from approximately 35 percent a year in 1977–81 to 58 percent in 1982–84. While it is generally recognized that the growth rates of the late 1970s were often supported by unsustainable fiscal deficits and financial policies, the worsening of macroeconomic performance and more rapid inflation further reduced the perceived debt-servicing capacity of the heavily indebted countries. On top of this, the external debt position of many of the heavily indebted emerging market countries deteriorated sharply compared with the early 1970s. For example, the ratio of external debt to exports of goods and services for heavily indebted emerging market countries with debt-servicing difficulties shot up from 182 percent in 1981 to 236 percent at the end of 1983 and to 375 percent in 1986. Also, the ratio of external debt service payments to exports of goods and services for these countries rose from 32 percent in 1981 to 44 percent by 1986.

The economic situation confronting the heavily indebted emerging market countries at the beginning of the 1990s created considerable skepticism about how rapidly these countries would be able to reestablish their access to international financial markets. Some observers argued that it could take a substantial time before access was restored, despite several years of adjustment effort and concerted lending.[11]

This pessimism reflected in part a perception at the time that the macroeconomic performance of the heavily indebted emerging market countries that had experienced debt-servicing difficulties was deteriorating again. While this group had seen a modest recovery in its economic growth in the period from 1984 to 1986 (averaging 3.5 percent a year), the rate of growth slowed to 1.5 percent in 1988–89. Inflation at the same time rose sharply, from an average rate of 69 percent a year in 1984–86 to 190 percent in 1988–89. Fiscal imbalances also remained in the range of 6 to 7 percent of GDP and the external debt position of these countries showed little improvement. The average ratio of debt-service payments to exports of goods and services for this group of countries in 1988–89 (35.9 percent) was virtually identical with that in 1982 (35.5 percent). In addition, the ratio of external debt to exports increased from 218 percent in 1982 to an average of 338 percent in 1988–89.

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[10]See, among others, Dooley (1986), Mathieson and Rojas-Suarez (1993), Reisen and Yeches (1993), and Rojas-Suarez (1991).

[11]See United States, Senate (1990).

Capital Flows in the 1990s

Despite this pessimism at the start of the decade, total net private capital flows to emerging markets in the 1990–96 period soared to $1,055 billion, more than seven times the amount they received in the 1973–81 period. Moreover, net private flows during 1990–96 were over nine times as large as net external borrowing from official creditors (see Table 13). Geographically, the distribution of these flows has been quite uneven. Asia received the largest proportion, 40 percent, and Western Hemisphere countries secured the next largest chunk at 30 percent. By contrast, only 8 percent of the flows went to economies in transition and around 5 percent to African countries. The composition of the net flows also changed dramatically from the 1978–82 period. While the syndicated bank loan was the dominant instrument associated with capital flows during 1978–82, portfolio investment (particularly bonds) and foreign direct investment have been the most important instruments since 1990. The share of foreign direct investment reached 40 percent of total net private capital flows during the period 1990–96 and portfolio flows accounted for 39 percent. Perhaps the most significant change has been in portfolio equity flows, which rose from $1 billion (3 percent of total net private capital flows) in 1990 to $16 billion (7 percent of total net private flows) in 1996. In total, inflows of private capital rose from the equivalent of 3 percent of domestic investment in emerging market countries in 1990 to 13 percent in 1996.

The 1990s also witnessed an expanding participation of emerging market institutions in major financial centers, in part related to the more active management of the growing foreign exchange reserves of these countries. The scale of these holdings and its implications are discussed in Annex I.

Another aspect of the increasing activities of emerging market residents in global financial markets has been the growing importance of capital flows among emerging markets themselves. Since the capital account reporting systems of these markets typically provide relatively limited information about the country of origin of most capital flows, much of the evidence is still anecdotal. One example of growing intraregional flows has been increased investment abroad by Chilean firms. Foreign acquisitions by Chilean companies in 1996 are estimated to have been worth $2.3 billion. Most of the purchases were of state-owned assets being privatized in Argentina, Brazil, Colombia, and Peru, and many of these acquisitions were financed with foreign borrowing in the form of bank loans and through bond issuance. Asia has also seen expanding intraregional flows. Outside of Japan, Hong Kong, China, remains the largest capital exporter in Asia and the single largest outward investor among emerging markets. In the period 1990–95, Hong Kong companies invested a total of $78 billion overseas, of which 65 percent went to China. While China remains a net importer of capital, its firms are beginning to invest abroad, with the financial services sector attracting the largest share of these foreign investments. Already, China is the largest investor in Hong Kong; and, by end-1995, Chinese firms had invested $450 million in Singapore and an estimated total of $462 million in Malaysia, Thailand, Indonesia, and the Philippines. More generally, in 1995, intraregional flows were estimated by some observers to account for about 40 percent of total foreign direct investment (FDI) in Southeast Asia, up from 25 percent in 1990. As an example of this trend, Malaysian firms accounted for 75 percent of the roughly $2 million received by Cambodia in 1995.

Factors Stimulating Capital Flows and Renewed Market Access in the 1990s

The large-scale capital flows to emerging markets in the 1990s stimulated a number of empirical studies that sought to identify the key factors driving them. These studies have typically divided the factors influencing capital flows into so-called push and pull factors.[12] *Push* factors encompass both structural and cyclical developments in international (mainly mature) financial markets that have led investors to diversify their portfolios internationally and seek higher yields in emerging markets. *Pull* factors refer to the macroeconomic and structural policies in emerging markets, as well as other political and noneconomic developments, that have increased their perceived creditworthiness.

