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May 11, 1995

To: Members of the Executive Board

From: The Secretary

Subject: International Capital Markets - Developments and Prospects,
           and Key Policy Issues - Background Material Part I - The
           <u>Crisis in Emerging Markets</u>

        The attached paper provides background material to the report on
*International Capital Markets - Developments, Prospects, and Key Policy
Issues*, which was circulated as EBS/95/75 on May 8, 1995, and is tentatively
scheduled for discussion on Wednesday, May 24, 1995.

        Mr. Folkerts-Landau (ext. 37665) or Mr. Schinasi (ext. 36613) is
available to answer technical or factual questions relating to this paper
prior to the Board discussion.

Att: (1)

Other Distribution:
Department Heads

INTERNATIONAL MONETARY FUND

International Capital Markets
Developments, Prospects, and Key Policy Issues

Background Material Part I: The Crisis in Emerging Markets

Prepared by the Research Department and
the Policy Development and Review Department

Approved by Michael Mussa and Jack Boorman

May 10, 1995

<table>
<tr><td colspan="4" align="center">Contents</td><td align="right">Page</td></tr>
<tr><td colspan="5"></td></tr>
</table>

Charts

I. Introduction

This paper provides background information for the staff report on "International Capital Markets: Developments, Prospects, and Policy Issues" (EBS/95/75). The first three chapters describe and analyze the economic and financial developments leading up to, and surrounding, the recent turbulence in emerging markets. Chapter II describes the evolution of capital flows to the developing countries in recent years, with particular focus on the period 1990-94. The chapter highlights the growing importance of portfolio flows and changes in the investor base for emerging market investments. Chapter III reviews the evolution of financial market developments during the period before and after the devaluation of the Mexican peso in late 1994. The chapter also describes the extent of financial market spillovers to other emerging markets. Chapter IV then steps back and examines the Mexican peso devaluation from the perspective of the "speculative attack" literature. Without formally testing a specific model, the analysis in this chapter suggests that, with some caveats, the events in Mexico conformed to many of the classic properties of a "speculative attack."

The next four chapters address two sets of issues relating to capital inflows: the macroeconomic policy responses, including the imposition of capital controls, to previous surges of capital inflows; and the financial sector issues that arise in developing countries that experience sizable and volatile capital flows. Chapter V examines the monetary, exchange rate, and fiscal policy responses that developing countries have used in the past to respond to surges of capital inflows, either to insulate the domestic economy from the inflow or to deal with the macroeconomic consequences of the inflow. The chapter documents, for example, where and when sterilization efforts were implemented, what forms of sterilization were employed, and whether they were effective. Chapter VI examines the experience with using capital controls either to prevent inflows in the first place or to limit the size and speed of outflows. Chapter VII then turns to the domestic financial sectors of recipient countries and examines the impact that large and volatile inflows can have on domestic banking sectors. This chapter also analyzes the effects inflows can have on domestic securities markets--in particular on equity markets--by presenting the results of empirical tests on market efficiency, market volatility, and market linkages and spillovers. Finally, Chapter VIII analyzes how the characteristics of domestic financial systems and the financial condition of the banking system can act as constraints on policy responses to a reversal of flows and in periods of crisis. This chapter examines the effectiveness of the classic "interest-rate defense" against a speculative attack and the experience with currency boards; it also discusses the Mexican banking system and recent measures to strengthen it.

II. Capital Flows to Developing Countries 1/

1. Introduction

The 1990s have witnessed a dramatic revival and expansion in capital flows to developing countries and significant changes in the composition of these flows. Many Asian countries, building on their strong economic performances of the latter half of the 1980s, attracted increasing levels of inflows. Major countries in the Western Hemisphere experienced a reversal of previous outflows of flight capital and renewed access to international capital markets, as debt problems of the 1980s were resolved and strong economic adjustment programs and structural reforms created opportunities and suitable climates for investment and growth. At the same time, the external environment for developing country financing improved, with the slowdown in economic activity in the industrial countries and regulatory changes that facilitated developing country access to capital markets. Foreign direct investment flows surged, accounting for a large part of the increase in inflows to developing countries, particularly those in Asia.

The most significant development was the sharp rise in portfolio capital flows. A new term "emerging markets" entered the lexicon of investors, as growing amounts of funds were placed in the bonds and stocks of developing countries, especially Western Hemisphere countries. Commercial bank loans, which were the main financing vehicle during the last surge in capital inflows in the 1970s, have pick up somewhat during the early 1990s, but they account for a relatively small portion of total inflows. Net capital inflows to developing countries reached a peak in 1993, and although maintaining a high level, they declined in 1994 with the change in the external environment prompted by the strengthening of economic recovery in the industrial countries. Rising U.S. interest rates in early 1994 triggered considerable turmoil in financial markets world-wide. The Mexican devaluation in December 1994 prompted a sell-off of developing country securities and continues to influence developments in these markets.

The first section of this chapter reviews developments in net capital inflows to developing countries during the 1990s, with comparisons to experiences during previous periods. The second section discusses in more detail the evolution of portfolio capital flows, and the final section looks at the behavior of bank lending to developing countries.

2. *Total capital flows*

With the onset of the debt crisis in 1982, net capital inflows to developing countries as a group fell sharply. Average annual inflows dropped from around $30 billion in 1977-82 to less than $9 billion in

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1983-89 (Table 1). 1/ Experiences with capital flows during 1983-89 differed markedly across geographic regions (and individual developing countries). Western Hemisphere countries experienced a shift to substantial net capital outflows, reflecting the difficulties that many of these countries encountered in servicing commercial bank debts. In sharp contrast, net capital inflows to Asia increased slightly, led by a rise in foreign direct investment flows. This development reflected measures taken by a number of developing countries in Asia to correct for overvalued exchange rates; to open up their economies; to remove structural impediments to economic efficiency; and to establish a stable macroeconomic policy environment to foster sustained economic growth.

At the end of the 1980s, the stage was set for a new surge in capital flows to developing countries. Continued sound macroeconomic policies and strong economic growth in the dynamic Asian economies were accompanied by the broadening of economic reforms in other countries of the region (most notably China). Around this time as well, major debtor countries in the Western Hemisphere were moving to complete the normalization of their relationships with creditors, and countries across the region initiated economic adjustment programs and comprehensive structural reforms. Similar adjustment and reform programs were put in place in several major developing countries in Europe. With these policy actions came improvements in the domestic economic climates of a broad spectrum of developing countries. Adding significantly to these improved climates was a range of measures taken to strengthen local financial systems--including banking sector and stock market reforms, the rationalization of regulatory regimes, and the tightening of financial regulation and accounting standards. These developments increased opportunities for investment by foreigners and lowered perceptions of country risk, thus triggering strong interest in developing country assets among investors in industrial countries.

Moreover, the external environment for developing country financing improved in the early 1990s. The slowdown in economic activity in the industrial countries and the decline in interest rates, particularly in the United States, stimulated investor interest in developing country securities where returns were higher. Lower international interest rates, through their impact on the debt servicing costs of developing countries, also contributed to reducing perceptions of country risk. Regulatory changes in industrial countries--notably the relaxation of restrictions on private security placements in the United States--also facilitated access by developing countries to international capital markets, while trends toward global diversification of portfolios boosted investor demand. 2/ In addition, increasing international integration of production, led by multinational corporations seeking cost and geographical advantages,

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1/ These figures exclude net capital flows of capital exporting countries such as Kuwait and Saudi Arabia.

2/ For further discussion of portfolio diversification, see Chapter IV of Background Material Part II.

Table 1. Capital Flows to Developing Countries, 1977-94 1/

(Annual averages, in billions of U.S. dollars)

	1977-82	1983-89	1990-94
All developing countries 2/			
Total net capital inflows	30.5	8.8	104.9
Net foreign direct investment	11.2	13.3	39.1
Net portfolio investment	-10.5	6.5	43.6
Other 3/	29.8	-11.0	22.2
Asia			
Total net capital inflows	15.8	16.7	52.1
Net foreign direct investment	2.7	5.2	23.4
Net portfolio investment	0.6	1.4	12.4
Other 3/	12.5	10.1	16.3
Western Hemisphere			
Total net capital inflows	26.3	-16.6	40.1
Net foreign direct investment	5.3	4.4	11.9
Net portfolio investment	1.6	-1.2	26.6
Other 3/	19.4	-19.8	1.6
Other developing countries 2/			
Total net capital inflows	-11.6	8.7	12.7
Net foreign direct investment	3.2	3.7	3.8
Net portfolio investment	-12.7	6.3	4.6
Other 3/	-2.1	-1.3	4.3

Source: International Monetary Fund, World Economic Outlook (WEO) database.

1/ Flows exclude exceptional financing. A number of countries do not report assets and liabilities separately. For these countries, it is assumed that there are no outflows, so that liabilities are set equal to the net value. To the extent that this assumption is not valid, the data underestimate the gross value. Adjustments are also made to the WEO data to net out the effects of bonds exchanged for commercial bank loans in debt and debt service reduction operations and to provide additional detail on selected private capital flows.
2/ Excludes capital-exporting countries such as Kuwait and Saudi Arabia.
3/ Includes bank lending.

heightened interest in foreign direct investment in developing countries, particularly favoring countries in Asia and the Western Hemisphere.

Over the period 1990-94, average annual net capital inflows to developing countries amounted to $105 billion, with inflows increasing from about $40 billion in 1990 to a peak of $155 billion in 1993. During this period, there was a marked surge in foreign direct investment flows, which accounted for a significant portion of the increase in net inflows to developing countries. However, the most dramatic change was the rise in portfolio capital flows, in terms both of absolute levels and the share of total inflows. Not since the opening decades of the twentieth century have portfolio capital inflows been a significant source of financing for these countries.

In Asia, the rise in net inflows was largely accounted for by foreign direct investment, although this was accompanied by a significant rise in portfolio flows. The data on net foreign direct investment flows mask one important development that took place in the region. Increasingly, some of the more economically advanced economies in Asia (Taiwan Province of China, Hong Kong, and to a lesser extent, Korea) became sources of foreign direct investment flows to other countries in the region. In the Western Hemisphere, while foreign direct investment flows rose substantially, most of the shift from net capital outflows in 1983-89 to inflows in 1990-94 was accounted for by portfolio capital inflows.

The international economic climate began to change in 1994, as economic recovery in the industrial countries strengthened. The major impact of this development was seen in net portfolio capital flows to developing countries. Early in the year, increases in interest rates triggered considerable turbulence in financial markets world-wide. As a result, interest in developing country investments waned and new issues of securities in international markets by borrowers in developing countries fell significantly. With the restoration of relative calm in the markets after May 1994, developing countries returned to international bond and equity markets, but the terms on new issues were less favorable and only the better credit risks maintained access. The Mexican devaluation in December 1994 precipitated a broad sell-off of developing country securities by foreign investors in late December and early January 1995. While selling pressures were concentrated in Western Hemisphere markets, they temporarily spread to Asian markets in mid-January. Western Hemisphere markets generally remained under pressure until mid-April. In contrast, Asian markets recovered and appear to be experiencing some renewed inflows of portfolio capital. Since December 1994, issuing activity in international bond markets has been weak and equity issuance has come to a virtual halt. Most bonds issued in international markets have been placed by Asian entities.

3. Portfolio capital flows

Portfolio capital flows to developing countries consist of international placements of bonds, issues of equities in international

markets, and purchases by foreigners of stocks and financial market instruments in developing countries' domestic markets. Over the period 1990-94, international bond issues have been the major source of external funding for developing countries. International equity issues have also been an important funding source, but to some extent they may have simply served to spark the interest of investors in developing country stocks. The fastest growing segment of portfolio flows appears to have been direct purchases of securities in domestic markets. Data on these flows are limited; however, the rapid growth (both in terms of numbers and net asset holdings) of mutual funds dedicated to investing in developing country securities (so-called emerging markets mutual funds) suggests that by 1994 inflows generated by direct securities purchases were at least on a par with funds raised through bond issues.

a. International bond placements

Bond issuance by developing countries in international capital markets grew from $6 billion in 1990 to more than $59 billion in 1993, before declining slightly to $57.6 billion in 1994 (Table 2 and Chart 1). In relation to total bond issuance in international markets, the share of developing country issues rose from 2.8 percent in 1990 to 12.4 percent in 1993. Most of the proceeds of developing country bond issues over the period represented net capital inflows, as maturing bonds issued by developing countries amounted to about $32 billion during 1990-94. Although the range of borrowers widened significantly, most of the bonds were issued by borrowers from a limited number of Asian and Western Hemisphere countries and a few issuers in Europe. Private sector borrowers accounted for nearly half of bond issues by developing countries.

With unsettled conditions in international bond markets early in 1994, access to the market over the course of the year tended to be restricted to better quality developing country borrowers. Nonetheless, developing countries placed almost as many bonds as in 1993. Asian entities became the largest issuers, placing roughly half of the total bonds issued by developing countries in 1994. Entities in the Western Hemisphere continued to be major issuers, although total bond placements by borrowers in the region declined significantly. Mexico remained the single largest borrower among developing countries, despite the fact that its issuance activity fell off sharply during the course of the year. Bond issues by Argentina and Brazil, while remaining quite large, also were down significantly from their 1993 levels. In other regions, South Africa and Israel stepped up bond issuance in 1994, while issuance by Hungary and Turkey declined sharply, reflecting a deterioration of economic conditions in these countries. Following the Mexican devaluation, only a small number of developing countries, primarily Asian countries, have issued bonds in international markets, with total issues in the first quarter of 1995 amounting to $4.8 billion, only one-third of the quarterly average rate of issues in 1994.

CHART 1

INTERNATIONAL BOND ISSUES BY DEVELOPING COUNTRIES
AND U.S. LONG-TERM INTEREST RATE, 1990-95

International Bond Issues
(In billions of US dollars)

U.S. Long-Term Interest Rate
(In percent)
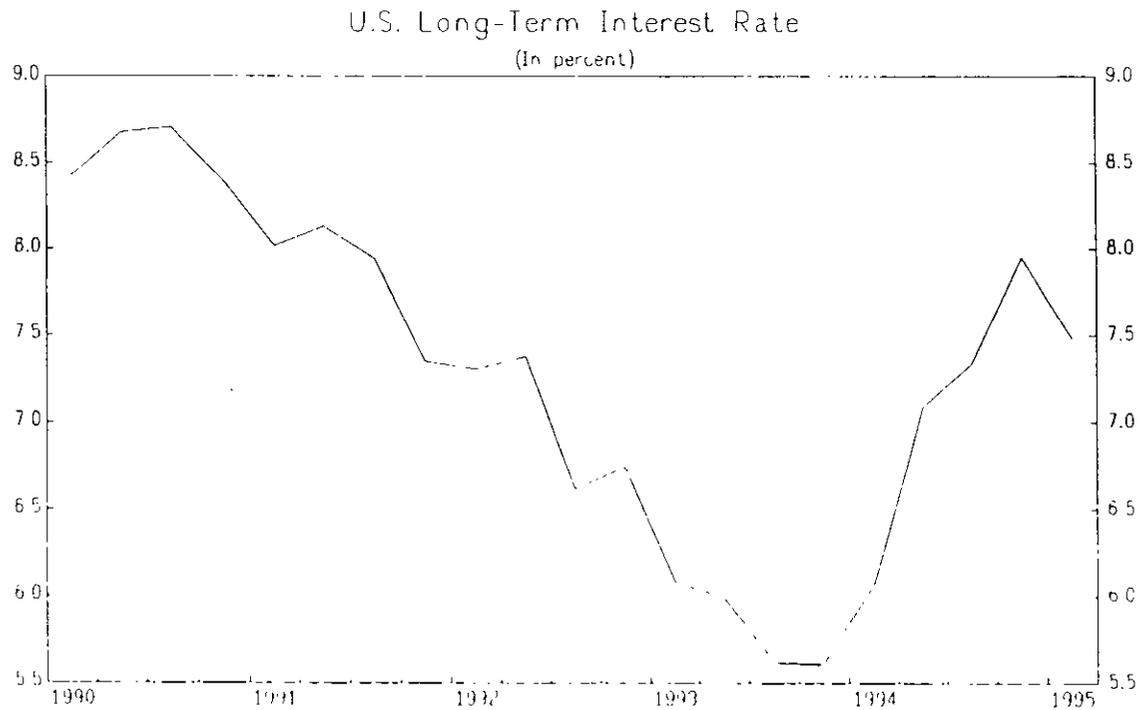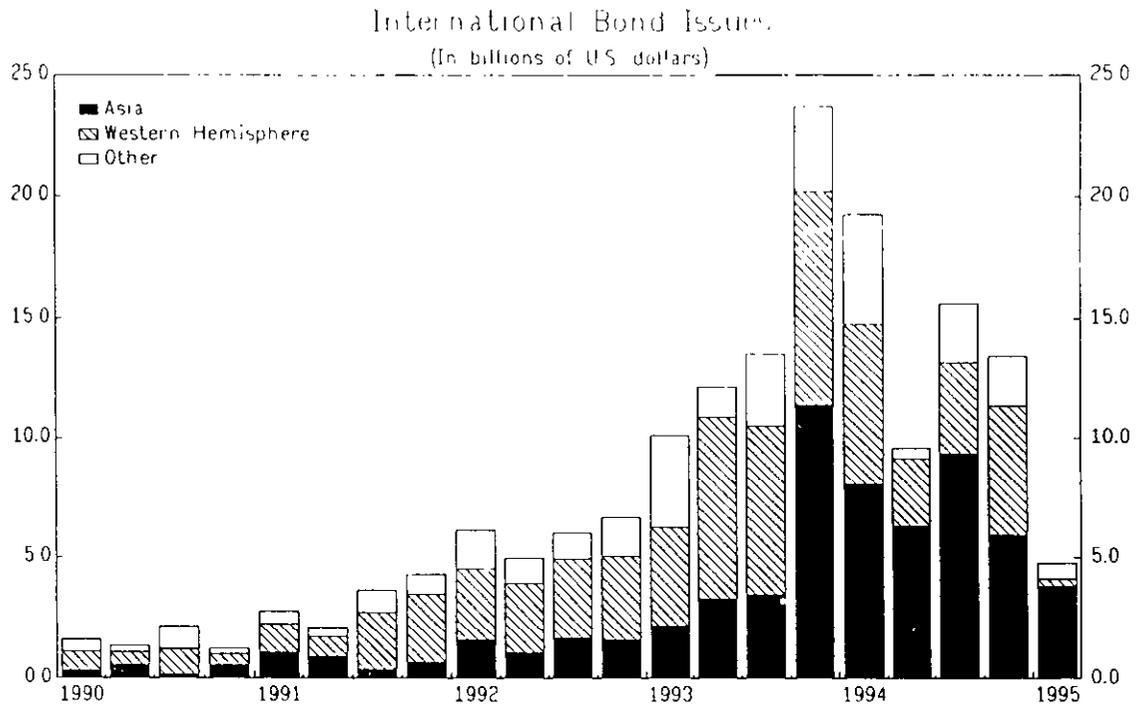
Sources. Eurobondware database; Financial Times, International Financing Review,
and International Monetary Fund, International Financial Statistics.

Table 2. International Bond Issues by Selected Developing Countries and Regions, 1990-First Quarter 1995 1/

(In millions of U.S. dollars)

	1990	1991	1992	1993	1994	1994 1st qtr.	1994 2nd qtr.	1994 3rd qtr.	1994 4th qtr.	1995 1st qtr
Developing countries	6,335	12,838	23,780	59,337	57,597	19,040	9,562	15,627	13,369	4,779
Africa	90	236	725	--	2,492	1,247	--	320	925	408
Congo	--	--	-	--	600	600	--	--	--	--
South Africa	--	236	725	--	1,615	370	--	320	925	158
Tunisia	--	--	--	--	277	277	--	--	--	251
Asia	1,630	3,000	5,917	20,401	29,639	8,066	6,290	9,346	5,936	3,830
China	--	115	1,359	3,047	4,077	1,650	876	888	668	154
Hong Kong	66	100	185	5,887	5,850	1,570	791	1,706	1,781	491
India	274	227	--	546	884	439	195	250	--	--
Indonesia	80	369	494	--	2,266	699	750	717	100	20
Korea	1,105	2,012	3,208	5,864	6,348	1,193	1,209	2,250	1,695	2,994
Macao	--	--	--	--	155	--	155	--	--	--
Malaysia	--	--	--	954	2,345	330	735	580	700	--
Pakistan	--	--	--	--	195	--	45	--	150	--
Philippines	--	--	--	1,293	1,144	154	385	345	261	--
Singapore	--	--	--	--	358	--	86	272	--	--
Taiwan Province of China	--	160	60	79	2,062	318	658	896	191	71
Thailand	--	17	610	2,247	3,955	1,713	407	1,442	391	100
Europe	1,856	1,960	4,561	9,638	3,542	1,055	439	921	1,127	254
Czech Republic	--	--	--	697	400	--	250	--	150	--
Czechoslovakia	375	277	129	--	--	--	--	--	--	--
Hungary	888	1,186	1,242	4,796	1,728	69	189	668	802	254
Malta	--	--	--	205	205	205	--	--	--	--
Russia	--	--	--	--	75	--	--	--	75	--
Slovak Republic	--	--	--	240	275	21	--	254	--	--
Turkey	593	497	3,190	3,905	859	760	--	--	99	--
Middle East	--	400	--	2,002	3,201	1,958	--	1,243	--	--
Israel	--	400	--	2,002	2,521	1,958	--	563	--	--
Lebanon	--	--	--	--	400	--	--	400	--	--
Saudi Arabia	--	--	--	--	280	--	--	280	--	--
Western Hemisphere	2,760	7,242	12,577	27,296	18,723	6,714	2,833	3,796	5,381	287
Argentina	21	795	1,570	6,233	5,319	1,460	900	879	2,080	--
Barbados	--	--	--	--	50	--	20	--	30	--
Bolivia	--	--	--	--	10	10	--	--	--	--
Brazil	--	1,837	3,655	6,679	4,036	1,180	100	595	2,161	50
Chile	--	200	120	433	155	--	--	155	--	--
Colombia	--	--	--	566	955	250	83	300	322	100
Costa Rica	--	--	--	--	50	50	--	--	--	--
Guatemala	--	--	--	60	--	--	--	--	--	--
Jamaica	--	--	--	--	55	--	--	55	--	--
Mexico	2,477	3,782	6,100	10,683	7,394	3,623	1,690	1,393	688	137
Panama	--	50	--	--	250	--	--	250	--	--
Peru	--	--	--	30	100	40	40	20	--	--
Trinidad and Tobago	--	--	100	125	150	--	--	150	--	--
Uruguay	--	--	100	140	200	100	--	--	100	--
Venezuela	262	578	932	2,348	--	--	--	--	--	--
Total bond issues in international bond markets	226,556	297,588	333,694	480,997	523,381	157,143	118,215	127,190	120,833	112,416
Shares of developing countries in global issuance	2.8	4.3	7.1	12.4	11.0	12.1	8.1	12.3	11.1	4.3

Sources: Euromoney database; Euroweek; Financial Times; and International Financing Review (IFR)

1/ Including note issues under European medium-term notes (EMTN) programs. Data for 1994 are based on Euromoney database and are not strictly comparable to data for 1991-93, which are estimated on the basis of data from Euroweek, Financial Times, and IFR.

The terms of new issues by developing countries improved significantly during the 1990s. The average yield spread at launch for U.S. dollar-denominated issues declined from over 400 basis points in 1991 to 288 basis points in the first quarter of 1994 (Table 3). 1/ The narrowing of spreads reflected a general improvement in credit ratings for developing countries, with several sovereign borrowers achieving investment grade ratings in the past few years. 2/ Over the period, Mexico set the tone for much of the market. The spread on Mexican sovereign issues narrowed from 800 basis points in 1989 to around 200 basis points at the end of 1993. As the first debt-restructuring country to re-establish access to international financial markets, Mexico tended to set a benchmark for measuring the riskiness of sovereign debt issues by other developing countries in the Western Hemisphere and other regions, particularly those with sub-investment grade ratings. Asian countries with good debt-servicing records have generally commanded lower spreads, reflecting the high credit ratings that generally have been assigned to them by major credit-rating agencies. Sovereign borrowers continued to pay lower spreads than private sector borrowers, although private entities have achieved notable improvements in spreads in recent years.

In the second quarter of 1994, spreads began to widen, reflecting the unsettled market conditions triggered by the increase in U.S. interest rates. The widening of the average spread during this period may not fully reflect the deterioration in market conditions, since bonds were issued primarily by higher-rated borrowers and carried shorter maturities. In the fourth quarter of the year, the average spread rose to 255 basis points following additional increases in U.S. interest rates. After the devaluation of the Mexican peso, activity in the new issue market dropped off sharply, but a deterioration in spreads was evident in an increase in secondary market yield spreads on developing country Eurodollar bonds and in stripped yield spreads on Brady bonds (Charts 2 and 3). After lengthening through the early 1990s, the average maturity of bonds issued by developing countries shortened from seven years in the first quarter to five years in the fourth quarter of 1994.

The U.S. dollar has been the dominant currency for developing country bond issues, accounting for about 70 percent of the total over the period 1990-94 (Table 4), before declining to 55 percent in the first quarter of 1995. The large share of the U.S. dollar sector partly reflected U.S. investors' greater interest in high-yielding securities. The yen sector's share in the total rose from 7 percent in 1990 to 13 percent in 1994, and further to 34 percent in the first quarter of 1995. Asian

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1/ The yield spread is a proxy for the riskiness of developing country bonds. It is measured as the difference between the yield on a developing country bond issue and the yield on a risk-free asset, proxied by the yield on a U.S. Treasury security of comparable maturity.

2/ Including Chile, China, Colombia, the Czech Republic, Indonesia, Israel, and South Africa.

CHART 2

SECONDARY MARKET YIELD SPREADS ON SELECTED EUROBONDS
January 1994 - March 1995 1/
(In basis points)
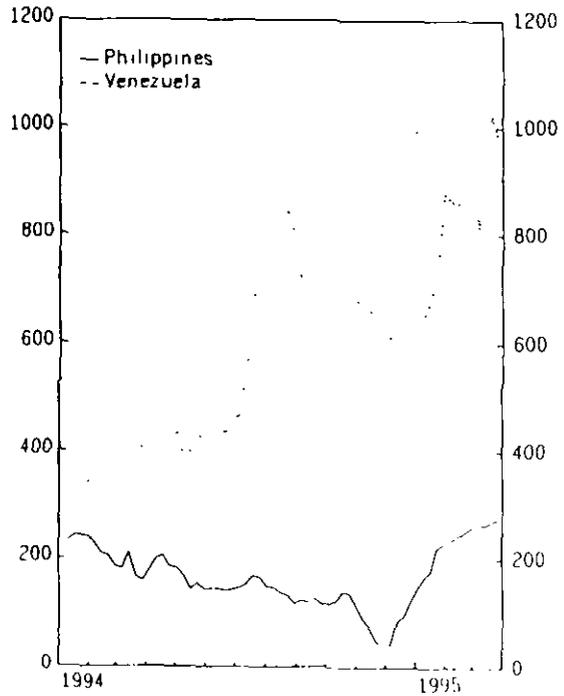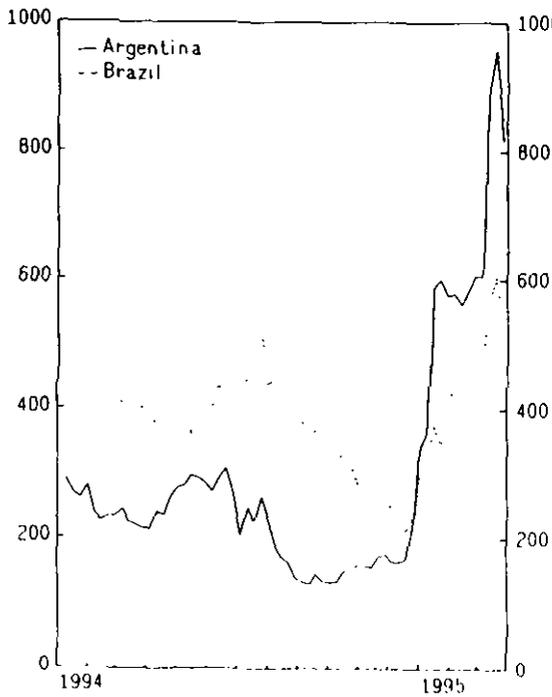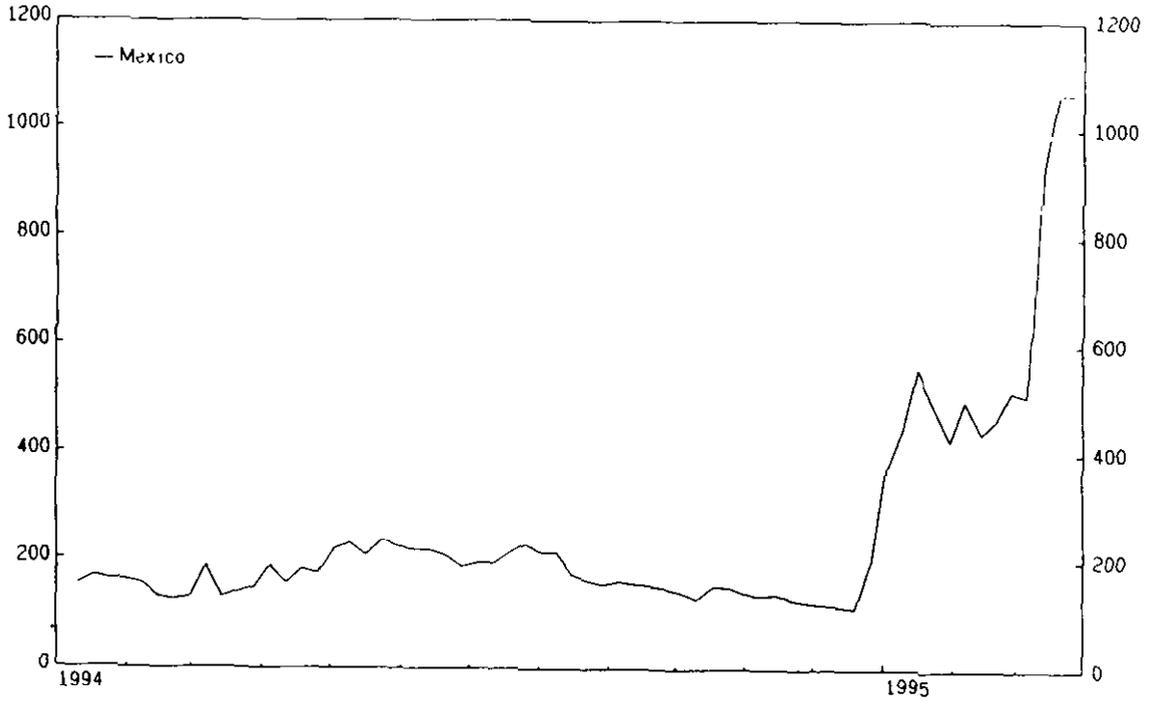
Sources: Reuters; and Salomon Brothers.
1/ Based on weekly average yields

SECONDARY MARKET STRIPPED YIELD SPREADS ON
SELECTED BRADY BONDS, January 1994 - March 1995
(In basis point)

Sources: Reuters; and Solomon Brothers
1/ Based on daily yields.

Table 3. Yield Spread at Launch for Unenhanced Bond Issues by Developing Countries, 1990-First Quarter 1995 1/

(In basis points)

	1990	1991	1992	1993	1994	1994				1995
						1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.
Sovereign borrowers	211	271	239	262	184	107	450	212	272	...
Argentina	...	375	294	277	248	120	...	190	350	...
Barbados	...	...	...	...	420	...	450	...	400	...
Chile	...	150	150	...	...	...	...	...	...	...
China	...	...	...	88	94	94	...	...	...	...
Colombia	...	...	...	215	153	148	...	160	...	...
Czech Republic	...	...	...	270	...	...	...	...	...	...
Czechoslovakia	...	300	...	...	...	...	...	...	...	...
Hungary	...	300	275	266	160	...	...	160	...	...
Lebanon	...	...	...	...	325	...	...	325	...	...
Mexico	...	...	215	208	...	...	...	...	...	...
Pakistan	...	...	...	...	385	...	...	...	385	...
Philippines	...	...	...	320	...	...	...	...	...	...
Saudi Arabia	...	...	...	...	25	...	...	25	...	...
South Africa	...	...	...	...	193	...	...	...	193	...
Thailand	...	...	100	74	...	...	...	...	...	...
Trinidad and Tobago	...	...	565	...	425	...	...	425	...	...
Turkey	211	...	219	...	...	...	...	...	...	...
Uruguay	...	...	275	228	158	158	...	...	...	...
Venezuela	...	235	...	385	...	...	...	...	...	...
Public sector	317	357	261	193	151	171	172	85	142	64
Argentina	...	...	...	440	338	...	333	...	344	...
Brazil	...	480	428	481	450	450	...	...	...	...
Chile	...	...	...	...	138	...	...	138	...	...
China	...	...	69	82	135	...	229	...	100	...
Colombia	...	...	...	217	180	...	...	...	180	...
Costa Rica	...	...	...	...	395	395	...	...	...	...
Czech Republic	...	...	...	...	116	...	120	...	110	...
Guatemala	...	...	...	605	...	...	...	...	...	...
India	160	...	...	...	...	...	...	...	...	...
Indonesia	...	...	...	...	150	158	...	144	...	...
Korea	...	...	89	83	46	68	...	34	38	68
Malaysia	...	...	...	100	...	...	...	...	...	...
Malta	...	...	...	...	115	115	...	...	...	...
Mexico	375	285	220	196	151	154	126	...	...	42
Philippines	...	...	...	250	167	...	...	...	167	...
Slovak Republic	...	...	...	...	325	325	...	...	...	...
Thailand	...	...	...	43	85	...	...	83	103	...
Turkey	...	...	...	205	...	...	...	...	...	...
Venezuela	...	275	265	212	...	...	...	...	...	...
Private sector	650	540	389	348	283	281	406	207	287	75
Argentina	730	447	409	375	379	310	411	420	430	...
Bolivia	...	...	...	...	428	428	...	...	...	...
Brazil	...	530	512	519	374	377	465	335	378	350
Chile	...	...	...	194	125	...	...	125	...	...
Colombia	...	...	...	310	641	...	641	...	...	...
Hong Kong	...	...	180	118	95	...	103	93	97	130
India	...	...	...	110	285	...	...	285	...	...
Indonesia	...	...	...	410	477	...	467	515	325	160
Korea	...	...	121	82	55	79	...	44	46	39
Mexico	613	593	414	359	305	253	498	235	322	...
Panama	...	...	...	...	60	...	...	60	...	...
Peru	...	...	...	706	680	680	...	...	...	...
Philippines	...	...	...	375	293	...	340	190	...	...
Thailand	...	...	43	43	132	157	81	141	147	98
Uruguay	...	...	...	300	...	...	...	...	...	...
Venezuela	693	362	375	469	...	...	...	...	...	...
All borrowers	355	405	322	282	225	187	343	187	255	70

Sources: Staff estimates based on Euromoney database; Euroweek; Financial Times, and International Financing Review (IFR).

1/ Excluding issues denominated in non-U.S. dollars. Yield spread measured as the difference between the bond yield at issue and the prevailing yield for industrial country government bonds in the same currency and of comparable maturity. All figures are weighted averages. Data for 1994 are based on Euromoney database and are not strictly comparable to data for 1990-93 which were estimated on the basis of data from Financial Times, Euroweek, and IFR.

Table 4.   International Bond Issues by Developing Countries by Currency of Denomination, 1990-First Quarter 1995 1/

(In millions of U.S. dollars)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1994 | | | | 1995 |
						1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.
U.S. dollar	3,890	8,755	16,991	44,192	44,049	15,696	6,782	11,901	9,671	2,621
Africa	--	--	--	--	1,845	600	--	320	925	--
Asia	960	1,683	4,143	16,700	21,342	6,249	4,059	6,751	4,284	2,334
Europe	550	300	1,014	1,395	1,115	291	250	250	324	--
Middle East	--	400	--	2,002	3,201	1,958	--	1,243	--	--
Western Hemisphere	2,380	6,372	11,834	24,095	16,546	6,598	2,473	3,337	4,139	287
Deutsche mark	1,693	1,618	2,013	4,521	1,560	141	540	129	749	203
Africa	89	236	408	--	--	--	--	--	--	--
Asia	283	96	125	--	270	26	180	64	--	203
Europe	983	961	1,063	3,285	425	--	--	--	425	--
Western Hemisphere	337	326	417	1,236	864	115	360	65	324	--
Japanese yen	450	1,458	3,554	7,965	7,403	1,611	1,532	2,391	1,869	1,633
Africa	--	--	--	--	277	277	--	--	--	251
Asia	259	1,001	1,306	3,099	4,849	638	1,532	1,774	905	1,128
Europe	190	457	2,247	4,078	1,562	695	--	558	309	254
Western Hemisphere	--	--	--	787	715	--	--	60	655	--
European currency unit (ECU)	127	423	630	--	--	--	--	--	--	--
Africa	--	--	318	--	--	--	--	--	--	--
Asia	127	--	--	--	--	--	--	--	--	--
Europe	--	242	186	--	--	--	--	--	--	--
Western Hemisphere	--	181	126	--	--	--	--	--	--	--
Other	175	585	593	2,759	4,622	1,592	708	1,206	1,116	322
Africa	--	--	--	--	370	370	--	--	--	158
Asia	--	221	342	602	3,178	1,153	519	758	748	164
Europe	132	--	51	880	439	69	189	114	67	--
Western Hemisphere	43	364	200	1,278	635	--	--	335	301	--
Total	6,335	12,838	23,780	59,437	57,634	19,040	9,562	15,627	13,406	4,779

Memorandum items:

Share in total issues by developing countries (in percent)

	1990	1991	1992	1993	1994	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.
U.S. dollar	61	68	71	74	76	81	71	76	72	55
Deutsche mark	27	13	8	8	3	1	6	1	6	4
Japanese yen	7	11	15	13	13	8	16	15	14	34
ECU	2	3	3	--	--	--	--	--	--	--
Other	3	5	2	5	8	9	7	8	8	7

Share in total issues in global bond market (in percent)

	1990	1991	1992	1993	1994	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.
U.S. dollar	32	30	39	36	15	36	21	34	40	37
Deutsche mark	8	7	11	13	3	9	1	6	8	13
Japanese yen	14	14	13	12	5	7	15	21	19	14
ECU	9	11	7	1	1	2	1	1	1	3
Other	38	40	34	38	17	36	28	27	24	35

Sources: Staff estimates based on Euromoney database; Euroweek; Financial Times; and International Financing Review (IFR).

1/   Data for 1994 are based on Euromoney database and are not strictly comparable to data for 1991-93 which were estimated on the basis of Euroweek, Financial Times, and IFR.

borrowers continued to dominate the yen sector owing to close economic relations with Japan and preferences of Japanese investors. Nonetheless, several non-Asian borrowers (notably Hungary, Mexico, and Argentina) have placed yen issues. Bond issues in deutsche mark, principally by European borrowers and some borrowers in the Western Hemisphere, remained relatively small and tended to be focused on investors in Germany. Issues in other currencies were minor over the period, although some European and Western Hemisphere borrowers more actively tapped smaller currency markets, including the Austrian schilling, Swiss franc, Danish krone, and Spanish peseta, as financial market conditions tightened in 1994.

Regarding the composition of bond issuers, non-sovereign borrowers accounted for the vast majority of bonds placed during 1990-94. The principal exceptions were Hungary and Turkey where virtually all bonds were government issues (Table 5). Financial institutions have been the leading borrowers in many countries. Among the 12 largest borrowers, the financial sector's share was particularly high in several countries, ranging from around 60 percent in Brazil and China to 40-50 percent in Hong Kong, Indonesia, Korea, and Mexico. 1/ Other non-sovereign issuers tended to be well-established companies with large domestic market shares or strong export potential. Petroleum, telecommunications, and public utility companies were major issuers in Argentina, Brazil, and Mexico; real estate companies led issuers in Hong Kong; and steel and electrical companies were the largest issuers in Korea.

b.   International equity placements

Placements of new equity issues in international markets by developing country companies also grew rapidly over the 1990-94 period, in part reflecting the privatization of public sector companies by several countries. Funds raised over this period totaled nearly $46 billion, with the value of issues rising from $1.3 billion in 1990 to $18 billion in 1994 (Table 6). Developing countries' share in total international equity issues increased from 16 percent in 1990 to 41 percent in 1992, but declined to 19 percent in 1994, as issuance by companies in industrial countries picked up. New placements of developing country equities trailed off sharply in December 1994, and total issues amounted to only $601 million in the first quarter of 1995.

Like bonds, international equity placements have been dominated by Asian and Western Hemisphere companies. Placements by Asian companies totaled nearly $25 billion in 1990-94, with roughly half of such issues taking place in 1994 alone. The leading issuers were Chinese companies ($5.6 billion),

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1/ Large foreign placements of bonds raises important questions as to the capacity of the financial sector in a developing country to intermediate capital flows effectively and efficiently. Chapter VII of the Background Material Part I, looks at the implications of large capital inflows on developing countries' financial systems.