Structural Changes

The scale and composition of the capital flows to emerging markets in the 1990s have been influenced by a series of ongoing structural changes in international financial markets. Clearly, the most important change has been the growing liberalization of domestic financial markets and capital account transactions in both mature and emerging market economies. While the removal of capital controls in mature markets in the 1980s and 1990s is well documented, there has also been considerable opening of emerging market economies. Box 9, using an index of capital account restrictions, illustrates the weakening of capital controls in developing countries.

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[12]Calvo, Leiderman, and Reinhart (1996), Fernandez-Arias (1996), and World Bank (1997) examine the causes and provide an empirical perspective on private capital flows in the 1990s. Agénor (1996) is a recent theoretical analysis of push versus pull factors.

Box 9. Liberalization of Capital Controls in Emerging Markets

The figure plots an index of capital controls in emerging markets. This index is based on information on 163 countries obtained from the IMF's annual survey of Exchange Arrangements and Exchange Restrictions and constructed using the methodology of Bartolini and Drazen (1997). Three dummy variables for each country for each year were constructed corresponding to whether a country restricted capital account transactions, used multiple exchange rate practices, or enforced surrender requirements for export proceeds. An index for each country for each year is obtained by summing its dummy variables and dividing by three. It varies between zero and one, with zero representing a complete lack of controls and one the existence of all the restrictions mentioned above. The aggregate capital control index shown is the mean of the country indices for each year.

The loosening of capital controls in emerging markets since the mid-1980s is clearly brought out by the index. The figure also suggests that the decline in capital account restrictions may have contributed to the recent boom in capital flows to emerging markets. The correlation between the index and capital inflows is –0.3 over the period shown and provides some simple corroboration for the claim that liberalization of external transactions has been instrumental in attracting foreign capital.

Capital Controls in and Flows to Emerging Markets
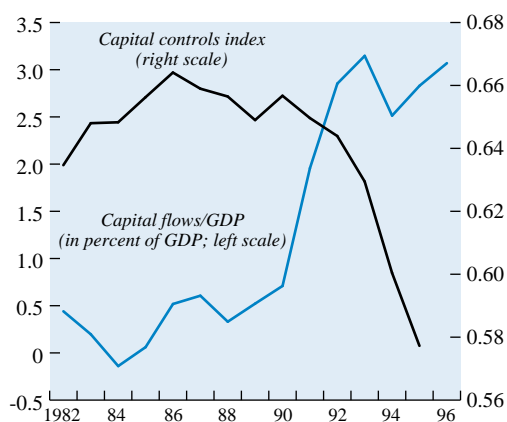
Sources: International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions;* and *World Economic Outlook.*

cial system, the process is at an early stage.[13] Recent empirical studies provide a similar picture: there is a growing degree of de facto integration of domestic and international financial markets, in the sense that it is becoming increasingly difficult to keep domestic financial market conditions isolated from developments in international markets.[14]

The growing importance of portfolio flows (both bond and equity) in the 1990s has reflected two other fundamental structural changes in international financial markets, namely, the growing role of institutional investors and securitization. Institutional investors, including mutual funds, insurance companies, pension funds, and, more recently, hedge funds, have become increasingly important purchasers of emerging market securities. To an important degree, their participation in such markets has been driven by the desire both to increase the overall return on their portfolios and to diversify the risks associated with these portfolios. Although these institutional investors typically allocate only a relatively small proportion of their total portfolios to emerging market assets, their sheer size has contributed to the rising tide of capital flowing to emerging markets.

Securitization has involved a greater use of direct debt and equity markets—in which the lender or investor holds a tradable direct claim on the borrower or firm—and a shift away from indirect finance—in which an intermediary holds a nontraded loan asset and the saver holds a liability (which may be tradable) on the intermediary. Another form of securitization has involved the creation of exchange-traded futures and options contracts. In this case, a certain type of risk, usually one associated with price volatility, is securitized. While the substitution of direct for indirect instruments has been driven in part by the lower relative cost of borrowing on securities markets by the more creditworthy borrowers (who often have a higher credit rating than banks), the growing importance of both exchange-traded and over-the-counter (OTC) derivative products has been strongly affected by the desire of portfolio managers (particularly from large institutional investors) to either hedge or increase their exposure to certain types of asset-price risks.

A final "structural" factor that has been especially important for the pricing of derivative products has

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[13]The World Bank (1997) index, based on country risk ratings by *Institutional Investor* magazine, combines a measure of a country's ability to attract different forms of private flows (with portfolio capital given a weight of five, commercial bank flows a weight of three, and foreign direct investment a weight of one), and a measure of the diversification of a country's source of finance (with countries receiving funds from diverse sources being regarded as more highly integrated). According to this index, the number of emerging markets classified as highly integrated increased from 2 in 1985–87 to 13 in 1992–94, whereas the number of countries classified as highly or moderately integrated increased from 26 to 39.

[14]See, for example, Dooley, Mathieson, and Rojas-Suarez (1996), Haque and Montiel (1991), and Reisen and Yeches (1993).

An index of integration developed by the World Bank shows that while many more emerging markets are now better integrated into the international finan-

been the development of an academic literature on how to price options—the Black-Scholes (1973) pricing model and its refinements. Although options have been traded for centuries, it was only in 1973 that the Chicago Board of Trade founded the Chicago Options Exchange to create a centralized market for trading options on listed securities. While options have always been priced by the markets, the Black-Scholes technique and subsequent improvements have added a significant degree of precision to such pricing and greatly facilitated the management and trading of financial risks.