Table 5. International Bond Issues by Country and Sector, 1990-94

	Argentina	Brazil	China	Hong Kong	Hungary	Indonesia	Korea	Malaysia	Mexico	Thailand	Turkey	Venezuela
					(In millions of U.S. dollars)							
Financial sector	2,790	9,827	5,263	4,912	359	1,801	9,085	320	13,034	3,674	577	75
Banks	2,740	9,587	2,500	2,459	359	1,476	8,985	100	12,083	3,658	577	75
Other	50	240	2,763	2,453	--	325	100	220	951	16	--	--
Petroleum	1,330	2,318	--	--	--	--	727	954	3,927	392	--	2,389
Transport	172	55	--	343	--	--	--	--	675	--	--	--
Real estate	50	--	--	3,763	--	22	--	--	325	899	--	--
Utility	1,365	150	--	--	--	--	2,572	600	350	141	--	--
Cement	--	--	--	7	--	--	115	--	150	--	--	--
Manufacturing	100	70	--	150	--	30	255	--	1,190	--	--	35
Steel	280	720	--	251	--	--	1,566	--	363	154	--	100
Telecommunications	1,780	1,000	--	--	--	--	100	735	1,130	--	--	50
Electrical	--	--	--	150	--	--	1,675	--	235	45	--	--
Construction	100	191	--	138	--	245	502	225	4,658	40	--	75
Sovereign	5,336	100	3,013	--	9,480	--	300	--	1,388	1,134	8,467	1,276
Other	636	1,813	323	2,372	--	1,596	1,640	465	3,110	350	--	120
Total	13,938	16,243	8,599	12,088	9,839	3,694	18,537	3,299	30,536	6,829	9,044	4,120
					(In percent of total)							
Financial sector	20.0	60.5	61.2	40.6	--	48.8	49.0	9.7	42.7	53.8	--	1.8
Banks	19.7	59.0	29.1	20.3	3.6	40.0	48.5	3.0	39.6	53.6	6.4	1.8
Other	0.4	1.5	32.1	20.3	--	8.8	0.5	6.7	3.1	0.2	--	--
Petroleum	9.5	14.3	--	--	--	--	3.9	28.9	12.9	5.7	--	58.0
Transport	1.2	0.3	--	2.8	--	--	--	--	2.2	--	--	.
Real estate	0.4	--	--	31.1	--	0.6	--	--	1.1	13.2	--	--
Utility	9.8	0.9	--	--	--	--	13.9	18.2	1.1	2.1	--	--
Cement	--	--	--	0.1	--	--	0.6	--	0.5	--	--	--
Manufacturing	0.7	0.4	--	1.2	--	0.8	1.4	--	3.9	--	--	0.8
Steel	2.0	4.4	--	2.1	--	--	8.4	--	1.2	2.3	--	2.4
Telecommunications	12.8	6.2	--	--	--	--	0.5	22.3	3.7	--	--	1.2
Electrical	--	--	--	1.2	--	--	9.0	--	0.8	0.7	--	--
Construction	0.7	1.2	--	1.1	--	6.6	2.7	6.8	15.3	0.6	--	1.8
Sovereign	38.3	0.6	35.0	--	96.4	--	1.6	--	4.5	16.6	93.6	31.0
Other	4.6	11.2	3.8	19.6	--	43.2	8.8	14.1	10.2	5.1	--	2.9

- 12 -

Table 6. International Equity Issues by Developing Countries and Regions, 1990-First Quarter 1995 1/

(In millions of U.S. dollars)

	1990	1991	1992	1993	1994	1994 1st qtr.	1994 2nd qtr.	1994 3rd qtr.	1994 4th qtr.	1995 1st qtr.
Developing countries	1,262	5,437	9,259	11,865	17,959	3,802	3,647	4,626	5,884	601
Africa	--	143	270	8	574	--	539	--	35	--
Ghana	--	--	--	--	398	--	398	--	--	--
Morocco	--	--	--	8	--	--	--	--	--	--
South Africa	--	143	270	--	176	--	141	--	35	--
Asia	1,040	1,022	4,732	5,673	12,039	2,097	1,855	3,273	4,814	587
Bangladesh	--	--	--	19	--	--	--	--	--	--
China	--	11	1,049	1,908	2,644	437	250	491	1,466	--
Hong Kong	--	140	1,250	1,264	318	--	133	145	40	147
India	--	--	240	331	3,028	1,185	424	696	723	138
Indonesia	633	168	262	604	1,329	95	15	201	1,018	--
Korea	40	200	150	328	1,168	150	208	210	600	150
Malaysia	--	--	382	--	--	--	--	--	--	--
Pakistan	--	11	48	5	1,183	20	--	918	245	--
Philippines	53	159	392	64	839	142	107	181	409	42
Singapore	214	125	272	613	300	35	--	190	75	--
Sri Lanka	--	--	--	--	33	33	--	--	--	--
Taiwan Province of China	--	--	543	72	438	--	220	218	--	110
Thailand	100	209	145	466	759	--	498	23	238	--
Europe	124	91	67	202	568	330	145	63	30	14
Czech Republic	--	--	--	--	10	--	--	--	10	--
Estonia	--	--	--	--	7	--	7	--	--	--
Hungary	68	91	33	17	201	--	138	63	--	--
Poland	--	--	--	1	--	--	--	--	--	14
Romania	--	--	--	--	1	--	--	--	1	--
Turkey	56	--	34	184	349	330	--	--	19	--
Middle East	--	60	127	257	89	32	8	--	49	--
Israel	--	60	127	257	89	32	8	--	49	--
Western Hemisphere	98	4,120	4,063	5,725	4,689	1,343	1,100	1,290	956	--
Argentina	--	356	372	2,793	735	194	380	--	161	--
Bolivia	--	--	--	10	--	--	--	--	--	--
Brazil	--	--	133	--	1,028	300	--	616	112	--
Chile	98	--	129	271	597	96	97	279	125	--
Colombia	--	--	--	91	393	--	86	68	239	--
Mexico	--	3,764	3,058	2,493	1,680	753	455	276	196	--
Panama	--	--	88	--	100	--	--	--	100	--
Peru	--	--	--	26	133	--	82	51	--	--
Uruguay	--	--	--	--	23	--	--	--	23	--
Venezuela	--	--	283	42	--	--	--	--	--	--
Memorandum items:										
Total equity issues in international equity market	8,152	15,546	22,632	51,654	95,541	36,893	25,422	16,682	16,544	4,138
Share of developing countries in global issuance (in percent)	15.5	35.0	40.9	23.0	18.8	10.3	14.3	27.7	35.5	14.5
GDR/ADR (in percent of developing countries' total equity issuance)	7.8	74.4	52.9	54.6	77.6	83.9	68.3	85.5	73.2	11.8

Sources: Staff estimates based on Euromoney database; Euroweek; Financial Times; and International Financing Review (IFR).

1/ Data for 1994 are based on Euromoney database and are not strictly comparable to data for 1992-93, which are estimated on the basis of data from Euroweek, Financial Times, and IFR.

followed by companies in India ($3.6 billion, most of which was placed in 1994) and in Hong Kong and Indonesia ($3 billion each). Western Hemisphere companies placed equity valued at nearly $19 billion during 1990-94. Mexican firms led all issuers with $11 billion placed; however, new equity placements were at their highest level in 1991 and declined subsequently, partly reflecting the completion of some major privatizations. In 1993, issuing activity by Mexican firms was subdued in the first three quarters of the year owing to uncertainties regarding passage of the North American Free Trade Agreement (NAFTA); and with the agreement's passage, new issues rose sharply in the final quarter of the year. In 1994, Mexican equity placements in the first quarter were less than half of their fourth quarter 1993 level and proceeded to decline further over the course of the year. Argentine equity issues amounted to $4.3 billion in 1990-94, with most of these funds being raised in 1993 with the partial privatization of the state-owned oil company.

An increasing share of developing country equities has been placed in international markets through equity-based instruments, such as American Depository Receipts (ADRs) and Global Depository Receipts (GDRs). In 1994, ADRs and GDRs accounted for 78 percent of total equity issues by developing countries. These facilities permit shares to be traded on industrial country exchanges, with the potential for raising liquidity, reducing settlement time, lowering settlement risk, and thus, broadening the investor base. Most Western Hemisphere companies have placed international equity issues almost exclusively through ADR/GDR programs in 1993-94.

International equity placements by developing country companies have been concentrated in the telecommunications, banking, electrical, and petroleum industries in 1990-94 (Table 7). On an individual country basis, telecommunications companies accounted for a significant share of issues by Indonesia, Mexico, Pakistan, and Thailand. Financial institutions were major issuers in Hong Kong, Indonesia, and Mexico. The electrical equipment and electronics industries in Hong Kong and Korea, and the transport industries (including shipbuilding) in China, India, and Korea were important issuers. The government privatization program made the petroleum company the largest issuer in Argentina.

c.   Direct portfolio investment in developing country markets

The information available suggests that direct purchases by foreigners of developing country securities in domestic markets have become an increasingly important source of portfolio flows to developing countries. In particular, emerging markets mutual funds have expanded rapidly in recent

Table 7. International Equity Issues by Country and Sector, 1990-94

	Argentina	China	Hong Kong	India	Indonesia	Korea	Mexico	Pakistan	Thailand
(In millions of U.S. dollars)									
Financial sector	292	142	1,146	230	489	--	2,055	25	127
Banks	292	--	246	--	229	--	1,166	25	96
Other	--	142	900	230	260	--	889	--	31
Petroleum	2,711	185	--	--	44	90	--	--	211
Transport	--	703	145	400	--	414	246	6	47
Real estate	31	246	250	--	281	--	--	--	129
Utility	--	1,008	--	--	--	--	--	--	54
Cement	--	--	--	--	--	--	622	--	--
Manufacturing	56	539	--	150	36	--	--	--	4
Steel	--	541	251	76	--	300	215	--	86
Telecommunications	622	82	--	35	925	--	4,830	898	508
Electrical	208	63	712	362	169	890	--	145	23
Construction	--	20	--	--	--	95	1,165	143	52
Sovereign	--	--	--	--	--	--	--	--	--
Other	335	2,083	717	2,348	1,052	77	1,860	29	438
Total	4,255	5,612	3,221	3,601	2,996	1,866	10,993	1,246	1,679
(In percent of total)									
Financial sector	6.9	2.5	35.6	6.4	16.3	--	18.7	2.0	7.6
Banks	6.9	--	7.6	--	7.6	--	10.6	2.0	5.7
Other	--	2.5	27.9	6.4	8.7	--	8.1	--	1.8
Petroleum	63.7	3.3	--	--	1.5	4.8	--	--	12.6
Transport	--	12.5	4.5	11.1	--	22.2	2.2	0.5	2.8
Real estate	0.7	4.4	7.8	--	9.4	--	--	--	7.7
Utility	--	18.0	--	--	--	--	--	--	3.2
Cement	--	--	--	--	--	--	5.7	--	--
Manufacturing	1.3	9.6	--	4.2	1.2	--	--	--	0.2
Steel	--	9.6	7.8	2.1	--	16.1	2.0	--	5.1
Telecommunications	14.6	1.5	--	1.0	30.9	--	43.9	72.1	30.3
Electrical	4.9	1.1	22.1	10.1	5.6	47.7	--	11.6	1.4
Construction	--	0.4	--	--	--	5.1	10.6	11.5	3.1
Sovereign	--	--	--	--	--	--	--	--	--
Other	7.9	37.1	22.3	65.2	35.1	4.1	16.9	2.3	26.1

Sources: Euromoney database; Euroweek; Financial Times; and International Financial Review.

years. 1/ The number of such funds reached 594 by the end of 1993 with a total net asset value of $90 billion (Table 8). In 1994, despite turbulent market conditions in many developing country markets, the growth of those funds picked up significantly, probably reflecting the time lag involved in establishing these funds; the number of funds increased to 908 and their total net asset value rose to $132 billion. Much of the increase in the net assets took place in the second half of the year despite declines in stock prices in most developing countries (Charts 4 and 5). It was largely accounted for by open-end equity funds domiciled in the United States (Tables 9 and 10). Net purchases of bonds and equities through emerging markets mutual funds are estimated to have amounted to $100 billion in 1990-94, with $18 billion in purchases taking place in 1993, and $64 billion in 1994 (Table 11). 2/

Emerging markets mutual funds have focused on equities in Asia, with the net asset value of those funds dedicated to Asian markets accounting for 58 percent of the net asset value of all emerging markets mutual funds in 1994. In contrast, mutual funds dedicated to the Western Hemisphere increased more moderately, with their share remaining at about 12 percent of total net asset value. Among dedicated country funds, Korean funds are the largest on the basis of net asset value, followed by India, Taiwan Province of China, Thailand, and China. The fastest growing segment of the market has been the global emerging markets mutual funds, which do not exclusively target specific countries or regions; the net asset value of these funds rose to 28 percent of the total in 1994. Global mutual funds (which invest in foreign securities but are not dedicated to emerging market investments) have also become major holders of developing country securities; however, comprehensive data on the activities of these funds are not readily available.

Events in Mexico in December 1994 prompted a sell off of equities on developing country markets worldwide, with pressures being concentrated and

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1/ An emerging market mutual fund is defined as one that holds at least 60 percent of its assets in developing country securities. Data on the activities of these funds provide only an indicator of direct security purchases. Information on other major investors, including global mutual funds, other institutional investors (such as pension funds and hedge funds), and high net worth individuals, is limited.

2/ An approximation for net purchases of developing country equities by emerging markets mutual funds can be obtained by adjusting the changes in the funds' net assets for share price changes. To the extent that emerging markets mutual funds hold part of their portfolios in cash, industrial country assets, or equities issued by developing countries in international capital markets, net purchases estimated in this way may misstate actual purchases of emerging markets securities in domestic markets. Moreover, changes in the indexes used to measure share prices (the IFC investible indexes) may not accurately proxy actual changes in the value of the portfolios of the emerging markets mutual funds.

Chart 4

Share Price Indices for Selected Markets in Latin America, January 1993-March 1995

(IFC weekly investable price indices, December 1988=100)

Latin America 1/

Argentina

Brazil

Chile
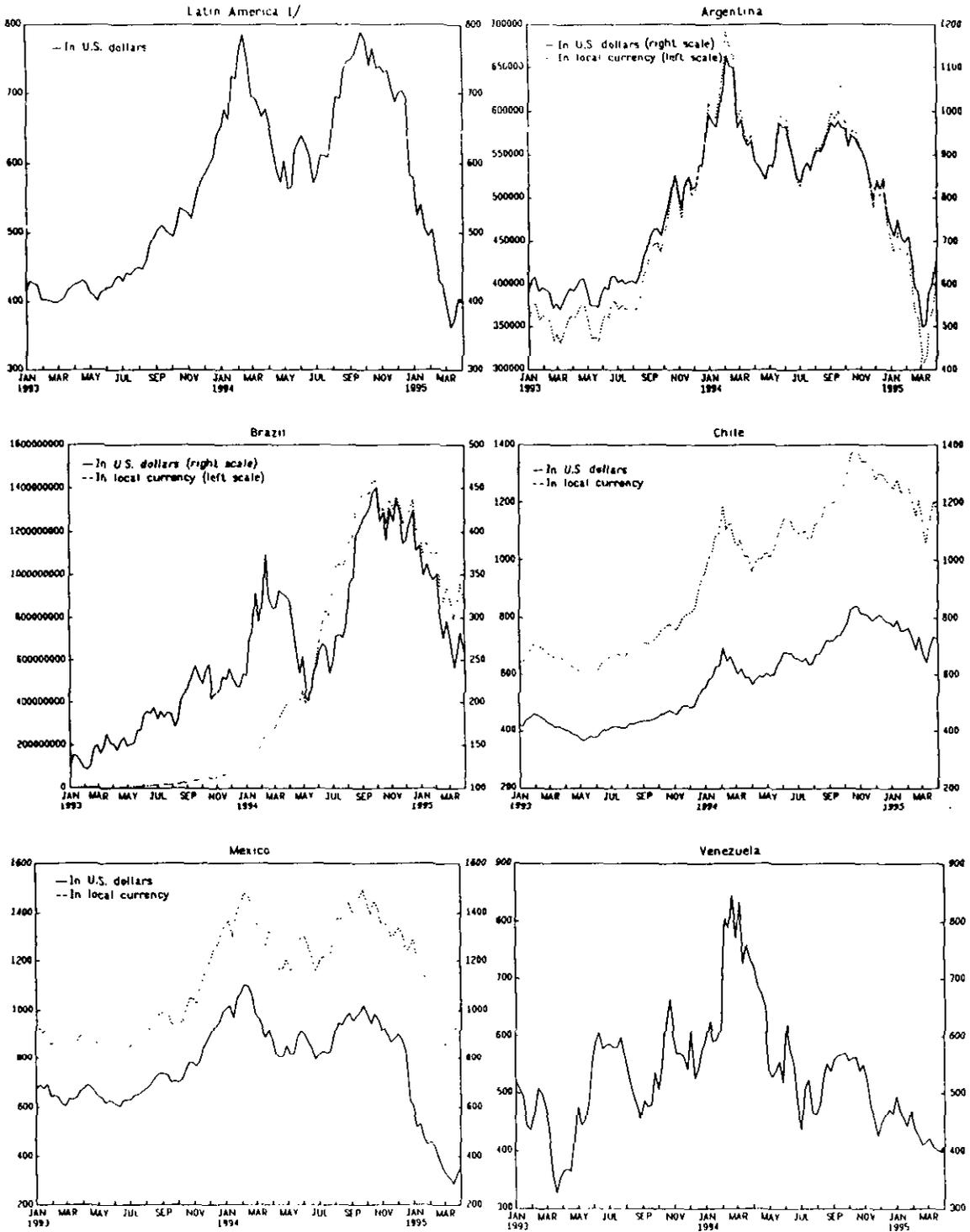
Mexico

Venezuela

Source: International Finance Corporation (IFC), Emerging Markets Data Base.
1/ Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

Chart 5
Share Price Indices for Selected Markets in Asia, January 1993-March 1995
(IFC weekly investable price indices, December 1988=100)

Asia 1/

India

Indonesia

Malaysia

Philippines
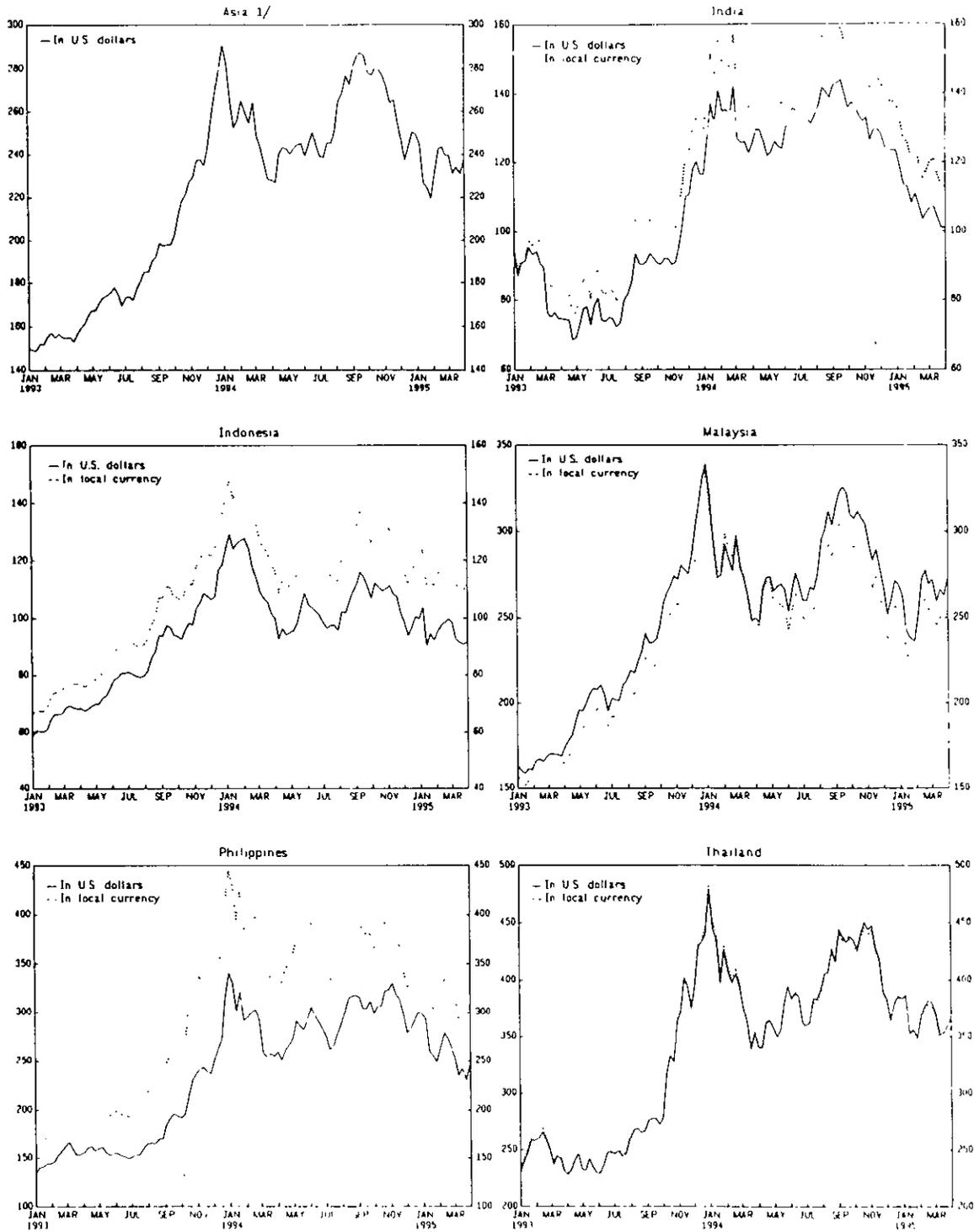
Thailand

Source. International Finance Corporation (IFC), Emerging Markets Data Base
1/ India, Korea, Malaysia, Pakistan, Philippines, Taiwan Province of China, and Thailand.

Table 8. Emerging Markets Mutual Funds, 1988-94 1/2/

	1988		1989		1990		1991		1992		1993		1994	
	Net assets	Number of funds	Net assets	Number of funds	Net assets	Number of funds	Net assets	Number of funds	Net assets	Number of funds	Net assets	Number of funds	Net assets	Number of funds
Equities	5,857	91	9,975	142	13,320	225	19,180	290	29,531	448	84,102	547	123,849	820
Global	900	15	1,350	18	2,300	29	3,750	39	5,040	35	18,033	52	34,977	118
Asia	4,437	72	7,435	112	9,240	174	11,575	211	18,823	344	55,472	418	71,889	554
Regional	1,750	35	3,100	50	4,000	75	5,350	92	10,673	193	38,509	228	51,113	308
China	47	2	50	2	60	3	110	4	783	19	2,360	30	2,731	30
Hong Kong	...	...	...	...	...	...	...	...	47	6	728	19	636	27
India	270	3	300	4	830	6	970	6	1,083	6	1,817	7	3,849	30
Indonesia	35	1	260	7	525	18	400	18	455	19	808	19	708	20
Korea	990	10	1,215	13	1,205	17	1,310	24	1,690	29	2,987	40	4,268	43
Malaysia and Singapore	75	3	240	7	505	17	600	17	824	28	1,559	27	1,238	27
Pakistan	--	--	--	--	--	--	65	2	31	2	220	3	377	6
Philippines	45	3	280	7	240	8	290	8	343	8	661	8	654	9
Taiwan Province of China	80	4	600	4	475	5	890	13	785	10	2,273	13	3,262	19
Thailand	845	11	1,390	18	1,400	25	1,580	26	2,109	24	3,458	22	2,761	22
Viet Nam	--	--	--	--	--	--	10	1	--	--	92	2	272	5
Latin America	520	4	985	9	1,455	16	3,525	33	4,862	55	9,741	65	14,706	105
Regional	--	--	175	2	380	5	1,510	18	2,169	36	5,951	48	10,571	75
Brazil	220	3	320	3	165	3	380	4	391	5	506	4	1,354	19
Chile	--	--	160	2	380	4	740	4	1,110	6	1,397	6	1,739	5
Mexico	300	1	330	2	530	4	780	5	1,192	8	1,887	7	1,042	6
Europe	--	--	205	3	325	6	330	7	806	14	757	10	1,430	32
Regional	--	--	90	2	210	4	240	5	541	8	433	6	917	21
Hungary	--	--	--	--	--	--	--	--	210	4	180	2	199	3
Russia	--	--	--	--	--	--	--	--	--	--	--	--	197	5
Turkey	--	--	115	1	115	2	90	2	55	2	144	2	117	3
Africa/Middle East	--	--	--	--	--	--	--	--	--	--	99	2	847	11
Bonds	275	...	500	...	900	...	1,700	...	3,750	...	5,954	47	8,149	88
Total funds	6,132	...	10,475	...	14,220	...	20,880	...	33,281	...	90,056	594	131,998	908

Sources: Emerging Market Funds Research, Inc; and Lipper Analytical Services, Inc.