A facilitating factor has been the revolution in information technologies, which has increased the ability of investors and creditors to better manage their portfolios and to undertake more robust analyses of credit and market risks. The increased computing power has fundamentally transformed the way information is processed by financial institutions, enlarged the databases that can be managed, and facilitated the pricing of complex derivative products. Improvements in telecommunication technology have complemented changes in computer technologies by allowing for both more rapid transmission of information across markets and better control over geographically dispersed financial operations. These technological changes have affected flows to emerging markets by increasing the efficiency of global securities markets in processing and managing the issuance of bond and equity issues, by facilitating the syndication of bank loans, and by providing emerging market borrowers and investors with derivative products with which to manage exchange rate, interest rate, and credit risks.

Taken together, the structural changes have implied that capital flows to emerging markets in the 1990s have occurred in a fundamentally different environment from that of the 1970s. The globalization of international bond and equity markets, as well as the growing role of institutional investors, has facilitated a shift from indirect finance (syndicated bank lending) to direct (bond and equity) finance. The advances in information technologies have also allowed international banks and investors to manage the risks associated with internationally diversified portfolios more easily. The management of the interest rate, exchange rate, and, more recently, credit risks associated with these portfolios has also been facilitated by the emergence of a variety of new derivative products. These structural developments have thus created incentives for international investors, especially institutional investors, to deal in an increasingly broad range of instruments issued by public and private borrowers from an expanding set of emerging markets.

Macroeconomic Pull and Push Factors

While structural changes in international financial markets have increased the role of institutional in-

vestors and improved the access of emerging market borrowers, recent empirical studies of the determinants of capital flows to emerging markets in the 1990s have also highlighted the roles played by macroeconomic policies and cyclical developments. The performance of emerging market economies during the 1990s stands in sharp contrast with that in the period between the emergence of the debt crisis in 1982 and the initiation of the Brady plan in 1989.[15] Fiscal deficits for emerging market countries that experienced debt-servicing difficulties fell from an average of 6 percent of GDP in 1983–89 to 3 percent of GDP in 1990–96. Although less progress was initially made in containing inflation, with the average rate of inflation for countries with debt-servicing difficulties rising from 77 percent a year in 1979–89 to 177 percent a year in 1990–95, the rate of this group fell to 36 percent in 1995 and 19 percent in 1996. By contrast, the real rate of output growth for the countries with debt-servicing difficulties rose from 2.2 percent a year in the period 1979–89 to over 6 percent in the period 1990–96. Similarly, exports of goods and services of this group of countries, which had grown at 6 percent a year in the 1983–89 period, expanded at an average annual rate of nearly 11 percent during the 1990–96 period. This surge of exports allowed for a decline in the ratio of external debt service payments to exports of countries with debt-servicing problems from 162 percent in 1990 to 128 percent in 1996 despite the rapid growth that had taken place in their external debt. Moreover, the ratio of external debt to GDP fell from 54 percent in 1990 to 37 percent in 1996.

The improving economic performance of many emerging market countries has played a key role in improving their access to international financial markets (see Figures 12 and 13 in the report and the discussion in Annex I). Indeed, between end-1989 and the first quarter of 1997, the number of emerging market countries with a Moody's credit rating almost quintupled, rising from 11 to 52 (Table 72). And, since the beginning of 1996, there have been many more upgrades than negative actions by major credit rating agencies.

In addition to the improvement in macroeconomic performance of emerging market countries, recent studies have stressed the key role played by the extensive privatizations undertaken by this group of countries, and more generally, by the switch to a strategy of opening their economies to international trade and capital flows.

Empirical studies have also emphasized the impact of changes in the global macroeconomic environment during the 1990s. Inflation in the major industrial countries has continually declined between 1990 and

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[15]The recent evolution of the macroeconomic performance of emerging market economies has been examined in detail in various IMF *World Economic Outlook* reports issued during the 1990s.

Table 72. Moody's Initial Ratings of Emerging Market Countries

	1989 and Before	1990	1991	1992	1993	1994	1995	1996	1997:Q1
Rated countries									
Yearly total	11	1	0	1	5	8	5	16	5
Cumulative total	11	12	12	13	18	26	31	47	52
Africa									
Mauritius								Baa2	
South Africa						Baa3			
Tunisia							Baa3		
Asia									
China	A3								
Hong Kong, China	A2								
India	A2								
Indonesia						Baa3			
Korea	A2								
Malaysia	Baa1								
Pakistan						Ba3			
Philippines					Ba3				
Singapore	Aa3								
Taiwan Province of China						Aa3			
Thailand	A2								
Europe									
Bulgaria								B3	
Czech Republic					Baa3				
Croatia									Baa3
Cyprus								A2	
Hungary	Baa2								
Kazakhstan								Ba3	
Malta						A2			
Lithuania								Ba2	
Moldova									Ba2
Poland							Baa3		
Romania								Ba3	
Russia								Ba2	
Slovak Republic							Baa3		
Slovenia								A3	
Turkey				Ba3					
Middle East									
Bahrain								Ba1	
Egypt								Ba2	
Israel							A3		
Jordan							Ba3		
Kuwait								Baa1	
Lebanon									B1
Oman								Baa2	
Qatar								Ba1	
Saudi Arabia								Baa3	
United Arab Emirates								Baa1	
Western Hemisphere									
Argentina	Ba3								
Bahamas									A3
Barbados						Ba2			
Bermuda						Aa1			
Brazil	Ba1								
Chile						Baa2			
Colombia					Ba1				
Mexico		Ba2							Baa1
Panama									
Peru								B2	
Trinidad and Tobago					Ba2				
Uruguay					Ba1				
Venezuela	Ba3								

Note: Moody's rating:
    Investment grade—Aaa, Aa, A, Baa
    Noninvestment grade—Ba, B
    Default grade—Caa, Ca, C, D
In addition, numbers from 1 (highest) to 3 are often attached to differentiate borrowers within a given grade.