1/ Data for 1992-94 are based on Lipper Analytical Services, Inc. and are not comparable to data for 1988-91, which were estimated by Emerging Market Fund Research, Inc.
2/ Net assets are shown in millions of U.S. dollars.

17

Table 9. Emerging Markets Open-End Mutual Funds, December 1993-December 1994

	December 1993		March 1994		June 1994		September 1994		December 1994	
	Number of funds	Net assets 1/	Number of funds	Net assets 1/	Number of funds	Net assets 1/	Number of funds	Net assets 1/	Number of funds	Net assets 1/
Overseas open-end funds	357	36,408	402	36,244	423	37,183	497	48,829	511	43,632
Equities	325	34,352	361	33,571	379	34,653	450	46,043	459	39,635
Global	20	3,161	28	4,238	32	4,232	43	7,211	47	7,097
Pacific Basin	80	8,791	87	8,314	87	8,845	91	9,567	94	8,892
Africa	--	--	--	--	--	--	--	--	--	--
Asia	195	20,619	211	18,254	219	19,000	257	25,666	251	20,671
Southeast Asia	95	14,680	103	12,508	104	12,807	116	15,092	120	14,060
China	10	413	12	263	12	247	13	296	15	257
Hong Kong	19	728	20	591	21	526	24	597	27	636
India	2	627	6	925	8	938	13	2,136	16	948
Indonesia	7	75	7	58	6	57	9	259	7	160
Korea	23	1,426	23	1,686	27	2,141	37	3,601	25	2,055
Malaysia/Singapore	9	262	10	218	10	227	9	247	9	214
Malaysia	7	349	7	277	7	223	8	386	7	283
Philippines	3	49	3	26	4	42	4	110	3	57
Singapore	4	62	4	44	4	55	5	135	4	70
Taiwan Province of China	8	1,367	8	1,332	8	1,390	10	2,050	10	1,469
Thailand	8	581	8	326	8	347	9	757	8	462
Europe	--	--	--	--	--	--	10	207	11	142
Latin America	30	1,781	35	2,765	41	2,576	49	3,392	56	2,833
Regional	26	1,592	31	2,597	31	2,033	40	2,600	39	2,103
Brazil	--	--	--	--	6	384	6	658	14	647
Mexico	4	189	4	168	4	159	3	134	3	83
Bonds	32	2,056	41	2,673	44	2,530	47	2,786	52	3,997
Global	5	266	6	415	7	366	8	397	13	399
Pacific Basin	2	14	2	14	2	14	2	14	2	13
Africa	--	--	1	9	1	9	1	7	1	7
Asia	2	12	3	69	4	89	4	96	3	101
Southeast Asia	1	1	2	59	3	79	3	88	2	93
Philippines	1	11	1	10	1	10	1	8	1	8
Latin America	23	1,764	29	2,166	30	2,052	32	2,272	32	3,365
Regional	12	650	13	1,062	11	1,039	13	1,280	13	2,477
Brazil	--	--	--	--	3	190	3	230	4	274
Mexico	11	1,114	16	1,104	16	823	16	762	15	614
U.S. open-end funds	47	14,137	78	20,604	95	22,235	114	28,124	137	46,582
Equities	43	13,655	70	19,997	83	21,284	102	26,841	122	45,363
Global	1	101	15	6,691	23	6,925	32	9,349	42	16,110
Pacific Basin	34	11,312	40	10,143	49	11,378	58	13,142	65	23,420
Latin America	8	2,242	15	3,163	11	2,981	12	4,350	15	5,833
Bonds	4	482	8	607	12	951	12	1,283	15	1,219

Source: Lipper Analytical Services, Inc.

1/ In millions of U.S. dollars.

Table 10. Emerging Markets Closed-End Mutual Funds, December 1993-December 1994

	December 1993		March 1994		June 1994		September 1994		December 1994	
	Number of Funds	Net Assets 1/	Number of Funds	Net Assets 1/	Number of Funds	Net Assets 1/	Number of Funds	Net Assets 1/	Number of Funds	Net Assets 1/
Closed-end funds	178	33,450	214	36,476	227	36,806	234	44,847	260	41,784
Equities	167	30,034	196	33,522	204	33,837	213	41,678	239	38,851
Global	19	8,710	23	10,516	24	10,288	26	12,810	29	11,770
Africa	--	--	5	387	7	413	7	592	7	611
Asia	109	14,750	125	15,360	126	16,008	129	19,410	144	18,906
Regional	19	3,726	27	4,124	27	4,115	26	5,079	29	4,761
China	20	1,947	21	1,665	22	1,651	23	2,643	23	2,474
India	5	1,190	8	2,477	11	2,836	12	3,101	14	2,901
Indonesia	12	733	13	641	13	588	13	619	13	548
Korea	17	1,561	17	1,595	17	1,865	17	2,145	18	2,213
Malaysia/Singapore	7	886	7	663	7	688	7	823	7	671
Pakistan	3	220	3	226	--	--	--	--	--	--
Philippines	5	612	6	509	6	535	6	602	6	597
Taiwan Province of China	5	906	7	1,308	7	1,415	7	1,621	9	1,793
Thailand	14	2,877	14	2,059	14	2,197	14	2,535	14	2,299
Viet Nam	2	92	2	93	2	118	4	242	5	272
Europe	10	757	13	1,055	12	998	16	1,255	21	1,288
Regional	6	433	9	795	10	743	8	814	10	775
Hungary	2	180	2	195	2	185	2	180	3	199
Russia	--	--	--	--	--	--	3	131	5	197
Turkey	2	144	2	65	2	70	3	130	3	117
Middle East	2	99	2	212	3	193	3	202	4	236
Latin America	27	5,718	28	5,992	32	5,937	32	7,409	34	6,040
Regional	14	2,117	16	2,458	19	2,470	20	3,142	21	2,635
Brazil	4	506	5	724	5	604	4	885	5	707
Chile	6	1,397	4	1,279	5	1,435	5	1,669	5	1,739
Mexico	3	1,698	3	1,531	3	1,428	3	1,713	3	959
Bonds	11	3,416	18	2,954	21	2,969	21	3,169	21	2,933
Global	7	2,806	9	2,325	11	2,321	11	2,502	11	2,319
Africa/Middle East	2	28	2	25	2	26	2	25	2	25
Europe	--	--	1	18	1	19	1	18	1	19
Latin America	2	582	6	586	7	603	7	624	7	570

Source: Lipper Analytical Services, Inc.

1/ In millions of U.S. dollars.

Table 11.   Net Bond and Equity Purchases by Emerging Markets
Mutual Funds, 1990-94 1/

(In millions of U.S. dollars)

	1990	1991	1992	1993	1994
Equities	6,464	2,511	8,448	17,559	58,150
Global	1,076	457	3,908	5,243	22,449
Asia	4,632	1,798	3,385	11,355	26,039
Regional	1,976	876	1,577	9,177	20,524
China	26	40	1,016	790	2,165
Hong Kong	--	--	271	290	168
India	412	2	-77	377	1,851
Indonesia	285	146	30	-74	66
Korea	407	352	342	791	544
Malaysia and Singapore	331	54	-64	-62	-11
Pakistan	--	25	34	82	190
Philippines	302	-69	3	-80	67
Taiwan Province of China	368	427	388	461	350
Thailand	525	-64	-150	-445	-73
Viet Nam	--	9	16	47	198
Latin America	652	36	678	1,362	7,587
Regional	185	267	446	1,625	6,574
Brazil	244	-60	108	-120	475
Chile	124	-13	7	-219	686
Mexico	99	-158	117	76	-148
Europe	103	199	393	-448	1,085
Regional	102	141	313	-336	803
Hungary	--	--	--	-125	104
Russia	--	--	--	--	183
Turkey	1	58	80	13	-5
Africa/Middle East	--	--	24	47	990
Bonds	400	323	827	248	5,482
Total funds	6,864	2,834	9,275	17,807	63,632

Sources: Emerging Markets Fund Research, Inc.; Lipper Analytical
Services, Inc.; and staff estimates.

1/ Estimated by deflating changes in the stock of fund net assets by
International Finance Corporation (IFC) investable share price indices for
equities and by the J.P. Morgan Eurobond price index for bonds. Data for
1993-94 are based on Lipper Analytical Services, Inc. and are not comparable
to data for 1989-92 which are estimated on the basis of data provided by
Emerging Market Funds Research, Inc.

sustained only in major Western Hemisphere markets. Actual or anticipated redemptions by shareholders led mutual funds to sell equities across Western Hemisphere markets and, on a more limited and temporary scale, in some Asian markets. Global mutual funds are reported to have been the largest sellers, while selling by emerging markets mutual funds has been more limited. This picture may change, however, since it is anticipated that the dedicated emerging markets funds will post significant losses in their net asset values in the first quarter of 1995. Such losses could induce redemptions and further selling into Western Hemisphere markets where market liquidity is already strained.

Investment in bonds by emerging markets mutual funds has been small, compared with equity investment. The total net asset value of emerging market bond funds was only $8 billion at the end of 1994, compared with $6 billion at the end of 1993. Market participants reported that non-dedicated general mutual funds, such as short-term bond funds, have heavily invested in short-term developing country government securities. These funds were reported to have invested a substantial share of their assets in Mexican Tesobonos prior to the devaluation in December 1994 and to have sold off a significant part of their holdings in the aftermath of the crisis. While large relative to the total assets of the funds, their holdings, nonetheless, were only a small fraction of all Tesobonos held by nonresidents of Mexico.

d.   Investor base

Comprehensive statistics are not available on the composition of the investor base in developing country securities. A crude picture, however, emerges from an examination of the partial information available and from anecdotal evidence. In the late 1980s and early 1990s, institutional investors (principally pension funds and insurance companies in the United States and the United Kingdom) began to show interest in the securities of developing countries in Asia--particularly the dynamic economies--as part of efforts by these investors to diversify their portfolios. 1/ In contrast, market participants report that, in the early stages of the resurgence of inflows to developing countries in the Western Hemisphere, the largest source of inflows was returning flight capital.

In the early 1990s, mutual funds began to expand their investment activities in developing country securities. At the same time, an increasing number of emerging markets mutual funds were established, first in the form of closed-end funds and then increasingly as open-end funds. The majority of these mutual funds are located in the United States and the United Kingdom--traditional locations for fund managers--but they attract

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1/ For further details on the changing role of institutional investors see Chapter IV of Background Material Part II.

money from investors throughout the world. 1/ By the end of 1994, there were at least 260 closed-end mutual funds and 648 open-end mutual funds dedicated to investing in emerging markets. Pension funds also expanded their holdings of developing country securities, moving beyond Asia to invest in Western Hemisphere assets. While these investors have significantly increased their holdings, they still place only a fraction of their portfolios in international investments, and of this amount only a small portion in developing country securities. Emerging market securities as a distinct asset class developed over the early 1990s and was firmly established by 1993.

The 1993-94 period witnessed a rather rapid expansion in the number of investors in developing country securities; however, there was a distinct tendency for these investors to have similar characteristics (for example, mutual funds). In particular, they tended to have similar risk/return preferences and methods of operation. Moreover, since securities markets in developing countries generally are not very deep, there was a concentration of investments in the largest markets and in the biggest issues. Moreover, in the face of actual or anticipated redemptions, the mutual funds sold securities across a range of countries outside of Mexico, especially those in the Western Hemisphere, in order to maintain the relative shares of the various assets in their portfolios roughly in line with their targeted allocations. Because of the concentration of investments, markets in Argentina and Brazil were strongly affected.

4. **Bank lending**

Thus far in the 1990s, the level of bank lending to developing countries has remained relatively unchanged and a relatively small source of financing for these countries (Table 12). 2/ In relation to total medium- and long-term bank commitments·, the share of developing countries also has declined, falling from a high of 24.6 percent in 1991 to 12 percent in 1994. The weighted average spread on bank loans over LIBOR has risen steadily from 64 basis points in 1990 to 107 basis points in 1994. At the same time, the average maturity of loans shortened from 9.5 years in 1990 to 6.8 years in 1994. The U.S. dollar remained the most important currency of denomination, accounting for nearly 80 percent of total bank loans to developing counties in 1994, followed by the pound sterling.

1/ For example, Japanese investors placing money in U.S. dollar-denominated funds investing in developing country securities tend to have their transactions cleared through New York. Thus, a portion of Japanese portfolio investment abroad recorded in the balance of payments accounts as an outflow to the United States may actually be flows through the United States to developing countries.

2/ These data cover commitments that are not insured by export credit agencies.

Table 12. Bank Credit Commitments by Country or Region of Destination, 1990-94 1/

(In billions of U.S. dollars)

	1990	1991	1992	1993	1994
Developing countries	24.6	28.5	18.5	21.2	24.4
Africa	0.6	0.2	0.6	0.2	0.1
Algeria	--	0.1	--	--	--
Angola	--	--	0.3	--	--
Ghana	0.1	0.1	0.1	--	0.1
Morocco	0.1	--	--	--	--
Tunisia	--	--	0.1	0.1	--
Zimbabwe	--	0.1	--	0.1	--
Other	0.4	--	0.1	--	--
Asia	13.4	14.6	11.9	15.7	20.4
China	1.5	2.3	2.7	3.6	4.0
Hong Kong	1.1	0.7	1.0	2.0	1.3
India	0.7	--	0.2	--	0.6
Indonesia	3.9	5.0	1.8	1.9	4.0
Korea	2.0	3.5	1.8	1.9	2.6
Malaysia	0.5	0.2	1.2	1.6	1.8
Pakistan	0.4	0.1	--	--	--
Philippines	0.7	--	--	--	--
Singapore	0.3	0.4	0.4	0.4	1.1
Taiwan Province of China	0.8	0.7	0.8	0.9	--
Thailand	1.3	1.6	2.0	3.4	4.7
Other	0.2	0.3	--	--	0.3
Europe	4.9	1.9	2.1	2.6	1.6
Czech Republic	--	--	--	0.2	0.2
Hungary	--	0.1	0.2	0.3	0.8
Turkey	1.8	1.6	1.8	1.9	0.2
Slovak Republic	--	--	--	0.1	0.1
Former U.S.S.R.	3.0	--	--	--	--
Other	0.1	0.2	0.1	--	0.3
Middle East	1.7	10.7	3.0	0.4	1.3
Bahrain	1.6	0.4	0.1	0.1	0.5
Kuwait	--	5.5	--	--	--
Saudi Arabia	0.1	4.5	2.9	0.2	0.2
Other	0.1	0.3	--	0.1	0.6
Western Hemisphere	4.0	1.0	0.9	2.2	1.0
Argentina	--	--	--	0.4	0.6
Brazil	--	--	0.2	0.2	--
Chile	0.3	--	0.4	0.3	--
Colombia	--	0.2	--	0.1	0.3
Mexico	1.6	0.6	0.2	0.4	--
Uruguay	--	0.1	--	--	--
Venezuela	1.4	--	0.2	0.8	--
Offshore banking centers (The Bahamas and Cayman Islands)	--	--	--	0.1	--
Other	0.7	0.1	--	--	0.1
Memorandum items:					
Total bank credit commitments	124.5	116.0	117.9	136.7	202.8
Share of bank credit commitments to developing countries in total (in percent)	19.8	24.6	15.7	15.5	12.0
Weighted average spread 2/	64	75	86	100	107
Weighted average maturity (in years)	9.5	7.6	6.7	5.5	6.8

Source: Organization for Economic Cooperation and Development, Financial Statistics Monthly.

1/ Excludes medium- and long-term loans that are insured by export credit agencies.
2/ Over LIBOR in basis points.

The bulk of medium- and long-term bank commitments to developing countries continued to be concentrated in Asian countries, which had not experienced debt serving difficulties in the past. New commitments to Asian developing countries increased over the 1990-94 period, particularly after a small decline in 1992. Loan commitments rose to $15.7 billion in 1993 and to $20.4 billion in 1994, largely reflecting increased borrowing by private entities in Indonesia and Thailand. Indonesia was the largest Asian borrower in 1990-94 receiving loans totaling $16.6 billion; it was followed by China ($14.1 billion), Thailand ($13 billion), and Korea ($11.8 billion).

Bank commitments to Western Hemisphere countries have remained relatively small and relatively widely disbursed across major countries in the region. Mexico was the largest borrower over the 1990-94 period, but has borrowed very little from banks in the last two years. In contrast, all new loan commitments to Argentina have occurred in 1993 and 1994. Bank lending to Europe also has remained relatively small, declining somewhat in recent years. Turkey was the largest borrower until 1994, when its access to bank credits was sharply reduced reflecting its economic difficulties. Bank loan commitments to other European countries remained small, although some Eastern European countries, including Hungary, increased their recourse to bank borrowing over the 1990-94 period.

III. Evolution of the Mexican Peso Crisis 1/

1. Introduction

On December 20, 1994, the Mexican peso was devalued by about 15 percent. Two days later, market pressures led to the free float of the Mexican peso and in the months that followed the peso reached a level less than half of its predevaluation rate. With the benefit of hindsight, the Mexican peso crisis reflected several factors, including the size of its net capital inflows in the early 1990s, the emergence of internal and external macroeconomic imbalances, the concentration of its government debt at the short end of the maturity spectrum, the currency composition of its debt, and problems in the banking system. The situation in Mexico did not stabilize until a package of multilateral and bilateral assistance was provided and until a credible program of adjustment was put in place. However, before the Mexican crisis was resolved, financial market pressures had spilled over into several other countries, and the countries most affected were in the Western Hemisphere (namely, Argentina and Brazil).

This chapter describes the Mexican peso crisis. Section 2 discusses the surge in capital inflows into Mexico during the early 1990s. Section 3 reviews developments in 1994 leading up to the devaluation, focusing on internal and external factors, macroeconomic trends, and the behavior of financial markets. Section 4 describes the crisis itself, including the

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1/ Prepared by John Montgomery.

devaluation and floating of the peso in late December 1994, examines the difficulties in rolling over tesobonos and problems in the banking system, and discusses the evolution and then subsequent resolution of the crisis in the first quarter of 1995. Section 5 describes the spillover effects in other markets.

2.   Capital inflows, 1990-93

In the period 1990-93, Mexico was the recipient of $94 billion in net capital inflows, or roughly one-fifth of all net inflows to developing countries. Annual net inflows to Mexico reached a peak of $34 billion in 1993, representing 21 percent of developing country inflows. In part as a result of these inflows, foreign exchange reserves increased rapidly in Mexico, from a level of $6.3 billion at end-1989, to $25.1 billion at end-1993. Foreign exchange reserves continued to increase in Mexico in early 1994.

A large portion of the net capital inflows to Mexico consisted of net portfolio investment. Over the 1990-93 period, net portfolio inflows amounted to $61 billion, reaching an annual peak of $28 billion in 1993. Net foreign direct investment totaled $16.6 billion over the period 1990-93.

The Mexican equity market received much of the net portfolio investment inflows. Over 1990-93, $22 billion of foreign investment flowed into the Mexican stock market, including nearly $11 billion in 1993. On the strength of these net portfolio inflows, the Mexican stock market boomed. The Bolsa index rose 436 percent in dollar terms over the period 1990-93. The most rapid rise occurred at end-1993 and the beginning of 1994, as markets reacted to the ratification of the NAFTA.

3.   The Buildup of pressures in Mexico in 1994

    a.   Domestic and international events

As described in Table 13, a series of domestic and international events affected Mexican financial markets in 1994. The first such event was the unrest in the state of Chiapas in January. This was soon followed by a period of turbulence in international bond markets that came after the 25 basis point increase in the U.S. Federal funds rate, to 3 1/4 percent, on February 4. This relatively small increase was widely, and apparently correctly, seen as the first in a series of interest rate increases in the United States, and in the industrial countries generally. The rise in interest rates reflected the improved economic conditions and prospects in the industrial countries, which had entered a period of expansion after years of low growth or recession. For the two-month period following the 25

Table 13. Chronology of Major Events in Mexican Crisis and its Spillover Effects

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1994

January 1	Chiapas rebels seize six towns.
February 4	Federal Reserve raises Federal funds rate 25 basis points after having left the rate at 3.0 percent since September 1992.
March 22	Federal Reserve raises rates another 25 basis points.
March 23	Mexican presidential candidate Colosio assassinated.
April 18	Federal Reserve raises rates another 25 basis points.
April 26	Permanent swap arrangement of Mexico with Canada and the United States announced, replacing a temporary facility that had been announced on March 24.
May 17	Federal Reserve raises interest rates by 50 basis points.
August 16	Federal Reserve raises interest rates by 50 basis points.
August 21	Victory of PRI candidate Ernesto Zedillo in the election for president of Mexico.
September 28	Mexican PRI secretary general Jose Francisco Ruiz Massieu assassinated.
November 15	Federal Reserve raises interest rates by 75 basis points.
November 23	Mexican deputy attorney general Mario Ruiz Massieu resigns, alleging a coverup of the murder of his brother.
November 30	Cabinet of Mexican President Zedillo is announced.
December 1	New Mexican government takes office.
December 19	Violence in Chiapas.
December 20	Mexico shifts intervention limit for peso by 15 percent.
December 21	Mexican authorities announce tightening of monetary and fiscal policies.
December 22	Mexico allows peso to float; Finance Minister Serra meets with U.S. investors in a stormy session at the Federal Reserve Bank of New York; Mexico announces a sixty-day wage and price freeze; $7 billion in swap lines with Canada and the United States are activated.
December 27	Mexico announces that the authorities are formulating a new economic plan, which is to be announced in a presidential speech on January 2; weekly auction of tesobonos fails and the peso hits its December low of 5.7.
December 28	Discussions reported between the Mexican authorities and both the IMF and the U.S. Treasury Department; unconfirmed press reports that the Federal Reserve intervened to support the peso; Mexico announces liberalization measures, including permitting faster expansion by foreign banks, and land reform measures in Chiapas.
December 29	Mexican President Zedillo announces a new finance minister, Guillermo Ortiz.
December 30	Chiapas rebels declare a temporary truce.