1996, with the average annual rate of inflation for this group of countries falling from slightly above 4 percent to less than 2 percent. As a consequence, their nominal short- and long-term interest rates have fallen: short-term rates from an average of 7.3 percent in 1987–90 to 4.3 percent in 1994–96, and long-term rates from 8 percent to 6.3 percent during the same periods. Many observers argue that these declines in nominal interest rates in industrial countries have been a crucial influence on the amount of capital flowing to emerging markets.

Recent research seems to indicate that economic fundamentals and profitable opportunities in recipient countries combined with changes in international interest rates influence flows to emerging markets. The weight of evidence does not seem to favor the view, expounded in earlier research (for example, Calvo, Leiderman, and Reinhart, 1993; Fernandez-Arias, 1996), that movements in international interest rates are the most important factor influencing the magnitude of flows. An update of the Calvo and others (1993) analysis in World Bank (1997) indicates (1) the degree of co-movement of flows to emerging markets was much lower in the 1993–96 period relative to the 1990–93 period; (2) the correlation between U.S. interest rates and total flows to emerging markets, which was negative over the 1990–93 period, is close to zero over the period 1990–96. The lower correlation between *total* flows to emerging markets and U.S./industrial country interest rates can be explained by the fact that foreign direct investment, which is largely unresponsive to (moderate) changes in international interest rates, has increased as a proportion of total capital flows to developing economies. The role of bank lending has declined and FDI flows have gradually increased to become the largest component, rising from 26 percent of total flows in 1991–92 to 45 percent in 1995–96.

Appendix 1
Determinants of Balance of Payments and Banking Crises

Reversals in capital inflows have been associated with balance of payments and banking crises. Recent research has focused on identifying a set of macroeconomic and financial indicators that appear to be the main determinants of such events and could possibly be useful as a set of early warning indicators of a country's vulnerability to crises.

Balance of Payments Crises

Empirical studies of the determinants of balance of payments crises utilize variables that play a key role in theoretical models of speculative attacks.

Theoretical Models

The early theoretical models argued that balance of payments crises occurred when deteriorating macroeconomic fundamentals became inconsistent with a fixed exchange rate regime. Krugman (1979) and Flood and Garber (1984a, b), for example, developed models in which excessive domestic credit expansion led to a gradual loss of international reserves and ultimately to a speculative attack on the domestic currency that forced the authorities to abandon the fixed parity and adopt a flexible exchange rate regime. Excessive domestic credit expansion could arise as a result of the need to finance a government budget deficit or to provide financial assistance to a weak banking system or both. Moreover, the credit creation could also spill over to domestic goods markets, leading to an increase in the relative price of nontraded goods, and thereby a real exchange rate appreciation that would contribute to a trade deficit or smaller trade surplus. Furthermore, if there was uncertainty about the domestic credit policy or the level of reserves that the authorities were willing to commit to defend the exchange rate, domestic interest rates would gradually increase as the crisis became more likely.[16]

More recent theoretical models of balance of payments crises argue that a fixed exchange rate regime can be maintained only as long as it is compatible with other policies. These theories imply that a crisis can arise even if there is no deterioration of economic fundamentals (Obstfeld, 1994). For example, a government may be forced to abandon a fixed exchange rate if defending the parity involves increases in interest rates that unduly increase the costs of servicing the domestic debt or seriously weaken the banking system.

A key feature of the more recent analyses is that macroeconomic policies are not regarded as predetermined but are taken as responding to the expectations of agents. This interdependence creates the possibility of self-fulfilling crises—crises arising without obvious policy inconsistencies—that are difficult to predict. However, the new theories do not assert that exchange rates can be attacked irrespective of economic fundamentals. Rather, they suggest it is necessary to consider a broader set of fundamentals that affect the government's and market participants' incentives and constraints when examining the determinants of balance of payments crises. More important, recent models show that the ability of a sudden change in expectations to trigger an attack is bounded by the position of fundamentals, such as the amount of short-term debt that the government has to roll over (Obstfeld, 1994; Calvo, 1995; and Cole and Kehoe, 1996), the desired degree of sterilized intervention (Flood and Marion,

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[16]For an extensive review of the early speculative attack literature see Agénor, Bhandari, and Flood (1992).

1996), or the access to international liquidity from private sources or other central banks (Lall, 1997).

Empirical Evidence

A number of studies have attempted to estimate the probability of a devaluation on the basis of fundamentals implied by various theoretical models of balance of payments crises. In an early study of devaluations in Mexico, Blanco and Garber (1986) estimated the probability of a devaluation occurring in the next quarter by comparing a "shadow" exchange rate—determined by a set of fundamentals that included the evolution of real income and money demand, as well as domestic credit creation—and the official fixed parity. They estimated probabilities of devaluation that increased to peaks of 20 percent just prior to the major devaluations of 1976 and 1982 and fell to low levels immediately after the devaluations. Cumby and van Wijnbergen (1989) applied the speculative attack model to the Argentine crawling peg of 1979–81 and found that the probability of an attack was driven mostly by domestic credit creation and that it reached a level of roughly 80 percent just before the actual devaluation. In another application of the model to Mexico's experience in the 1980s, Goldberg (1994) found that the probability of a devaluation over a one-month forecast horizon reached nearly 100 percent just before the crisis and that domestic credit creation—rather than external credit constraints or deviations from purchasing power parity—was the main driving force of the speculative attacks.

In an attempt to characterize the nature of balance of payments crises across a broad range of emerging markets, Frankel and Rose (1996) studied a panel of annual data from 1971 through 1992 for over a hundred emerging market countries. The authors classified the potential determinants of currency crashes into four categories: (1) domestic macroeconomic indicators, such as monetary (credit) and fiscal shocks; (2) external variables, such as real exchange rate appreciation, the size of the current account imbalances, and the level of external indebtedness; (3) foreign variables, such as OECD output growth and world interest rates; and (4) the maturity and ownership composition of the external debt. The study confirmed previous results: balance of payments crises tend to occur when domestic credit growth is high, and when international reserves and output growth are low. Such crises also tend to be associated with increases in world interest rates, real exchange rate appreciations, and a fall in FDI inflows. Interestingly, neither current account nor government deficits appear to have a statistically significant effect on a typical balance of payments crisis. However, high ratios of short-term external debt, of concessional debt, and of public debt to total external debt appear to increase the probability of a balance of payments crisis in the next year.

The Mexican crisis of 1994–95 and its impact on other emerging markets—the so-called Tequila effect—stimulated a number of recent studies. For example, Sachs, Tornell, and Velasco (1996) identified three major factors that determined whether a country was vulnerable to a financial crisis: a low level of international reserves relative to broad money; a large appreciation of the real exchange rate; and a weak banking system. These three factors explain around 70 percent of the variability of a "crisis index" for a sample of 20 emerging markets in the period November 1994–June 1995. Other factors, such as the size of a country's current account deficit, the scale of capital inflows, and the fiscal position during the period 1990–94, did not help predict the occurrence of a balance of payments crisis.

Kaminsky, Lizondo, and Reinhart (1997) propose a new methodology for the design of an early warning system for balance of payments crises. Examining a group of earlier empirical studies, the authors attempt to identify those indicators found to be most useful in predicting crises. These earlier empirical studies include some that focus on estimating the probability of a crisis—as discussed above—as well as others in which the behavior of the indicators in the precrisis period was systematically compared with its behavior in a control group (consisting of either noncrisis countries or the same country in "tranquil" times). A summary of those indicators is provided in the first two columns of Table 73. The authors conclude that an effective warning system should consider a broad variety of indicators because currency crises seem to be preceded by multiple economic, and sometimes political, problems. Variables regarded as the most useful indicators of currency crises include international reserves, domestic credit expansion, credit to the public sector, the real exchange rate, and domestic inflation. In addition, output growth, the trade balance, export performance, and the fiscal deficit have shown some usefulness as predictors of crises. The structure of the external debt and the current account balance were not regarded as useful indicators.

Based on their review, Kaminsky, Lizondo, and Reinhart (1997) propose a "signals" early warning system and they use this approach to analyze 76 currency crises that occurred in 15 developing countries and 5 industrial countries during 1970–95. The authors define a crisis as a period in which an index of "exchange market pressure" (comprising a weighted average of monthly percentage changes in the exchange rate and in gross international reserves) is above its sample mean by more than three standard deviations. An indicator signals a crisis when the deviation from its mean crosses a threshold level, which is defined using the tail-ends of the distribution of the indicator over the sample period. The approach allows the authors to measure how often an indicator gives good signals—that is, when the signal was indeed fol-

Table 73. Performance of Crises Indicators

| Indicators | Regression Studies[1] | | "Signals" Approach (Percentage of crises called) | |
	Number of studies considered	Statistically significant results	Balance of payments crises	Banking crises
Capital account				
International reserves	13	12	75*	81
Short-term capital flows	2	1	n.a.	n.a.
Domestic-foreign interest				
differential	2	1	86	100*
Other	2	1	n.a.	n.a.
Debt profile				
Share of short-term debt	2	0	n.a.	n.a.
Other	7	2	n.a.	n.a.
Current account				
Real exchange rate	12	10	57**	58**
Current account balance	6	2	n.a.	n.a.
Trade balance	3	2	n.a.	n.a.
Exports	3	2	85**	84*
Imports	2	1	54	60
Terms of trade	2	1	79	95
Other	3	0	n.a.	n.a.
International				
Foreign interest rates	3	1	n.a.	n.a.
Foreign price level	2	1	n.a.	n.a.
Foreign real GDP growth	1	0	n.a.	n.a.
Financial				
Credit growth	7	5	56*	50
Money multiplier	1	1	73*	71**
Real interest rates	1	1	89	100*
Lending/deposit rates	1	0	67	69
Money supply-demand gap	1	1	61*	39
Change in bank deposits	1	0	49	64
M2/reserves	2	2	80**	77
Money	3	2	n.a.	n.a.
Inflation	5	5	n.a.	n.a.
Other	4	4	n.a.	n.a.
Real sector				
Real GDP growth or level	8	5	77*	89*
Unemployment	3	2	n.a.	n.a.
Change in stock prices	1	1	64**	80**
Other	1	1	n.a.	n.a.
Fiscal				
Fiscal deficit	5	3	n.a.	n.a.
Credit to public sector	3	3	n.a.	n.a.
Government consumption	1	1	n.a.	n.a.
Institutional/structural				
Exchange/capital controls	2	1	n.a.	n.a.
Financial liberalization	2	1	n.a.	n.a.
Other	7	4	n.a.	n.a.
Political	4	3	n.a.	n.a.