1995

January 7	Argentina relaxes reserve requirements.
January 9	Mexico announces scheme to recapitalize banks.
January 11	U.S. President Clinton vows to provide more financial support to Mexico if necessary; IMF team was reported to be commencing meetings with the Mexican authorities.

Table 13 (concluded). Chronology of Major Events in Mexican Crisis and its Spillover Effects

<u>1995</u> (continued)

January 12	U.S. authorities propose a program to guarantee Mexico's debt.
	Argentina eliminates a small differential between its buy and sell rates for pesos, unifying the rates at one peso per dollar; it also mandates that banks may maintain their required reserves in either currency, unifies the reserve ratios for the two currencies, and creates a fund of approximately $1 billion to assist troubled banks.
	Rumors of a baht devaluation sweep Thai markets.
	Hungary cancels a privatization deal and removes the privatization commissioner.
January 13	Thai authorities arrange temporary swap facility to defend baht.
	A temporary, automatic halt to trading in the Philippine peso is called on January 13 after a large depreciation that day.
	Hong Kong Monetary Authority raises interbank rates more than five percentage points in response to pressure on Hong Kong dollar.
January 14	Indonesia leaves the foreign exchange window open on Saturday.
January 15	Direct talks between Mexican government and Zapatista rebels begin.
January 16	Indonesian authorities raise official discount rate 50 basis points.
January 17	Canada raises rates for third time in nine days.
January 26	Mexico signs a letter of intent on a $7.8 billion IMF standby credit.
January 31	U.S. authorities withdraw their loan guarantee proposal and in its place announce a direct loan package of $50 billion, including $20 billion from the United States, $18 billion from the IMF (including the previously agreed $7.8 billion), $10 billion from the Bank for International Settlements, and $3 billion from commercial banks.
February 15	Grupo Sidek, a Mexican conglomerate, announces that it will suspend payments on $19.5 million in U.S. dollar commercial paper owed by three of its affiliates.
February 21	Mexico and United States sign loan agreement.
February 22	Mexican authorities tighten their prudential standards for banks by mandating that loan-loss reserves should cover at least 60 percent of past-due loans or 4 percent of total loans.
February 24	The Philippine peso again breaches its daily trading band, and the authorities respond by raising domestic overnight interest rates and tightening restrictions on short-term peso borrowing by foreign banks.
March 3	Mexico takes over holding company for Banpais.
March 5	The ERM parities of the Spanish peseta and Portuguese escudo are lowered.
March 6	Brazil shifts fluctuation bands for real and slates further adjustment for May.
March 10	Brazil shifts real bands again and institutes several measures aimed at increased capital inflows and decreasing outflows.
March 9	Mexican economic program announced.
March 10	Mexican authorities announce a program to restructure bank loans to small- and medium-sized companies.

basis point increase, world interest rates increased relatively
sharply. 1/ In the course of 1994, U.S. official interest rates were
raised five times, and the Federal funds rate reached 5.5 percent by end-
November.

Other political events in Mexico also affected financial markets. On
March 23, 1994, Luis Donaldo Colosio, the presidential candidate of the
ruling PRI party, was assassinated. The political situation stabilized in
Mexico during the summer, culminating in the victory of PRI candidate
Ernesto Zedillo in the presidential election on August 21. However,
political difficulties surfaced again on September 28 when PRI secretary
general Jose Francisco Ruiz Massieu was assassinated. Shortly after the
newly elected President Zedillo took office on December 1, 1994, violence
occurred again in Chiapas on December 19, just before the devaluation of the
peso.

In addition to these political and international events, macroeconomic
fundamentals in Mexico could be interpreted as having contributed to
financial market stress in Mexico during the course of 1994. One factor
that contributed to the internal imbalances was that the Bank of Mexico
followed a policy of sterilized intervention in 1994 when the peso came
under pressure, first in the April-March period and later in November and
early December. This sterilized intervention had the effect of maintaining
the stock of base money in the presence of a decline in the demand for
pesos; in effect, the decline in foreign exchange reserves in Mexico were
offset by an increase in the Bank of Mexico's net domestic assets. This
policy maintained relatively low interest rates early in the year when
industrial country interest rates increased, and later in the year in the
presence of heavy selling pressures on the Mexican peso. In addition,
domestic credit expanded rapidly in Mexico, and the current account deficit
widened from 6.4 percent of GDP in 1993 to 8.0 percent in 1994. The rise in
Mexico's external deficit reflected a sharp rise of 20 percent in the value
of imports, compared with a 14 percent rise in the value of exports. This
rise in imports reflected, in part, a 35 percent appreciation of the real
effective value of the Mexican peso in the four-year period ending in
February 1994. During the period from February through November 1994, the
real effective value of the peso declined 9 percent, however.
Counterbalancing the emergence of these apparent macroeconomic imbalances in
1994 were some positive developments, including a reduction in inflation and
the maintenance of balanced government fiscal accounts. 2/

1/ For a detailed description of this turbulence and its implications for
international capital markets see International Monetary Fund (1994a).

2/ For a more detailed discussion of the macroeconomic events in Mexico
in 1994 see "Factors Behind the Financial Crisis in Mexico," Annex I, in
World Economic Outlook-Boxes and Annexes, EBS/95/38 (March 17, 1995).

b.   Financial market developments in 1994

(1)   Flows and reserve changes

(a)   Equity flows

Foreign investment in the Mexican stock market peaked in late 1993 and early 1994, with the passage of NAFTA (see Chart 6). Equity inflows fell off sharply in March, reflecting pressures following the increase in interest rates in the United States in February and later in other industrial countries. Following the assassination of presidential candidate Colosio in March 1994, there was a net outflow of capital in April, the first such outflow since July 1992. Net foreign investment turned positive again in the period between end-April and the end of the Summer, but outflows resumed again in the Fall, when there was a net outflow of $744 million in the three-month period of September through November.

(b)   Government debt restructuring

Mexican public finances also came under pressure in 1994. As a result of the events early in the year and the ensuing financial pressures, the Mexican government altered its financing strategy and shifted from standard, peso-denominated debt (principally cetes) to debt indexed to the peso-dollar exchange rate (Chart 6). The government began to make heavier use of tesobonos, which are short-term debt securities paid in pesos but indexed to the U.S. dollar. 1/ In April 1994, the government reduced peso debt by MexN$17 billion while at the same time it increased tesobono debt by MexN$22 billion. As a share of total Mexican debt, tesobonos continued to increase in the period after April until end-November, when they accounted for 50 percent of the value of all Mexican government securities outstanding; tesobonos had accounted for 6 percent of Mexican-government debt at end-February 1994.

The attractiveness of tesobonos relative to cetes increased with the exchange market pressures that resulted from the Colosio assassination in March. These pressures led to a sharp increase in interest rates on cetes (Chart 7). As yields on cetes increased, the spread between yields on cetes and tesobonos increased from 437 basis points in mid-March to 735 basis points at the beginning of April and then to 870 basis points by end-April. The spread between the yields on these two instruments reflects, in part, investor perceptions of exchange rate risk. 2/

1/   See the more detailed discussion below in Section 4.b.

2/   See "The Mexican Foreign Exchange Crisis from the Perspective of the Speculative Attacks Literature," Chapter IV of the Background Material Part I.

(c) Reserve changes

In retrospect, foreign exchange reserves in Mexico clearly reflected these growing concerns in financial markets (Chart 8). Reflecting successful macroeconomic adjustment in the early 1990s and sizable net capital inflows, foreign exchange reserves reached a peak of $29.3 billion in Mexico by end-February 1994. Financial pressures on the Mexican peso following the Colosio assassination led to a decline in reserves of $3.4 billion in March and a further decline of $8.2 billion in April. With these financial market pressures subsiding temporarily beginning in May, the stock of foreign exchange reserves remained fairly stable until end-October. In November, selling pressures on the Mexican peso increased again, and foreign exchange reserves in Mexico declined $4.8 billion. This reduced the stock of reserves to $12.9 billion by end-November. The decline in reserves in November was not publicly announced until after the devaluation of the Mexican peso in December.

(2) Evolution of financial prices

In the eleven months leading up to December 1994, Mexican interest rates, Mexican stock prices, and the peso-dollar exchange rate all experienced periods of turbulence. Up until the devaluation of the peso, the peso-dollar exchange rate was allowed to fluctuate in a band consisting of a fixed lower limit (on the peso appreciation) and an upper limit that increased by MexN$0.0004 per day. At the beginning of 1994, the peso-dollar exchange rate fluctuated within a narrow trading range until February 22, when it began a 4 percent decline over the next two months. At the end of this two-month period, the peso had reached the lower end of the intervention band.

Short-term peso interest rates increased significantly after the Colosio assassination; interest rates on 91-day cetes rose from 10.1 percent on March 23 to 17.8 percent one month later. In the period from April to December, the peso-dollar rate mostly remained near the upper intervention limit, appreciating away from the intervention limit only twice, at the end of April and again in August. Likewise, short-term interest rates remained fairly steady until July, with rates on cetes fluctuating between 16 and 18 percent. In early August, as the peso strengthened temporarily, interest rates declined, and from then until the end of November rates fluctuated in the range of 13 to 15 percent.

The Mexican stock and bond markets also showed signs of pressure. Spreads on Mexico's Brady bonds over comparable U.S. Treasuries began to widen in January as violence flared up in Chiapas. Between the beginning of the year and the week of the Colosio assassination in March, spreads on Mexican (par) Brady bonds increased about 140 basis points. After the Colosio assassination, spreads increased an additional 220 basis points, and reached a peak of 528 basis points on April 21. From May through November, Brady spreads fluctuated in the 300-460 basis points range, well above their levels before the Colosio assassination.

Chart 6. Mexico: Government Debt Outstanding and Stock Market Flows, January 1993-March 1995

Flow of Foreign Equity Investment in Mexico, January 1993-February 1995
(In millions of US dollars)
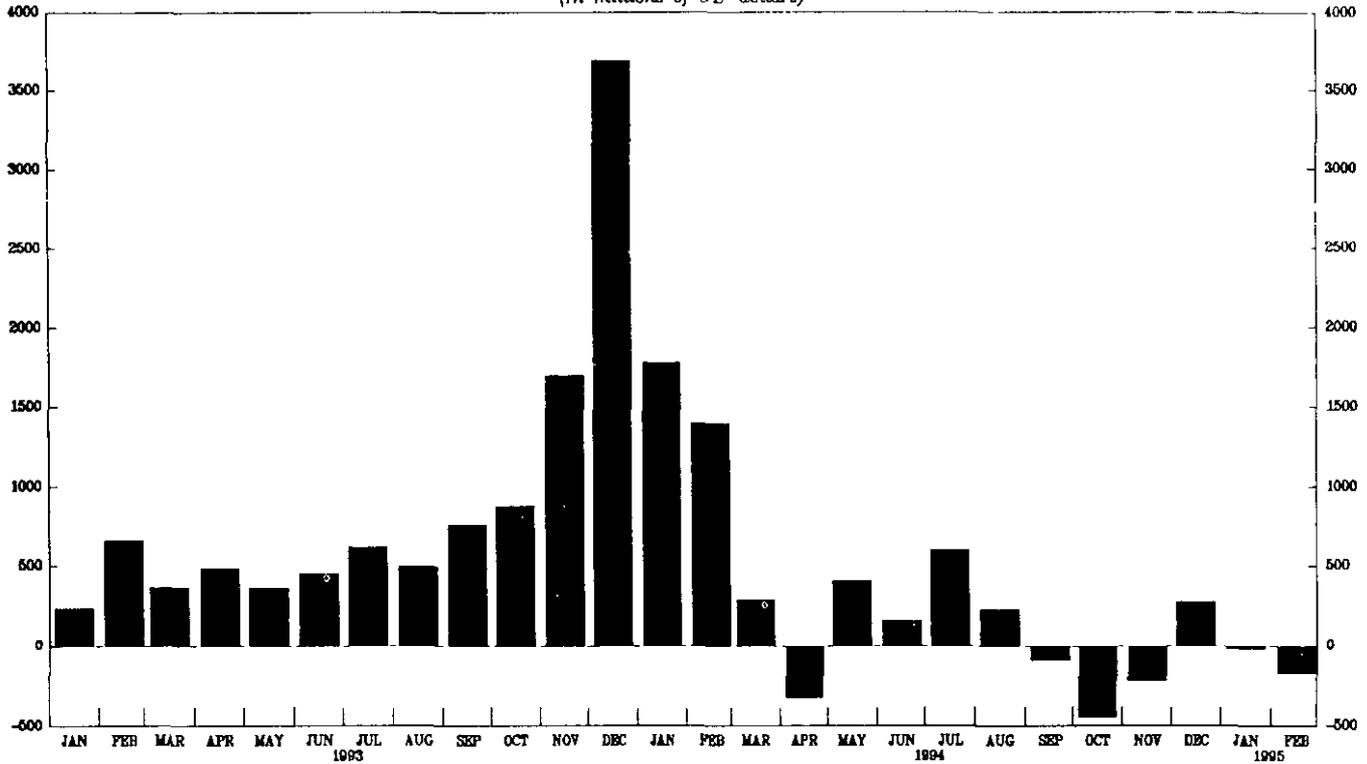
Domestic Government Debt Outstanding, January 1994-March 9, 1995
(In billions of new pesos)
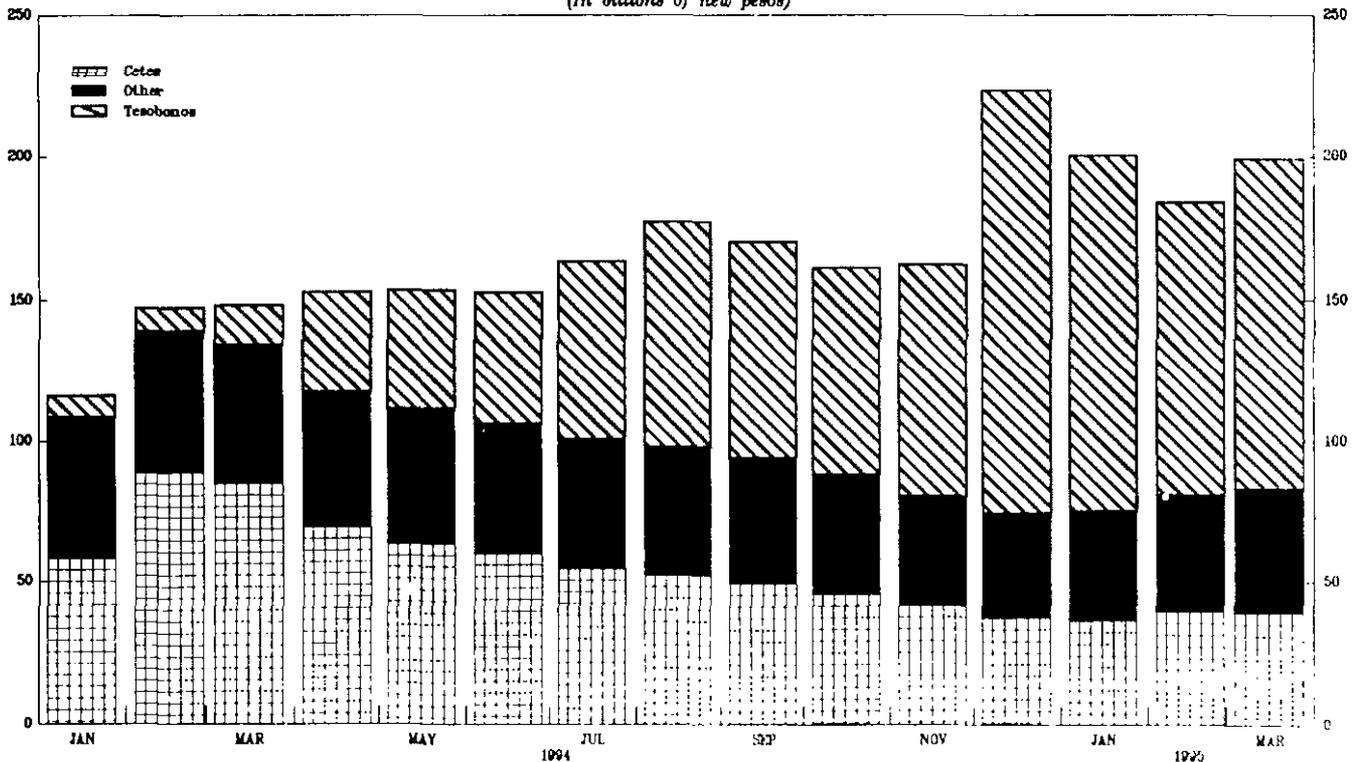
Sources: Banco de Mexico; and Comision Nacional de Valores.

Chart 7. Mexico: Yields on Cetes and Tesobonos,
December 31, 1993–March 31, 1995 '
(In percent)
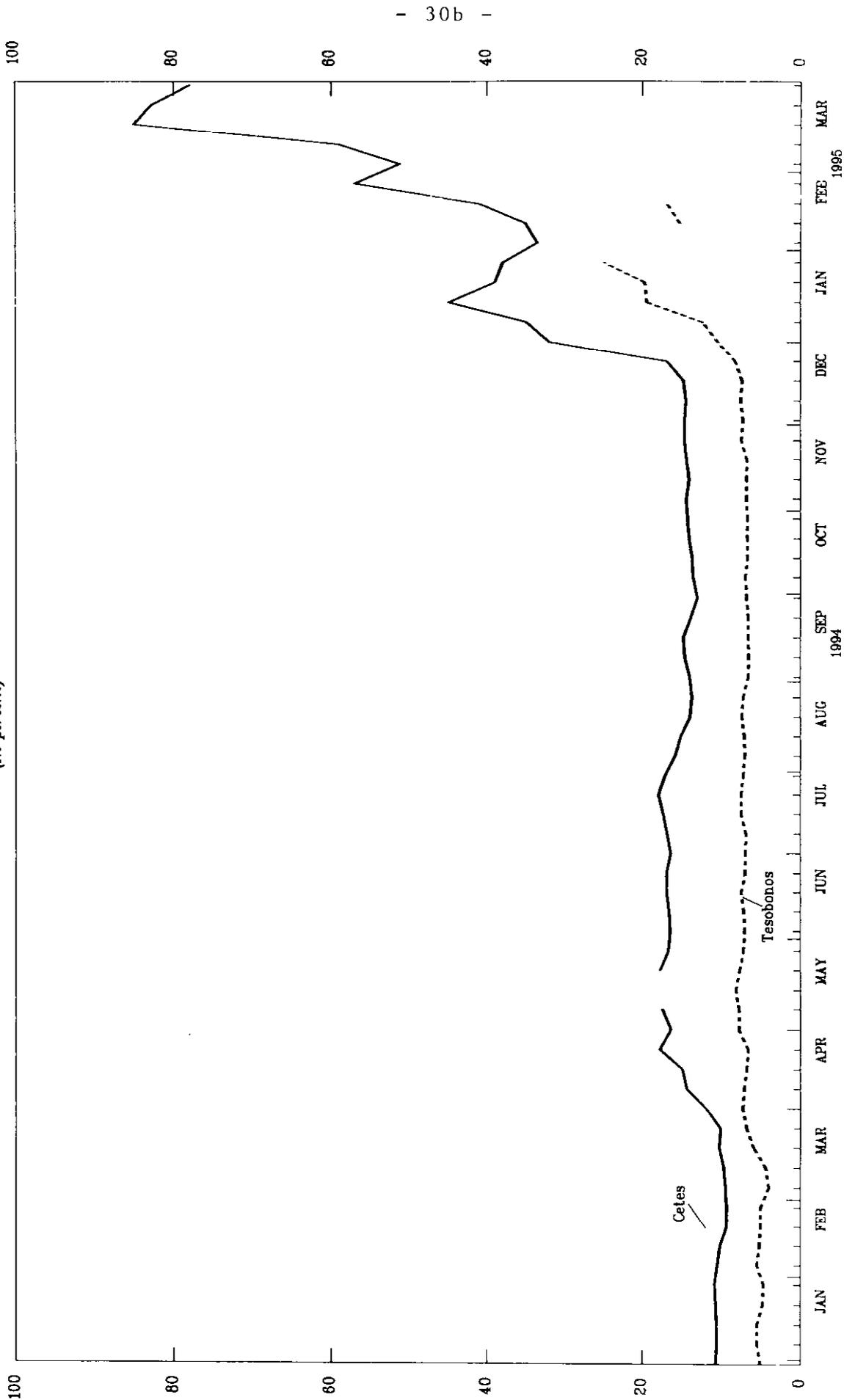
Source: Bloomberg Financial Markets.

'Weekly auction data for 91-day cetes (Mexican government treasury bills) and 91-day tesobonos. The break in the cetes series reflec:s the fact that there was no auction during the week of May 11, 1994. The break in the tesobonos series is due to cancellation of the January 31, 1995 auction by the Bank of Mexico.

Chart 8.   Mexico: Net International Reserves, 1994

(In billions of U.S. dollars)

Prices on the Mexican stock market increased in January 1994, reflecting in part the perception that the NAFTA agreement would improve corporate performance in Mexico (Chart 9). Stock prices began to decline, however, with the increase in interest rates in February. The Bolsa reached a 1990s high on February 8, but by April 20, the Bolsa had declined 37 percent in dollar terms. The stock market recovered in May and was especially strong in August, but then began a gradual decline in September.

4. **The Crisis in Mexico**

As is typical of crises, the financial situation in Mexico unfolded rapidly. As a result of the financial pressures in the first two weeks of December 1994, the peso was devalued on December 20. Reflecting continuous pressure during the next two days, and a steep decline in reserves, the peso was allowed to float on December 22, after which Mexican financial markets experienced heavy selling pressures. These pressures were exacerbated by two factors. First, the value of Mexico's dollar-linked tesobono debt increased sharply as the peso depreciated. Second, the depreciation of the peso and the associated rapid rise in domestic interest rates increased the amount of nonperforming loans in the Mexican banking system, in part because most loans in Mexico have floating interest rates that quickly reflect market rates. The immediate crisis was resolved during the early part of 1995: on January 31 the United States announced a lending program; on February 1 the IMF approved the largest stand-by arrangement in its history; and throughout the first quarter the Mexican government announced policy measures. The financial market pressures in Mexico spilled over into a number of other markets, including those of Argentina and Brazil, and led to a general reevaluation and rebalancing of international portfolios by institutional investors, which affected countries in Asia as well.

    a.   Financial market developments during
             the devaluation and floating of the peso

After a gradual decline in the Mexican stock market in the Fall of 1994, downward pressures on prices intensified in early December. In dollar terms, the Mexican Bolsa declined 9 percent from December 1 to December 16 (Chart 9). Violence erupted in Chiapas on Monday, December 19. In the early morning of December 20, the Mexican authorities announced that the intervention limit for the peso would be widened by 15 percent (from MexN$3.4712 to MexN$4.0016 per dollar), which allowed further room for the currency to depreciate. It was the stated objective of the authorities to maintain the value of the peso within the band and to continue to allow the band to change by MexN$0.0004 pesos per day.

    (1)   **Financial market reaction to the devaluation**

The evolution of the peso in December and subsequent months is shown in Chart 9. The widening of the intervention band resulted in an immediate 12 percent depreciation of the peso, from 3.47 pesos to the dollar (the close on December 19) to 3.88 (the opening) on December 20. During the

course of the trading day on December 20, the peso depreciated an additional 3 percent and reached a low at the close of the market just below the new intervention limit. On December 21, the peso remained in a narrow range, opening at 3.9870 and then closing at 3.9965, near that day's intervention limit of 4.0020. However, during this two-day period--December 20 and 21-- foreign exchange reserves in Mexico declined by $4 billion.

Short-term interest rates rose in reaction to the devaluation. In the secondary market for Mexican government securities, the rate on 28-day cetes repurchase agreements increased from 14.7 percent on December 19 to 17 percent on December 21. At the cetes auctions on December 21, the average interest rates on cetes increased from 14.8 percent in the previous week's auction to 16.2 percent. This rise was sufficient for the auctions to be reasonably successful; almost all of the cetes that were offered were sold (Table 14). At the December 20 tesobono auction, average interest rates increased by 38 basis points above the previous week's auction rates.

The dollar value of Mexican equity securities declined sharply after the devaluation. Although the Mexican Bolsa rose 2 percent in peso terms on December 20 and then fell by 3 percent the next day, the dollar value of the index fell a total of 14 percent. Meanwhile, spreads on Mexican Brady bonds over interest rates on similar U.S. Treasury securities increased 143 basis points.

(2) Impact of decision to float on December 22 on financial markets

Before markets opened on December 22, an announcement was made that the Mexican peso would be allowed to float against the dollar. Also announced were the activation of a $7 billion swap line with Canada and the United States, and agreements between business and labor leaders in Mexico to restrain wage and price increases. Selling pressures on Mexican assets generally followed these announcements. By the close of the foreign exchange market in Mexico on December 22, the peso had declined by an additional 20 percent to MexN$4.80 to the dollar. Prices of shares on the Mexican stock market increased 5 percent in peso terms, but fell 13 percent in dollar terms. Meanwhile, spreads on Mexican Brady bonds increased an additional 103 basis points from the previous day. Reflecting these additional selling pressures and a loss of confidence, money-market conditions in Mexico tightened significantly as interest rates on 28-day cetes repurchase agreements rose from 17 percent on December 21 to 24.5 percent on December 22.

(3) Financial developments during the following week

In the days following the floating of the peso, selling pressure on Mexican assets continued. Following the Christmas weekend, the peso declined to a 1994 low of MexN$5.7 per dollar on Tuesday, December 27. Partly accounting for this decline was the weak demand for tesobonos at the auction held on that day. At auction, bids were received for $28 million of

Chart 9. Mexico: Exchange Rate and Stock Market Index,
December 1993-March 1995

Spot Exchange Rate and Lower and Upper Intervention Bands,
January 1994-March 1995
(New pesos per U.S. dollar)
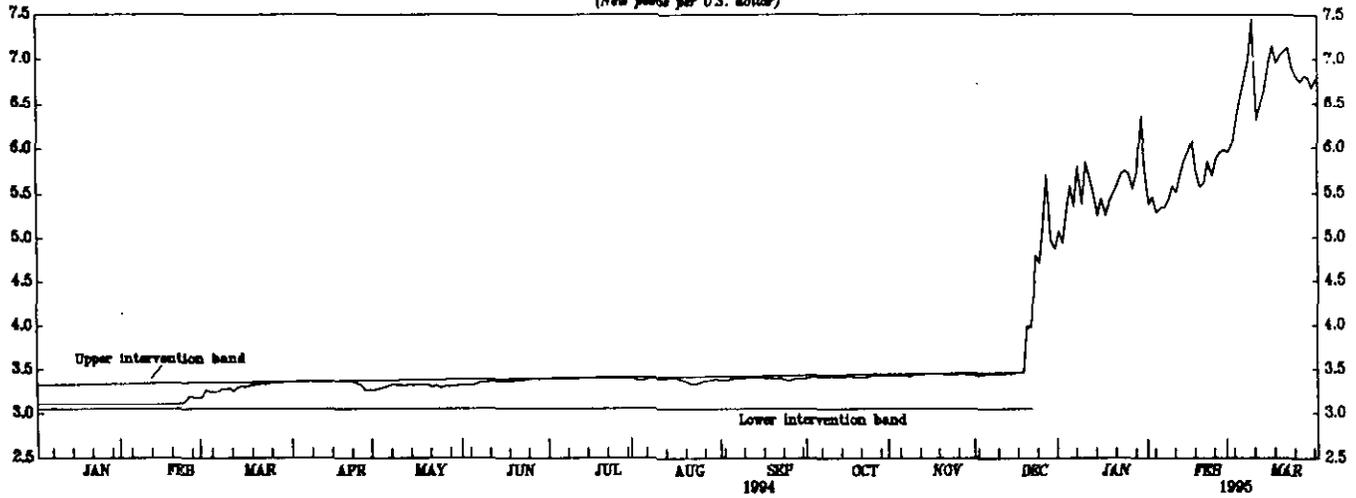
Stock Market Index, December 31, 1993-December 30, 1994
(December 31, 1993 = 100)
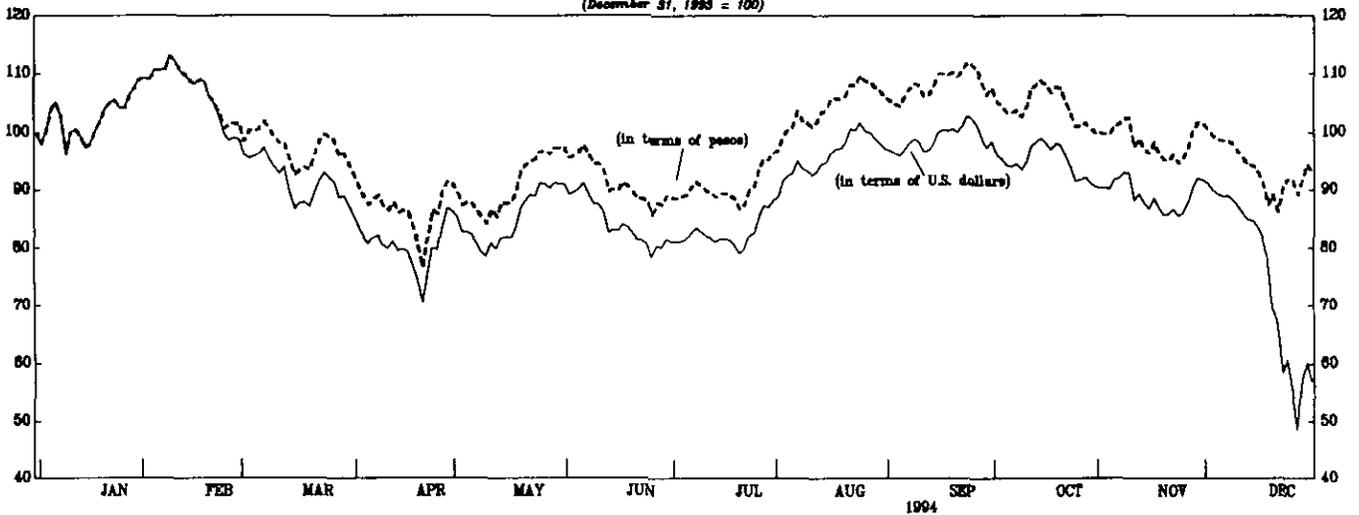
Stock Market Index, November 30, 1994-March 31, 1995
(November 30, 1994 = 100)
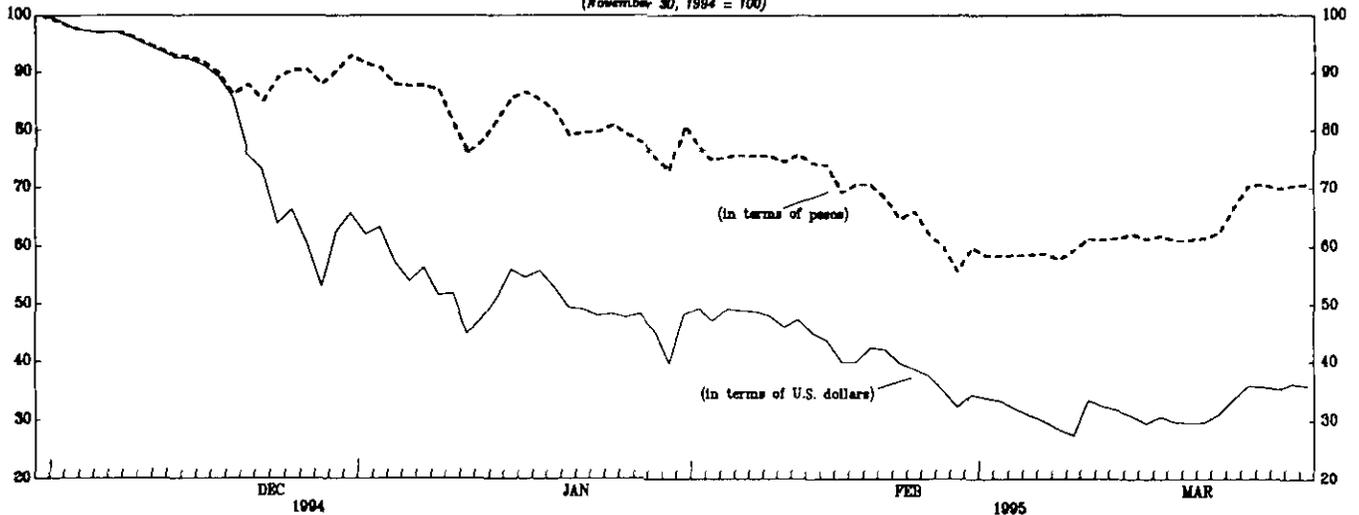
Sources: Bloomberg Financial Markets; and International Monetary Fund.

Table 14. Mexico: Cetes and Tesobonos Auctions, December 1994-March 15, 1995

	Yield 1/ (In percent)	Amount Sold	Amount Offered	Amount Bid	Bid-Cover Ratio (in percent)
Cetes			(In millions of new pesos)		
Dec. 7, 1994	14.25	1,100	1,100	4,314	392.18
Dec. 14, 1994	14.80	897	1,100	1,371	124.64
Dec. 21, 1994	16.22	1,066	1,100	1,773	161.18
Dec. 28, 1994	31.41	586	1,100	645	58.64
Jan. 4, 1995	32.46	1,403	1,500	1,921	128.07
Jan. 11, 1995	40.91	1,425	2,800	2,332	83.29
Jan. 18, 1995	38.80	3,306	2,800	6,252	223.29
Jan. 25, 1995	36.33	2,800	2,800	10,610	378.93
Feb. 1, 1995	31.74	4,000	4,000	10,540	263.50
Feb. 8, 1995	33.70	3,805	4,200	7,942	189.10
Feb. 15, 1995	38.58	2,967	3,400	3,698	108.76
Feb. 22, 1995	53.00	2,865	3,400	3,747	110.21
Mar. 1, 1995	48.98	3,200	3,200	8,180	255.63
Mar. 8, 1995	57.13	1,867	3,200	2,628	82.13
Mar. 15, 1995	83.13	1,400	1,400	3,220	230.00
Tesobonos			(In millions of U.S. dollars)		
Dec. 6, 1994	8.39	420	420	1,071	255.00
Dec. 13, 1994	8.23	375	375	865	230.67
Dec. 20, 1994	8.61	416	600	868	144.67
Dec. 27, 1994	10.23	28	600	28	4.67
Jan. 3, 1995	12.31	52	500	72	14.40
Jan. 10, 1995	19.63	63	400	129	32.25
Jan. 17, 1995	19.75	400	300	941	313.67
Jan. 24, 1995	21.40	50	50	147	294.00
Jan. 31, 1995	24.98	155	150	164	109.33
Feb. 7, 1995	21.01	240	270	439	162.59
Feb. 14, 1995 2/	17.81	210	210	427	203.33

Source: Bloomberg Financial Markets.

1/ Yield averaged across maturities auctioned, weighted by amounts sold of each maturity

2/ Most recent auction held

the $600 million in tesobonos offered for sale, a bid-cover ratio of only
5 percent. During this same period, the dollar value of Mexican stocks
declined nearly one-for-one with the value of the peso. Overall, the dollar
value of the Bolsa fell 17 percent between December 22 and December 27.
Mexican Brady bonds spreads reached 936 basis points on December 27, an
increase of 286 basis points from December 22 and 527 basis points from
December 19.

After reaching this low, markets recovered before the end of the week
(and year), with the peso recovering 11 percent of its value and the Bolsa
17 percent of its dollar value. Brady bond spreads declined 143 basis
points before the end of the week. Policy measures contributed to this
upswing. International support for a solution to the Mexican crisis began
to crystalize on Wednesday, December 28, as discussions were widely reported
to be taking place between the Mexican authorities and both the
International Monetary Fund and the U.S. Treasury Department. That same
day, the Mexican government announced liberalization measures. One of these
permitted faster expansion by foreign banks, a measure that was designed to
add capital to a banking system depleted by the depreciating currency, as
well as to maintain an increase in capital inflows. The government also
announced land reform measures in Chiapas, after which rebels in Chiapas
declared a temporary truce.

Money-market conditions remained tight in Mexico in the week following
the decision to allow the peso to float. Interest rates on 28-day cetes
repurchase agreements increased from 21 percent on December 26 to 25 percent
on December 30, indicating that conditions tightened in response to the
selling pressures that peaked on December 27. Interest rates at the cetes
auctions on Tuesday, December 28 nearly doubled and reached an average of
31.4 percent, up from 16.2 on the previous Tuesday (see Table 14). The bids
received at the December 28 cetes auctions amounted to slightly more than
half of the cetes offered for sale.

(4) Evidence on capital outflows

Data on portfolio capital outflows during December 1994 is
relatively scant. According to stock market investment data there was a
small net inflow of $282 million of net foreign investment into the stock
market. 1/ Foreign holdings of cetes declined by MexN$5.5 billion over
the month, but foreign holdings of tesobonos increased by about MexN$3.1
billion. On balance, there was a net outflow in the form of foreign
holdings of Mexican domestic government securities (including cetes,
tesobonos, and others) of about MexN$3.6 billion ($790 million). Despite
net sales of foreign holdings of equity and government securities of about
$510 million, the Banco de Mexico sold $6.6 billion in foreign reserves
during December.

1/ Data provided by the Comision Nacional de Valores. Data on foreign
holdings of government securities are from the Banco de Mexico.

Evidence on sales by foreign institutional investors is limited. 1/ Net outflows of U.S. based mutual funds occurred in some categories, as did net inflows in other categories, with no specific information on the holdings of Mexican assets by these institutional funds. Before the crisis, U.S. mutual funds held Mexican bonds amounting to $1.5 billion, including sovereign bonds issued in international capital markets. Tesobonos held by U.S. mutual funds at that time are estimated to have been around $700 million, compared with $16 billion held by non-residents in mid-December 1994. It appears unlikely, therefore, that U.S. mutual funds were a major source of selling pressure on Mexican fixed-income markets.

b. The tesobono problem

(1) Operation of tesobono market

Until recently, tesobonos were bought in a primary market operated by the Banco de Mexico. Bids were submitted in dollars at 9:30 a.m. on Tuesday. At 11:00 a.m. the foreign exchange "fix" determined the peso value of these bids. This fix was also used to determine the peso value of maturing tesobonos, which were settled on Thursday in pesos. The fix is an average market exchange rate that the central bank calculates daily, dropping the high and low observations from the prices quoted by the six largest market participants. For a fee (normally about 10-15 basis points), banks sell insurance that guarantees that customers will receive pesos indexed to the fix rate, for delivery two days later for the purchase of tesobonos or the conversion of the proceeds of maturing tesobonos into dollars. For this two-day settlement period, investors incur some exchange rate risk. Tesobonos were last sold in the primary market on February 14, 1995. In March, the government moved to permit the direct settlement of tesobonos at maturity in dollars, at the option of investors.

(2) Effects of peso depreciation on tesobono liabilities

Mexico's reliance on tesobonos had increased during the course of 1994, and by end-November about 50 percent, or $24 billion, of domestic government debt was held in this form. By end-December, tesobonos comprised 66 percent of total domestic government debt as the value of tesobonos outstanding rose from MexN$82 billion at end-November to MexN$149 billion at end-December. As the crisis continued, market participants became increasingly concerned about the amount of tesobonos that would mature in the first few months of 1995, and this created further pressure on financial markets in Mexico. A total of $3.3 billion in tesobonos were expected to mature in January 1995, and a total of $9.9 billion were expected to mature in the first quarter; however, foreign exchange reserves in Mexico amounted to $6.3 billion at end-December 1994 (Table 15). At this time, market commentaries increasingly focused on the possibility that tesobonos would be

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1/ For details see Table 10 in "The Increasing Importance of Institutional Investors," Chapter IV of the Background Paper Part II.

Table 15.   Calendar of Total Maturing Cetes and Tesobonos, 1995

Month Maturing	Cetes (In millions of new pesos)	Cetes (In millions of U.S. dollars) 1/	Tesobonos	Cetes plus Tesobonos
			(In millions of U.S. dollars)	
January	5,142.37	1,142.75	3,290.37	4,433.12
February	3,186.67	708.15	3,495.68	4,203.83
March	5,238.47	1,164.10	3,087.88	4,251.99
April	2,272.61	505.02	1,852.23	2,357.25
May	1,264.35	280.97	2,634.96	2,915.93
June	3,498.64	777.48	1,942.07	2,719.54
July	682.99	151.78	3,631.16	3,782.94
August	1,824.43	405.43	4,143.18	4,548.61
September	2,184.56	485.46	651.35	1,136.81
October	1,481.35	329.19	865.31	1,194.50
November	1,560.80	346.84	2,206.55	2,553.40
December	1,201.94	267.10	855.97	1,123.07
By quarter				
January-March	13,567.51	3,015.00	9,873.94	12,888.94
April-June	7,035.60	1,563.47	6,429.26	7,992.72
July-September	4,691.98	1,042.66	8,425.70	9,468.36
October-December	4,244.09	943.13	3,927.83	4,870.97

Source: Banco de Mexico.

1/   Converted by the Banco de Mexico at MexN$4.5 to the dollar.

restructured, and there were rumors that discussions were under way in Mexico with investment bankers on how the tesobonos could be refinanced.

(3) Changes in foreign and domestic holdings of tesobonos after devaluation

The available evidence indicates that investors retained their holdings of tesobonos immediately following the devaluation. Foreign holdings of tesobonos remained relatively constant (in dollar terms) in the weeks before the devaluation and then increased somewhat in the week following the devaluation, before falling off again (Chart 10). Foreign holdings of tesobonos amounted to $16.1 billion on December 19, the day before the devaluation, and peaked at $17.0 billion on December 27. Meanwhile, there appears to have been a portfolio shift out of cetes after the devaluation, mirroring the rise in foreign holdings of tesobonos. Holdings of tesobonos by Mexican banks and nonbank residents also increased in the wake of the devaluation. Holdings by nonbank residents rose from $3.9 billion just before the devaluation to a peak of $5.1 billion on December 23.