Sources: Based on Kaminsky and Reinhart (1996); and Kaminsky, Lizondo, and Reinhart (1997).
Notes: *means that the indicator has a noise-to-signal ratio of less than 75 percent.
　　　　**means that the indicator has a noise-to-signal ratio of less than 50 percent.
　　　　n.a. indicates variable was not considered in the cited sources.
[1]Balance of payment crises.

lowed by a crisis in the next 24 months—as well as how often it gives a false signal ("noise")—that is, it is not followed by a crisis in the next 24 months. The third column in Table 73 shows that virtually every in-dicator correctly identified a crisis in at least half of their respective samples. The authors then argue that the noise-to-signal ratio can be used to decide which indicators to drop from the list of possible indicators.

An increase in the ratio of lending to deposit rates and a sudden fall in bank deposits—indicators of solvency and liquidity problems in the banking system, together with rapid import growth, were eliminated on these grounds. A considerable real exchange rate appreciation, a slowdown in export growth, a fall in stock market prices, and an increase in the ratio of M2 to reserves are the most efficient indicators of a currency crisis. A low level of international reserves, excess credit growth, and a recession also give fairly accurate signals of a potential balance of payments crisis.

Balance of Payments and Banking Crises

Several recent studies have attempted to identify the linkages between balance of payments crises and banking crises, where the latter are defined to encompass situations in which many banks suffer severe liquidity or solvency problems or both. Banking systems in emerging markets have been viewed as more vulnerable to crises than those in mature markets (Mishkin, 1996). First, emerging markets are often subject to large and volatile swings in the terms of trade that can adversely affect the debt-servicing capacity of a country's export- and import-competing industries and thereby weaken domestic banks' balance sheets. Second, unanticipated devaluations can severely damage balance-sheet positions, especially when banks and nonfinancial firms have issued large amounts of foreign-currency-denominated debt during periods of protracted real exchange rate appreciation. Third, when deregulation of the financial system leads to rapid credit expansion, a sharp increase in nonperforming loans is likely, especially when banks have weak credit evaluation systems and there is inadequate bank supervision (Goldstein and Turner, 1996; Honohan, 1997).

There have been far fewer cross-country studies of the determinants of banking crises than of balance of payments crises, reflecting in part the fact that it is difficult to obtain reliable and comparable balance-sheet data for banks.[17] Kaminsky and Reinhart (1996) apply the "signals" approach to 26 banking crises during the period 1970–95. The main results of that study are presented in the last column of Table 73. Recessions and large corrections in the stock market preceded over 80 percent of the banking crises. High real interest rates were associated with all of the 20 crises for which interest rate data were available. Large terms of trade deteriorations over the preceding 24 months

foreshadowed a banking crisis in 95 percent of the cases studied. However, the terms of trade indicator did not have much predictive success, as it crossed the threshold in a large number of episodes in which a crisis did not result (having a noise-signal ratio of approximately 1).[18] The evidence from credit growth seems to confirm that the effects of lending booms have been mixed (Goldstein and Turner, 1996; Caprio and Klingebiel, 1997). While rapid growth in financial intermediation, as measured by the growth of the money multiplier, quite accurately signals a future crisis in more than 70 percent of the cases, the same is not true for the indicator on credit growth (Table 73). Finally, the appreciation of the real exchange rate is as good a signal for banking crises as it is for balance of payments crises, and is also quite accurate.

Theoretical Analyses

A key question addressed in recent studies is the direction of causation between balance of payment crises and banking crises. Indeed, one difficulty is that both crises may have common roots in domestic and external macroeconomic developments.

Most studies assume that there are two ways in which a balance of payments crisis could lead to a banking crisis. First, a large loss in international reserves that leads to the abandonment of the fixed parity could, if not sterilized, produce a sharp decline in credit availability that may lead to increased bankruptcies of nonfinancial firms and consequently a banking crisis. Indeed, if depositors participate in the run against central bank reserves, they may force the commercial banks to suspend the convertibility of deposits (as was the case in the U.S. financial panic of 1893 (Miller, 1996)) or to reduce lending abruptly and force the liquidation of profitable investments. Second, a devaluation could create insolvencies among banks that had taken large foreign exchange exposures.[19] Even if the foreign exchange position of the banks is small, a large number of loans to nontradable sectors (such as the real estate sector) could lead to a large number of nonbank insolvencies that, in turn, could weaken the banks' positions.

A banking crisis could give rise to a balance of payments crisis if the central bank allowed an excessive expansion of domestic credit to finance the bailout of the banks or the depositors or both under an explicit or implicit deposit insurance scheme. Velasco (1987)

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[17]Most studies analyze specific cases of banking crises, with an emphasis on the macroeconomic determinants of the crises (see Sundararajan and Baliño (1991) and Lindgren, Garcia, and Saal (1996)). Caprio and Klingebiel (1997) also stress microeconomic determinants of banking crises, such as poor supervision and regulation, deficient bank management, and political interference in lending decisions.

[18]Using a larger sample of banking crises, Caprio and Klingebiel (1997) found that, in 75 percent of the cases, the terms of trade fell by more than 10 percent in the years preceding the episode, with an average fall of 17 percent.

[19]That over-the-counter derivatives and other investment vehicles facilitate the avoidance of prudential bank regulations—in particular, with respect to foreign exchange exposures—was demonstrated in the Mexican crisis of 1994–95 (Garber, 1996).

shows that a government with otherwise prudent financial policies could be forced to expand domestic credit in order to support the banking system and thereby generate a balance of payments crisis. Alternatively, if the government finances the bailout by issuing large amounts of domestic debt, market participants may perceive that the authorities have incentives to reduce the burden of the debt through inflation or currency devaluation and this may lead to a self-fulfilling crisis.

Another possibility is that both balance of payments and banking crises are the result of common macroeconomic developments. Especially important in this regard are large swings in world interest rates that influence business conditions in emerging markets and at the same time the volume of capital flows, which in such markets are often intermediated by the banking system (Calvo, Leiderman, and Reinhart, 1993; IMF, 1995). The growing integration of world capital markets in the 1990s has dramatically increased the opportunities for investors to diversify risks. It has been argued, however, that highly diversified investors may not have the incentive to learn about individual countries because each constitutes a small share of the portfolio, and this situation could make capital flows highly sensitive to new information (Calvo, 1995). A large capital outflow could produce a sharp reduction in banks' domestic deposits, and, unless offset by central bank actions, this could magnify the response of foreign investors and cause both a balance of payments and a banking crisis (Goldfajn and Valdés, 1997).

Empirical Evidence

In their study of 76 balance of payments and 26 banking crises, Kaminsky and Reinhart (1996) note that there was no apparent link between both types of crises during the 1970s, when financial markets were highly regulated and banking crises were rare events. In the 1980s and 1990s, however, balance of payments and banking crises became much more closely linked following the widespread deregulation of financial markets. Indeed, the authors find that banking crises precede—and help predict—balance of payments crises, while the converse is not true. More than half of the banking crises studied were followed by a balance of payment crisis within three years and about one quarter of the banking crises began a year (or less) before a currency crisis. The crises in the southern cone of Latin America in the early 1980s (Argentina, Chile, and Uruguay in 1981–82), those in the Nordic countries (Finland, Norway, and Sweden in 1991–92) as well as those in Brazil (1987), Colombia (1983), Mexico (1984), Peru (1985), Thailand (1983), Turkey (1994), and Venezuela (1994) were among the cases in which financial crises began before the turmoil in foreign exchange markets. Although the authors found

statistical evidence that banking crises help predict balance of payments crises, they concluded that both crises were the result of common financial developments, which included either financial liberalization or improved access to international capital markets that is accompanied by a boom-bust cycle in asset prices and economic activity.

Kaminsky and Reinhart (1996) also conclude that since most of the crises are preceded by a deterioration in fundamentals, it would be difficult to characterize them as a result of self-fulfilling changes in market expectations. As noted in Table 73, both types of crisis are preceded by recessions, in part due to a worsening of the terms of trade, an overvalued exchange rate, and steep increases in real interest rates. The rapid increase in financial intermediation, reflected in the growth of the money multiplier and the M2/reserves ratio, also increases the financial vulnerability of economies to a reversal of capital flows or steep declines in asset prices.

Appendix 2

Speculative Attacks in the 1990s: Have Economic Models Got It Right Yet?

The speculative attacks that forced devaluations in Europe in 1992–93 and the devaluation and subsequent floating of the peso in Mexico in 1994 were dramatic events that stimulated a large body of research intended to evaluate the lessons learned from the attacks. That new research builds off a base that originates in the rational expectations revolution of the 1970s and 80s. The use of forward-looking expectations spawned a theory of speculative attacks that allowed economists to view such attacks on fixed exchange rate regimes as infrequently observed but completely standard events rather than pathologies.

The first generation of papers, published around 1980, modeled speculative attacks as the market's attempt to profit from dismantling inconsistent government policies through the money markets.[20] In these models, speculators fully understand the market and realize that fiscally required excessive money creation combined with a fixed exchange rate are inconsistent policies over the longer run. Printing money allows countries to finance fiscal deficits but leads to an excess supply of domestic money, to be cashed in for international reserves. Speculators realize that eventually reserves will be exhausted and policy adjusted—either the printing presses will stop or the currency will be devalued.

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[20]See Salant and Henderson (1978), Krugman (1979), and Flood and Garber (1984b). Agénor, Bhandari, and Flood (1992) survey this literature.

The insight of the first-generation models rested on the prediction that the attacked currency's interest rates jump upward after the attack. This could be expected, it was argued, if the attacked exchange rate were allowed to float after a successful attack. The idea is that after the attack, the currency will depreciate, reflecting continued excessive domestic money printing. Domestic currency interest rates jump upward after the attack to compensate for expected currency depreciation. Higher domestic currency interest rates induce portfolio holders to shift wealth out of interest-rate-controlled assets like currency.

Normally, such a portfolio reallocation is accompanied by a price change—here a depreciation of the domestic currency reflecting the size of the portfolio reallocation. Anticipating this price change, speculators rush to the central bank to exchange domestic money for international reserves, hoping for a capital gain. This portfolio speculation is the attack. Foreign-currency-denominated assets move from public to private portfolios, and domestic currency assets from private to public portfolios. The asset shift matches the demand shift that set it in motion. Usually, the larger is the attack, the smaller is the price change required to rebalance portfolios.