Concerns about tesobono liabilities intensified after December 27, and as a result, holdings of tesobonos by foreigners and domestic nonbank residents decreased. Some of this slack was taken up by Mexican banks and the remaining slack was taken up by a reduction in the total outstanding. The falloff in holdings of tesobonos by nonbank residents was particularly marked, as these holdings declined from $5.1 billion on December 23 to $2.4 billion at end-January. Foreign holdings were more stable, falling by $0.9 billion at end-January from a peak of $17.0 billion.

(4) Auction performance after the peso was floating

Although the tesobono auction on December 20 immediately following the devaluation was relatively successful, subsequent auctions were not (see Table 14). For three successive weekly auctions between December 27, 1994 and January 10, 1995, the quantity of bids fell far short of the amount of tesobonos offered at auctions for all maturities. Bid-cover ratios for all maturities ranged between 5 percent and 32 percent during these auctions. There was somewhat higher demand for cetes, although bids at many of the cetes auctions also fell short of the amount offered for sale. 1/ In the weeks following mid-January, demand at auctions increased, although yields continued to rise for both cetes and tesobonos. After February 14, the authorities discontinued tesobono auctions.

1/ Auction results are difficult to interpret. The Banco de Mexico can adjust the amount sold after receiving bids. This fact may lead to strategic behavior by bidders and make bid-cover ratios difficult to interpret. Winners curse considerations might also complicate interpretation; see International Monetary Fund (1994a), page 44.

c.   Financial fragility in the banking system 1/

Before the devaluation in late December, the Mexican banking system had already experienced a sharp increase in nonperforming loans: the ratio of past-due loans to total loans increased from 4.6 percent at end-1991 to 8.5 percent in March 1994. The depreciation of the peso had an immediate, though modest, impact on the health of Mexican banks. Banks experienced losses on their securities portfolios in the wake of the devaluation, particularly in their fixed-income portfolios. Losses from equity holdings may have been considerably smaller. After a 39 percent decline in peso terms from end-December 1994 to February 27, 1995, the Mexican stock market has recovered half of its losses.

The peso devaluation, and the subsequent tightening of financial market conditions created asset quality problems in the peso-denominated and foreign-currency loan books of Mexican banks. Foreign-currency loans represented about a third of total loans made by Mexican banks as of December 1994, but many of these loans were extended to firms without sources of foreign-currency income. 2/ As the peso depreciated, borrowers encountered debt-servicing problems as the value of their liabilities increased in peso terms. The sharp rise in interest rates also affected the peso-loan portfolio. Most, if not all bank credits in Mexico have variable interest rates tied to the one-month cetes rate or to interbank interest rates. When interest rates reached levels as high as 80 percent in the first quarter of 1995, payments ceased on a large proportion of loans of all types. Banks generally chose to restructure these loans, or simply to suspend interest payments, rather than be forced to recognize them as high-risk assets and write off a certain amount of their already declining capital by making provisions. Nevertheless, the deterioration in asset quality forced the risk-weighted capital ratios of several Mexican banks below the 8 percent minimum.

Banks in January 1995 faced severe dollar liquidity problems. Many had borrowed in dollars, using tesobonos as collateral. These tesobonos proved illiquid as concerns over the government's tesobono liabilities grew. In response, the Banco de Mexico operated a dollar liquidity facility in January for banks needing to refinance maturing dollar liabilities.

On January 9, the authorities announced a scheme to recapitalize banks with capital ratios below the 8 percent minimum. As of end-March 1995, six banks had obtained assistance totalling MexN$6.49 billion (equal to 14.5 percent of the net worth of all Mexican commercial banks at the end of 1994) from the deposit-guarantee fund (Fobaproa) under the temporary capitalization program (Procapte). On February 22, the National Banking Commission (CNB) changed prudential requirements for banks. It imposed on

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1/ For further details on both recent developments in the Mexican banking system and on the restructuring plans see Chapter VIII below.
    2/ Moody's Investor Service.

Chart 10. Mexico: Government Securities Holdings by Sector,
December 2, 1994 – January 27, 1995

▨ Foreign residents   ▨ Nonbank domestic residents   ■ Mexican commercial banks

Tesobonos *(In billions of dollars)*

Tesobonos *(In billions of new pesos)*

CETES *(In billions of new pesos)*

Total debt *(In billions of new pesos)*
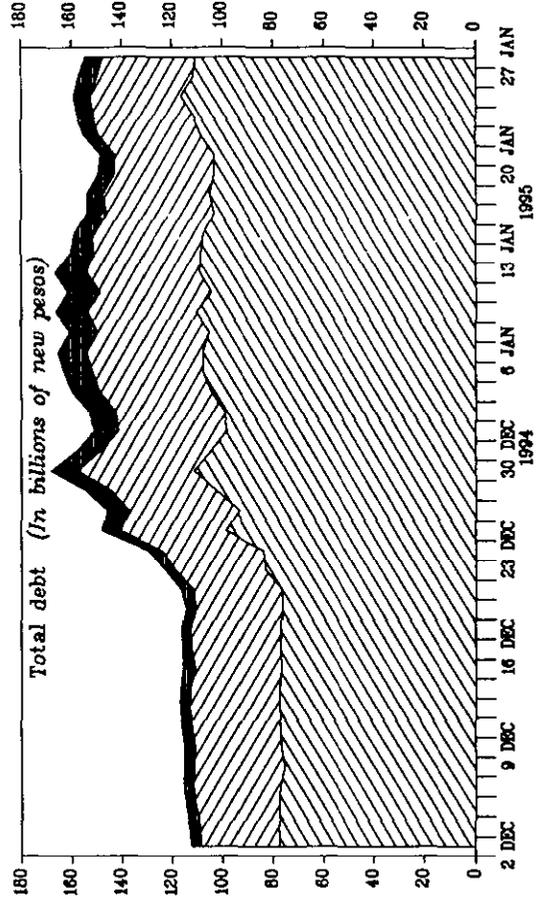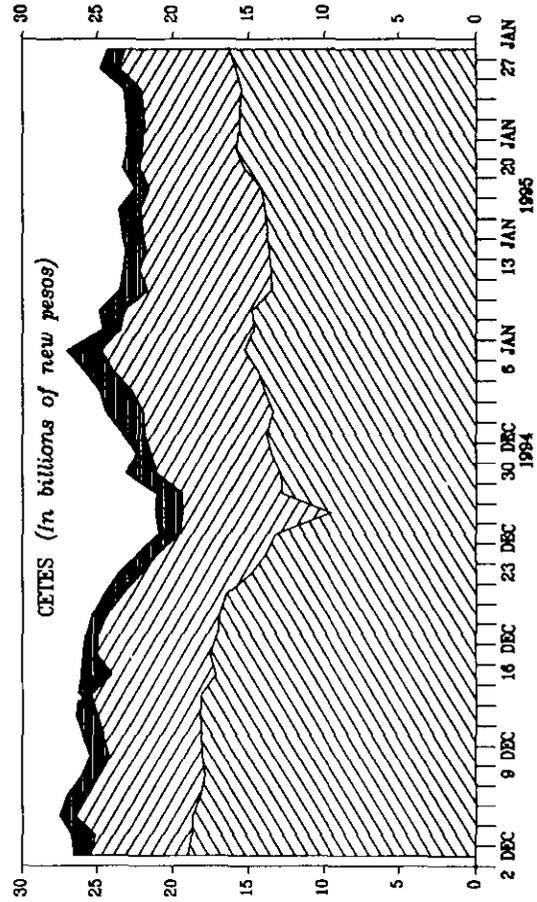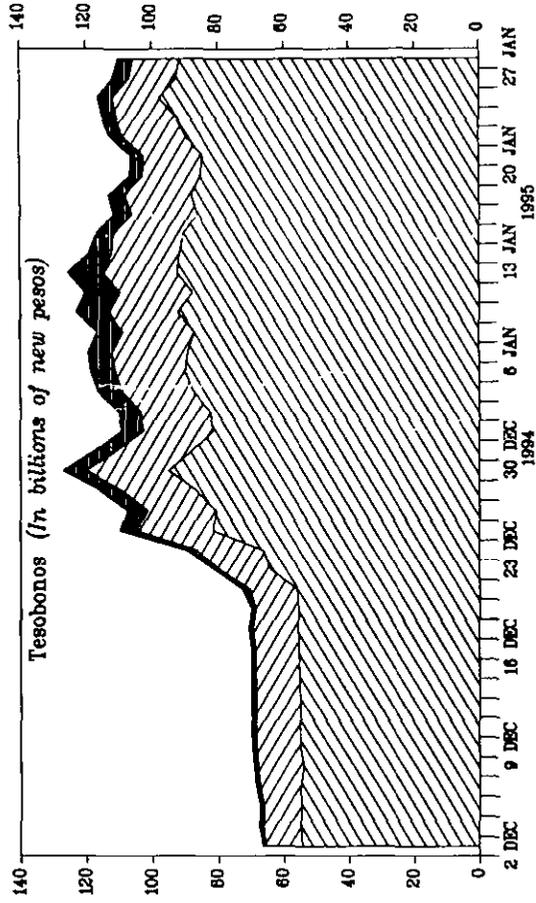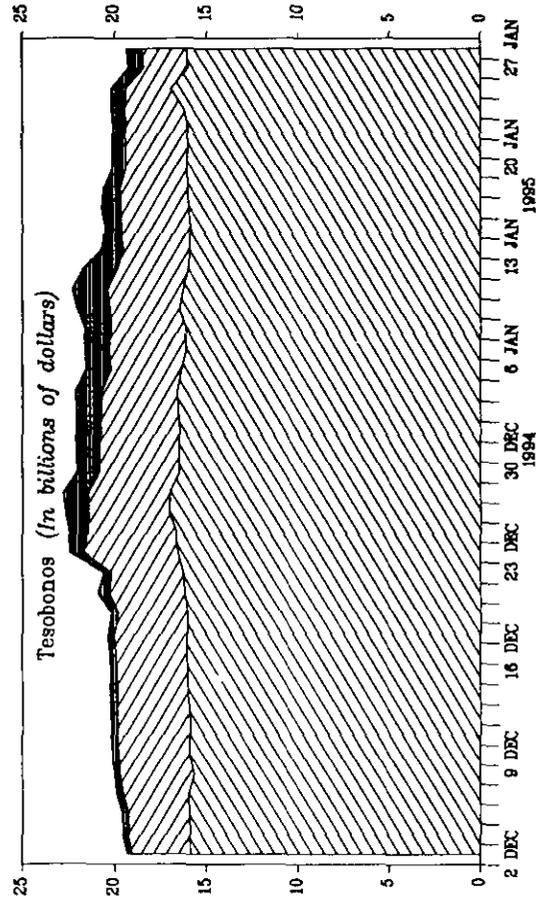
Source: Bank of Mexico.

banks the requirement to maintain a minimum level of loan loss reserves equal to the greater of 60 percent of their nonperforming loan portfolio or 4 percent of their total loan portfolio in an attempt to ensure that banks would have sufficient reserves to withstand a decline in asset quality. Finally, in March 1995 three additional facilities were introduced for restructuring loans, with additional funding totalling MexN$148 billion: one for small- and medium-sized companies; another for mortgages; and another for dollar-denominated loans.

d.   Continuation and resolution of crisis in the first quarter of 1995

(1)   Domestic and international measures to resolve crisis

The first international effort to assist Mexico came early in January 1995. On January 2 it was announced that an $18 billion international credit package had been agreed, including $9 billion from the United States, $1 billion from Canada, $5 billion from the Bank for International Settlements (BIS), and $3 billion from U.S. banks. The next day, following intensive discussions with business and labor representatives, the Mexican authorities announced a stabilization plan, including commitments on the part of business and labor to restrain wage and price increases. The government also announced a privatization program, and opened the Mexican banking system to greater foreign investment by permitting 100 percent foreign ownership of Mexican banks.

After markets continued to deteriorate, and pressures spread to other emerging markets, the international loan package was replaced by a larger program. On January 12, a program guaranteeing Mexico's debt was proposed, but later in the month opposition to this proposal increased in the U.S. Congress.

This proposal was subsequently withdrawn on January 31 and a direct loan package of $50 billion was announced in its place. This involved $20 billion from the United States, $18 billion from the IMF, $10 billion from the BIS, and $3 billion from commercial banks. The $18 billion from the Fund included $7.8 billion on which Mexico had already signed a letter of intent on January 26, and an additional $10 billion in non-BIS central bank financing that was to be arranged. The IMF Executive Board approved the new credit on February 1. Negotiations between the United States and Mexico on the $20 billion credit, however, did not commence until February and they were concluded five days later. The other parts of the loan proposals, from the BIS and from commercial banks, were never finalized.

The final stage in the resolution of the crisis occurred on March 9, when the Mexican government announced a new economic plan. The plan included substantial increases in government revenues, government spending cuts, and curbs on wage increases. In response to the plan, the United States authorized Mexico to draw the first $3 billion of the agreed loan.

(2) Financial markets developments in Mexico
in the first quarter of 1995

Mexican financial markets continued to experience turbulence throughout January and February, until the announcement of the economic plan and the release of U.S. funds on March 9. From December 30, 1994 until March 9, 1995 the peso declined 32 percent against the dollar, reaching a low of MexN$7.45 to a dollar, which was 53 percent below its predevaluation level (see Chart 9). Between March 9 and end-April, the peso had appreciated 20 percent and stood at MexN$5.925 per dollar at end-April.

Throughout January and February, money market conditions continued to tighten, reflecting exchange market pressures. In the secondary market for Mexican government debt, the interest rate on 28-day cetes repurchase agreements rose from 25 percent on December 30, 1994 to 47 percent on January 10, 1995. They subsequently declined after the announcement of the U.S. loan guarantee package. Interest rates remained between 30 percent and 40 percent until February 20, when they began to rise sharply, reaching a high of 80 percent on March 16. Since then (through April 26), rates have remained above 70 percent. Interest rates determined in cetes auctions evolved in a similar manner (see Table 14). Bid-cover ratios remained above 100 percent in most auctions, with the exception of the January 11 and March 8 auctions and several other scattered auctions (not shown in the aggregate numbers in the table).

Prices on the Mexican stock market also continued to decline throughout January and February (see Chart 9). The Bolsa declined before the announcement of the support packages on January 12 and 31, rebounded when the programs were announced, and then declined steadily in February. In peso terms, the Bolsa reached its trough on February 27, when it was 39 percent below its end-1994 level. Since reaching this trough, the market has risen 35 percent. The flow of foreign investment in the stock market turned negative in January and February; the total outflow for these two months was $188 million (see Chart 6).

Mexican Brady bonds also experienced sharp losses in the first quarter. Spreads on these instruments increased to a peak of nearly 21 percentage points (that is 2,094 basis points) on March 20, up from 409 basis points immediately before the devaluation. Since late March, spreads have recovered, and have recently (April 21) moved below 1,000 basis points again.

5. Spillovers to other markets

    a. Direct, short-term effects of devaluation

The initial effects of the peso devaluation and subsequent floating of the peso were confined to a few markets. Among developing country stock markets, prices on the exchanges in Argentina and Brazil declined substantially, but other countries were relatively unaffected (see Charts 11

and 12). The Argentine market fell 14 percent in dollar terms from December 19 to December 27, and the Brazilian market fell 17 percent over the same period. Other emerging financial markets in the Western Hemisphere were less affected; the Chilean market gained 1 percent in dollar terms while the Colombian market rose 8 percent. Stock markets in Asian emerging markets increased after the devaluation; the largest increase occurred in the Malaysian market, which gained 3 percent in dollar terms between December 19 and December 27. During this period, stock markets in industrial countries generally gained ground, with the U.S. stock market (Standard and Poor's 500) gaining 1 percent, the Japanese market gaining 2 percent (in yen terms), and the German market rising 1 percent (in deutsche mark terms).

Brady bond markets also declined and spreads generally widened (Chart 13). The spread on Argentine Brady bonds increased 389 basis points, and the spread on Brazilian Brady bonds rose 207 basis points. Although the stock market in the Philippines increased after the peso devaluation, Philippine Brady bond spreads increased 149 basis points. To some extent, Mexico had provided a baseline for emerging markets, especially for the pricing of fixed-income securities. 1/ Correlations among Brady bond yields generally increased up to May 1994, then declined, but increased significantly after the crisis (Table 16).

b.   Effects on other Western Hemisphere markets

(1) Argentina

Argentina was the first country to experience financial market pressures, probably because it had some of the macroeconomic features that characterized Mexico, including a fixed exchange regime, a low domestic savings rate, a weak banking system, and a significant current account deficit. 2/ On December 28, the week after the Mexican peso was floated, Argentina sold $353 million of reserves, the largest amount since the start of the convertibility plan in 1991, and sold more than one-third of its foreign exchange reserves during the next three months. Both the movement out of Argentine peso assets into dollar assets and the movement out of the domestic banking system increased funding costs for Argentine banks, as interbank interest rates rose from 9.5 percent on December 19 to 23 percent a week later. 3/ A wholesale bank was closed during the week, and the financial condition of other banks was reported to have worsened. On December 28, reserve requirements on foreign currency deposits were reduced, and on January 12, reserve requirements on local currency deposits were lowered to the level on foreign currency deposits. Banks were allowed to

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1/ See International Monetary Fund (1994).
2/ Under the "convertibility plan" Argentina maintains a currency board arrangement, whereby the monetary base is backed one-for-one by central bank dollar reserves.
3/ During that period, total deposits in the banking system fell by $313 million.

Table 16. Correlation Among Total Returns on Brady Bonds, January 1993 - March 1995

January 1993 - January 1994

	Argentina	Brazil	Mexico	Nigeria	Philippines	Venezuela
Argentina	1.00					
Brazil	0.23	1.00				
Mexico	0.56	0.22	1.00			
Nigeria	0.41	0.11	0.58	1.00		
Philippines	0.29	0.22	0.32	0.33	1.00	
Venezuela	0.53	0.19	0.55	0.38	0.28	1.00
Thirty-year U.S. Treasury bonds	0.36	0.04	0.51	0.26	0.16	0.31

February - May 1994

	Argentina	Brazil	Mexico	Nigeria	Philippines	Venezuela
Argentina	1.00					
Brazil	0.57	1.00				
Mexico	0.84	0.51	1.00			
Nigeria	0.57	0.63	0.59	1.00		
Philippines	0.21	0.40	0.22	0.44	1.00	
Venezuela	0.72	0.58	0.65	0.75	0.35	1.00
Thirty-year U.S. Treasury bonds	0.74	0.42	0.63	0.40	0.18	0.46

Mid-May 1994 - Mid-December 1994

	Argentina	Brazil	Mexico	Nigeria	Philippines	Venezuela
Argentina	1.00					
Brazil	0.58	1.00				
Mexico	0.77	0.45	1.00			
Nigeria	0.42	0.33	0.35	1.00		
Philippines	0.26	0.11	0.25	0.09	1.00	
Venezuela	0.48	0.31	0.47	0.29	0.15	1.00
Thirty-year U.S. Treasury bonds	0.55	0.24	0.55	0.18	0.11	0.28

Mid-December 1994 - Early March 1995

	Argentina	Brazil	Mexico	Nigeria	Philippines	Venezuela
Argentina	1.00					
Brazil	0.80	1.00				
Mexico	0.89	0.73	1.00			
Nigeria	0.68	0.55	0.70	1.00		
Philippines	0.34	0.38	0.43	0.38	1.00	
Venezuela	0.83	0.80	0.78	0.80	0.42	1.00
Thirty-year U.S. Treasury bonds	0.06	0.04	-0.01	-0.10	-0.13	--

Chart 11. Stock Market Performance and Nominal Exchange Rates in Selected Latin American Countries, December 31, 1993–March 31, 1995

Stock Market Performance, December 31, 1993–March 31, 1995

(In U.S. dollar terms, December 31, 1993 = 100)
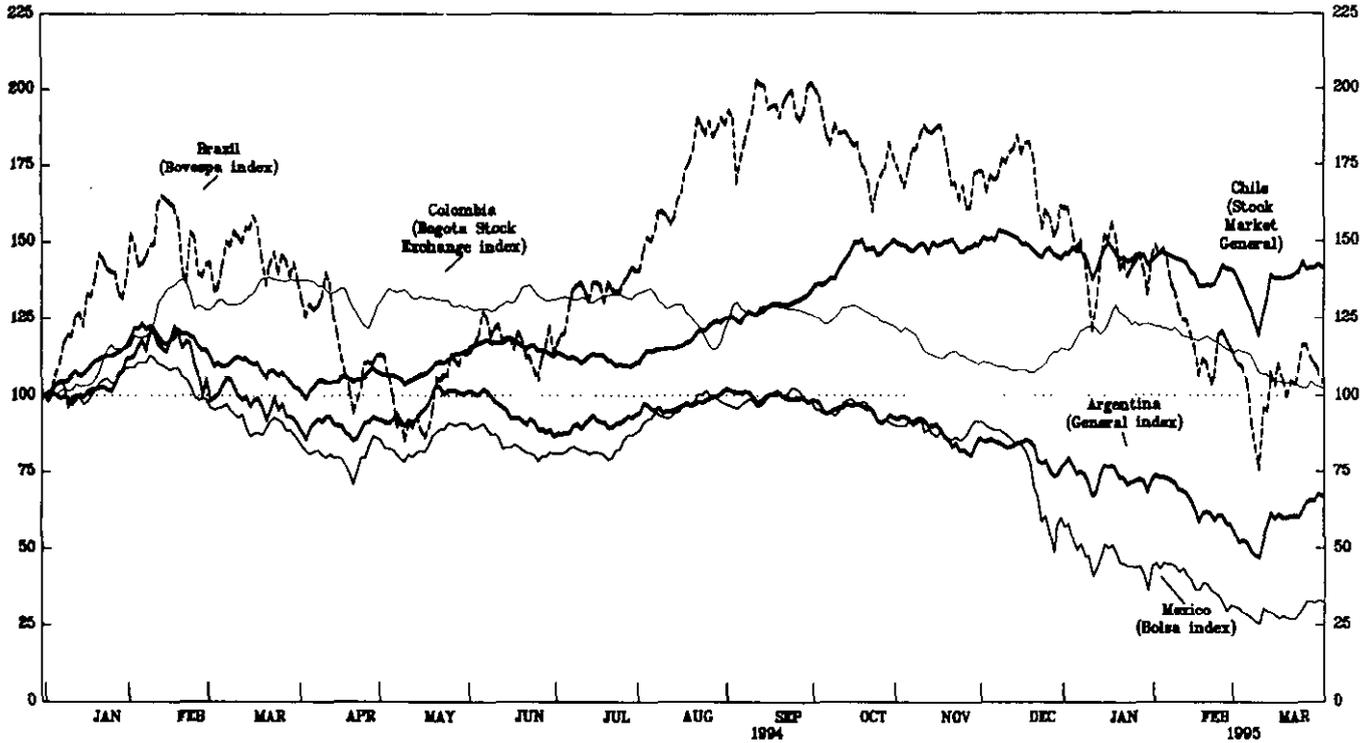
Nominal Exchange Rates, July 1, 1994–March 31, 1995