As an extreme example, imagine a speculative attack foreseen perfectly by speculators. Here speculators can be expected to compete away foreseen riskless profits so that the exchange rate does not jump at all at the time of the attack. To find out when the speculative attack takes place, find the point in time when remaining international reserves at the domestic central bank, which are slowly being depleted, precisely match the portfolio reallocation indicated by the post-attack interest rate shift. At this instant, remaining reserves are sold to speculators precisely fulfilling shifted private demand. This simple scenario, which has been extended widely, provides the first insight into interpreting a speculative attack as a market's response to inconsistent policies.

This story worked well in helping to interpret speculative attacks in developing countries such as Argentina in 1981 and Mexico in 1982.[21] It ran into at least three problems, however, with the attacks in the 1990s. First, in the 1992–93 European attacks, month-to-month reserve changes did not tell the entire story of government commitments in the exchange markets. Second, in the recent European and the Mexican episodes, the speculative attacks were largely sterilized and therefore not allowed to disturb domestic money supplies. Third, while underlying money growth (fiscal finance) in the first generation was excessive, policy in some countries, France for example, seems not to have been overly expansionary.

The first problem is the easiest to deal with. The first-generation models were quite explicitly set up to mimic small countries whose capitulation to an attack involves allowing the exchange rate to float and whose actions do little to influence large partners. The European crises involved large countries that devalue in crisis (not float) and had entered into borrowing arrangements with each other and with the anchor country, Germany. With devaluation rather than flotation, the first-generation models allow for reserve losses prior to devaluation, but then predict an *equally large inflow after the devaluation,* which may occur too quickly to be picked up from monthly reserve observations. Speculation against a country's currency peg to the anchor is speculation against both the country's reserve stock and against that country's borrowing arrangements. In the event of the attack, the borrowing arrangements broke down. Fulfilling the borrowing arrangements would have compromised German monetary policy. Seeing the collapse of their credit lines, countries such as the United Kingdom took discretion to be the better part of valor and devalued. This is entirely consistent with the first-generation models, albeit in an expanded multicountry version.

The second problem is a bit harder to solve. The hallmark of the first-generation models is the final attack on international reserves that results in an equal decline of the domestic money supply. In the recent attacks, reserve losses were sterilized, insulating the money supply against the speculative attack.[22] The insulation is secured by the monetary authorities who, at the instant of the speculative attack, expand the domestic component of the monetary base to offset the effect of reserve losses on the money supply. The domestic part of the base is normally expanded by an open market purchase of domestic government securities and in this case the open market operation is precisely the size of the speculative attack. Thus, sterilization moves the portfolio-adjustment part of the speculative attack from the money market into the bond market.

This switch of markets in no way changes the basic principles of the attack, but it complicates the story and puts it on much less firm footing. When moved to the bond markets, the first-generation speculative attack scenario requires that changes in the stocks of bonds available to the private sector influence interest rate spreads. The attack scenario must rely, therefore, on *risk aversion,* the economic property that is relevant for determining the effectiveness of sterilized intervention. If bond market participants are risk averse—at least in the short run—then sterilized intervention may be effective and the attack scenario is basically unaltered except for the interpretation of a few parameters. If risk aversion is not present, however,

[21]See Cumby and van Wijnbergen (1989) on Argentina and Blanco and Garber (1986) on Mexico.

[22]See Flood, Garber, and Kramer (1996).

then sterilized intervention is ineffective—even in the short run—and we simply have to look elsewhere for a speculative attack model. Presently, our empirical understanding of risk aversion in exchange markets is minimal. Traces of it show up regularly, usually as statistical demonstrations that market participants almost certainly are not risk neutral. Yet simple aggregate models of risk aversion, including those based on privately available bond stocks, perform poorly.

The third problem involves the observation that in the 1990s attacks, particularly in Europe, some governments' policies were not overly expansionary and need not have caused a crisis. Instead of having an expansive government as the root cause of the attack, government reactions to private expectations become the important element in triggering the crises. In these models, the private expectation of currency depreciation can put the government in a bind that it can escape from only by depreciating the currency. In this sense, currency crises can be self-fulfilling events. Expecting the crisis can make it more likely to happen. Research like this is called *second generation.*[23]

Private expectations can impose pressures on government. A private sector may expect currency depreciation, for example, and that will be built into interest rates (raising them), labor contracts (raising wages), and other pricing decisions (causing seemingly unwarranted inflation). A government with other problems—a fragile banking system, voters with floating-rate mortgages, unemployed workers at a low point in the business cycle—may attempt to reduce these pressures by fulfilling private expectations. The idea is that once satisfied, these expectations will abate, at least for a while, so interest rates will fall and labor market difficulties will be eased. Following this logic, the expectation of depreciation can cause a depreciation in a self-fulfilling way. If the private sector expects depreciation, a well-meaning government may need to depreciate, but if the private sector does not expect depreciation, then none may be needed. There may be *multiple equilibria,* and which one is chosen depends entirely on expectations.

Were such multiple equilibria present in the 1992–93 European attacks or the 1994 Mexican episode? The empirical verdict is still out. This approach matches up well with the lack of excessive expansion in fundamentals before the crisis in some European countries, but since this was the observation that initiated the approach, it cannot be regarded as independent confirmation. The currency depreciations proposed in this approach do not exist in a vacuum, however. Other nominal magnitudes or policies have to be adjusted after the depreciation, and these fail to show up consistently in the empirical work. For example, little postattack expansion occurred in France, but there was some easing in Germany and the United Kingdom. Thus, current research suggests while self-fulfilling crises are not the norm, they cannot always be ruled out.[24]

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[23]See Flood and Garber (1984a), and Obstfeld (1997).

[24]See Eichengreen, Rose, and Wyploz (1995).