(July 1, 1994 = 100)
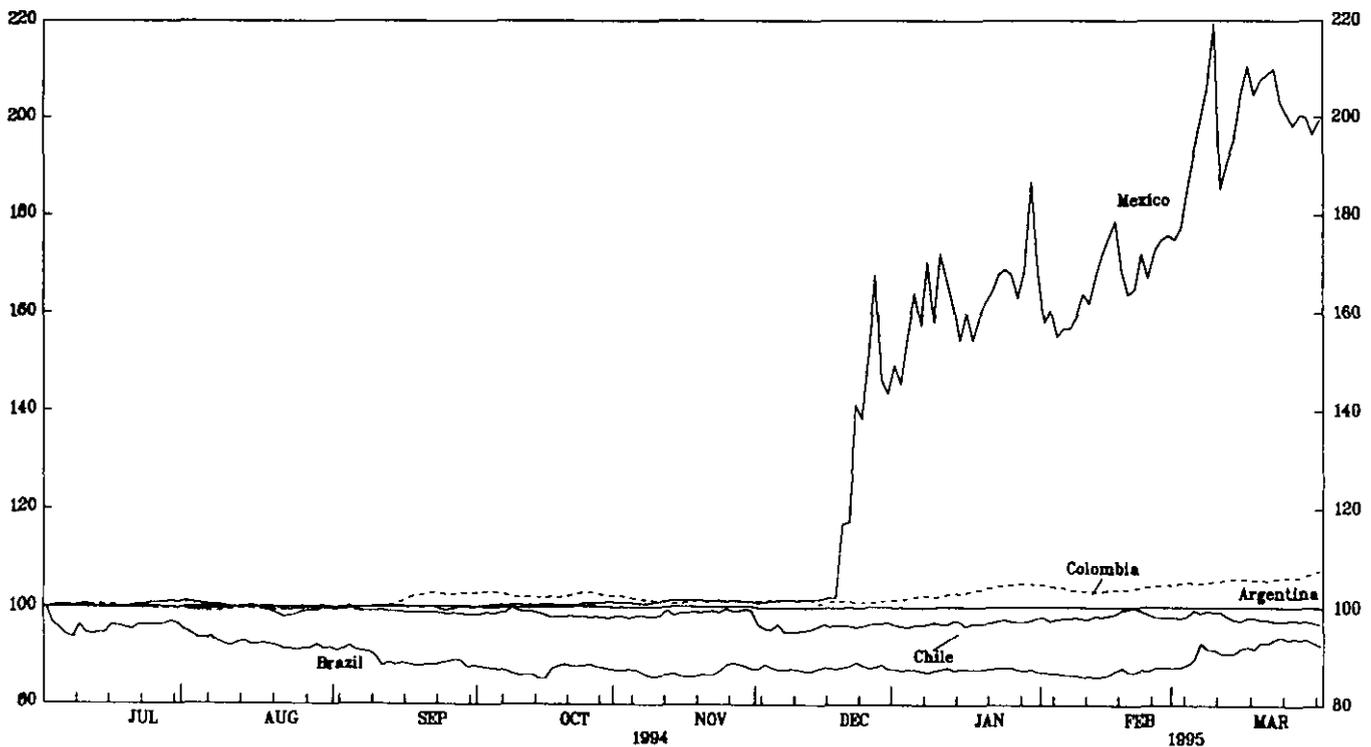
Source: Bloomberg Financial Markets.

Chart 12. Stock Market Performance, Nominal Exchange Rates, and Interest Rates in Selected Asian Countries, Dec. 31, 1993-Mar. 31, 1995

Stock Market Performance
(In U.S. dollar terms, December 31, 1993 = 100)

Nominal Exchange Rates
(December 31, 1993 = 100)

Short-Term Interest Rates
(In percent)

Source: Bloomberg Financial Markets.
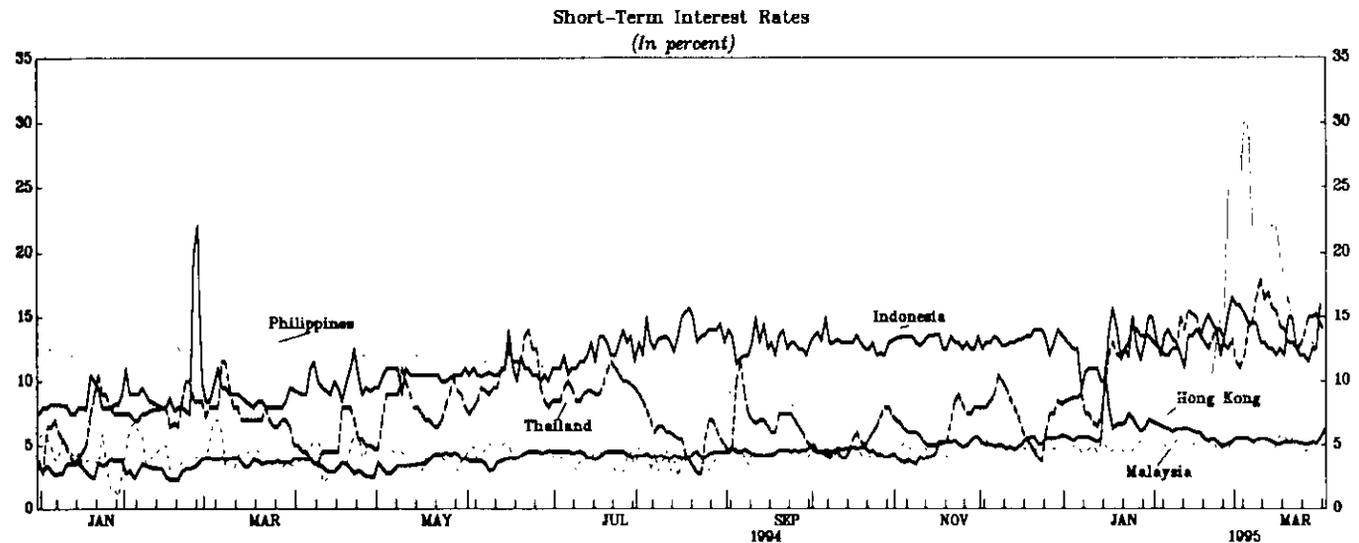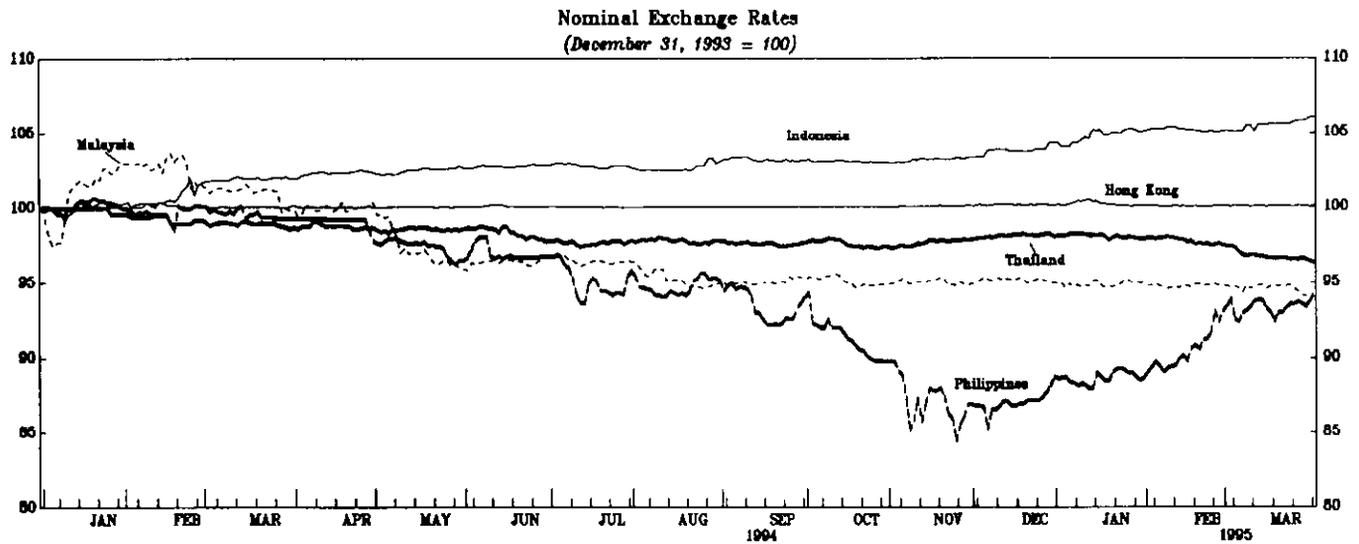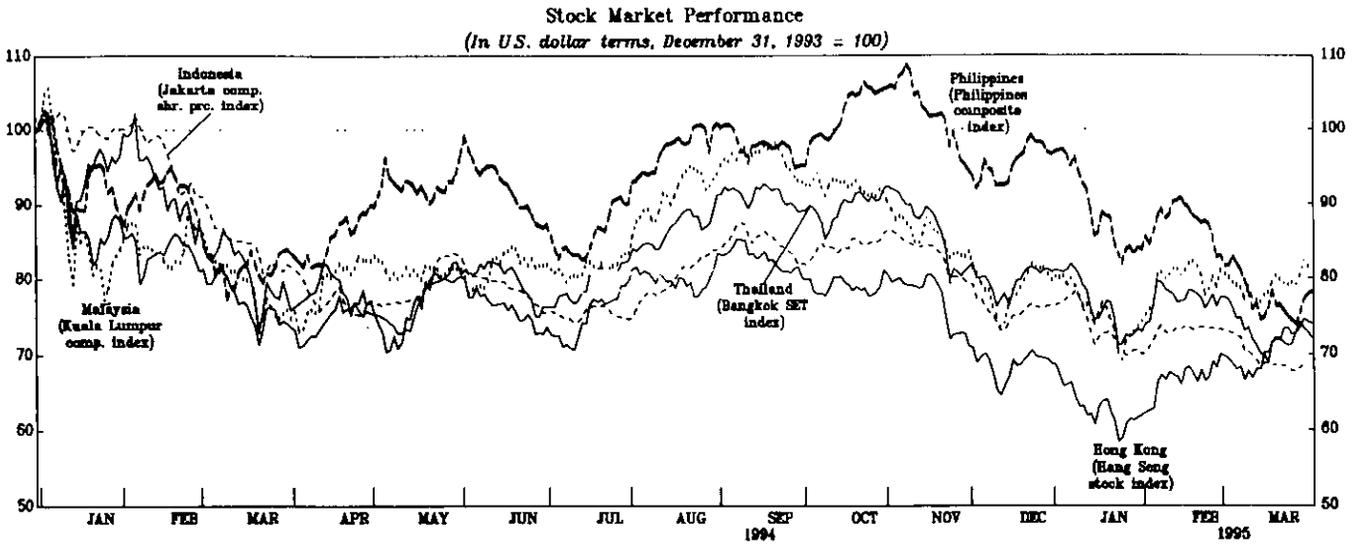
Chart 13. Brady Bond Spreads, November 30, 1994–March 31, 1995
(In basis points)
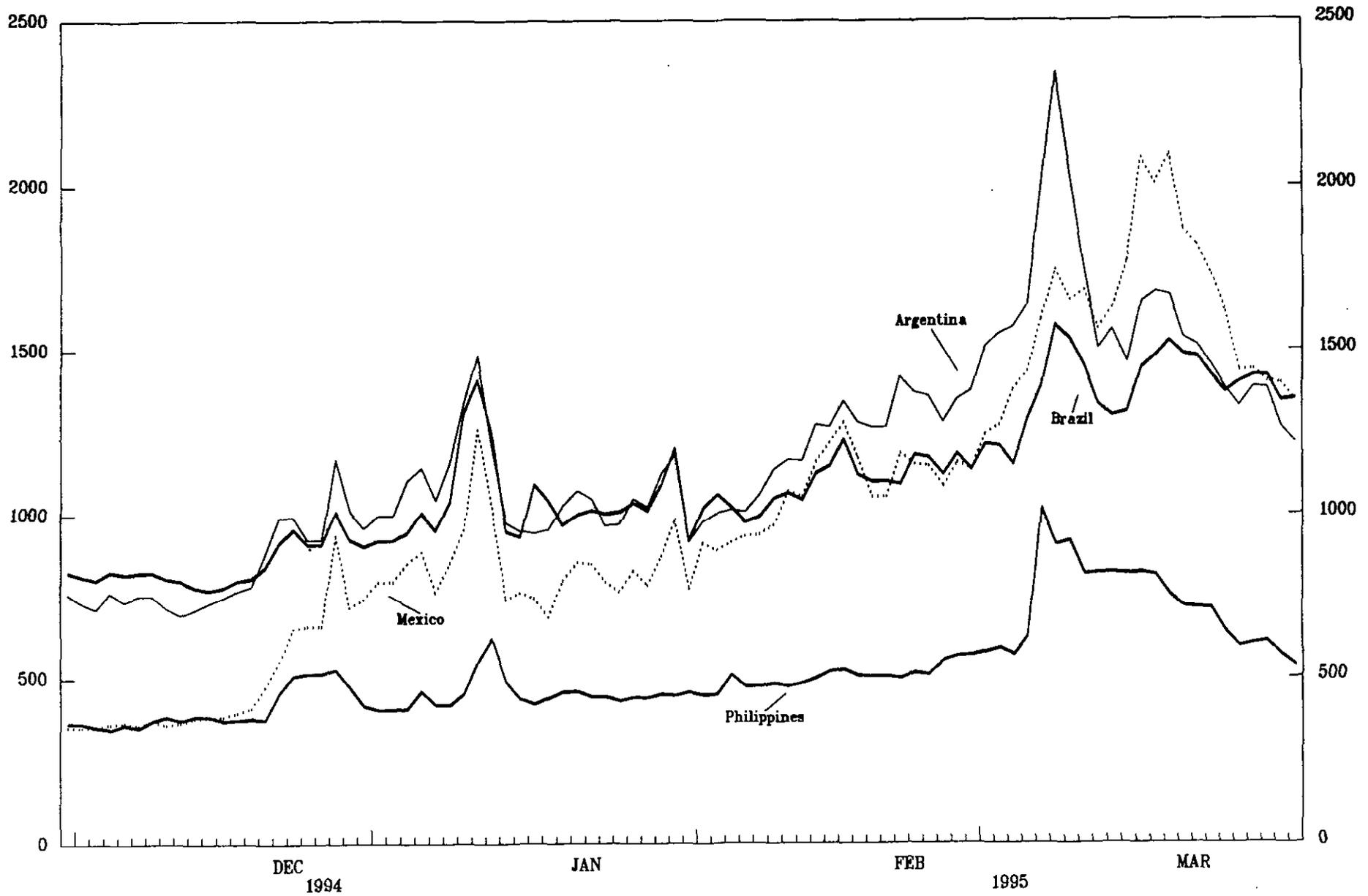
Sources: Reuters; Salomon Brothers; and staff estimates.

maintain their required reserves in either currency, and the small differential between buying and selling rates for pesos was eliminated, thus reducing banks' transactions costs. At the same time, the authorities moved to strengthen fiscal policy by decreeing an Arg$1 billion cut in expenditure (0.3 percent of GDP) from the 1995 budget, vetoing all additional expenditures approved by Congress, and announced a delay in lowering employer social security contributions in 1995.

Following these measures and the announcement of the initial loan guarantee program for Mexico, pressures in financial markets in Argentina subsided for the next month and a half. In the second half of February, however, the interbank peso interest rate increased from 12 percent on February 17 to 17 percent a week later and then to 65 percent the following week (March 3). Between February 17 and March 9, prices on the Argentine stock market fell 25 percent. In response to these pressures, the authorities: took strong action to reinforce the public finances (equal to 2 3/4 percent of GDP at an annual basis); set up a deposit insurance scheme and two special funds for the privatization of provincial banks and the restructuring of the banking system; and arranged international financial assistance (including through a one-year extension of the extended arrangement from the IMF). The markets reacted positively to these measures, reflected inter alia in a noticeable recovery in the prices of bonds and stocks, and the stabilization of the level of deposits in the banking system.

(2) Brazil

Financial markets in Brazil also came under pressure. The Brazilian stock market fell 25 percent in dollar terms over January and February, and the authorities had to intervene in the foreign exchange market to maintain the exchange rate around R$0.85 per U.S. dollar. 1/

In March 1995, however, pressures on the real increased. On Monday, March 6, the authorities switched their exchange rate policy to a system of adjustable exchange rate bands. The initial band was set at R$0.86-R$0.90 per U.S. dollar, and it was announced that the band would be widened to R$0.86-R$0.98 per U.S. dollar on May 2, 1995, for an undetermined period of time. This led to strong pressures on the real, and the Central Bank intervened heavily, as reflected by the decline in foreign reserves. On Friday, March 10, the authorities established a new exchange rate band (R$0.88-R$0.93 per U.S. dollar), increased interest rates (the overnight market interest rate rose from 46 percent to 65 percent), and took steps to increase capital inflows and to increase outflows. As a consequence, the attack on the currency was halted.

1/ In principle, the real was floating freely subject to a floor of parity with respect to the U.S. dollar. In effect, however, the exchange rate has been managed to remain close to R$0.85 per U.S. dollar since October 1994.

(3) Other Western Hemisphere countries

Other developing countries in the Western Hemisphere generally experienced less turbulence in financial markets than in Argentina and Brazil. The Chilean stock market fell 3 percent in dollar terms in the first quarter of 1995, and the Chilean peso was unchanged against the dollar over the quarter; the peso depreciated 4 percent up to February 21, but then appreciated during the remaining weeks (Chart 11). Prices on the Colombian stock market declined 11 percent in dollar terms over the quarter, after gaining 7 percent at end-December after the devaluation. The Colombian peso depreciated 6 percent during the first quarter.

c.   Effects on Asian markets

After declining in the first half of December, most Asian stock markets rebounded in dollar terms in the wake of the Mexican devaluation (see Chart 12). These markets did not begin to experience price declines until the beginning of January, when pressures on Mexico began to intensify. Price declines in Asian emerging stock markets in January ranged from 7 percent in Malaysia to 13 percent in the Philippines. Asian markets felt the greatest pressure during the week of January 9 to 13. Most markets recovered in February, although the Philippine market fell an additional 1 percent in dollar terms as the Philippine peso continued to depreciate.

(1) Thailand

Perhaps the most pronounced event occurred in Thailand, which took successful measures in January to defend its currency. While many Asian markets felt pressure during this same week (January 9-13), the baht came under greater pressure because traders had built up large positions in the domestic money market to arbitrage the peg of the baht against the basket of the dollar, yen, and mark. 1/ On Thursday, January 12, rumors of a devaluation swept through the markets, causing selling pressure against the baht. The authorities responded by announcing that they would sell any amount of dollars that banks needed and by assuring market participants that they would maintain the peg. The next day, the Bank of Thailand instituted a swap facility with foreign banks that allowed it to borrow dollars from foreign banks through a swap of bahts for dollars, so it could continue to buy bahts for dollars from domestic banks. This facility was replaced a week later with a more flexible swap facility, and it was finally closed in February. Domestic short-term interest rates rose in January as the central bank tightened conditions; Bangkok overnight rates rose from 6.5 percent on January 11 to 12.0 percent on January 16 (see Chart 12). In the event, the defense of the baht was successful, and the peg held. Thai foreign exchange reserves fell $400 million in January.

1/ "Emerging Market Debt: Tequila Slammers," International Financing Review, No. 1064 (January 14, 1995).

(2) The Philippines

The Philippine peso also came under pressure in early 1995. In contrast to Thailand and the major countries in the Western Hemisphere, however, the Philippines did not have a pegged or target zone exchange rate system. The peso depreciated 7 percent against the dollar from December 19 to February 28 (see Chart 12). A temporary, automatic halt to trading in the peso was called on January 13 after a large depreciation that day, the same day that pressures in Thailand peaked. Pressure on the peso persisted in February, despite intervention in the foreign exchange market and increases in the central bank overnight rate and the benchmark 91-day Treasury bill rate. After the peso again breached its daily trading band on February 24, the central bank responded with a sharp and temporary increase in its overnight rate to 30 percent, and the Treasury bill rate was allowed to rise by two percent. Since mid-March, the Treasury bill rate has risen by about another 1 percent, and the peso has stabilized.

It is unclear why the Philippines experienced these pressures. Possible explanations are the expansion of liquidity and the sharp decline in interest rates during 1994, and the low level of foreign exchange reserves by Asian standards. In addition, the weakening of the exchange rate in February 1995 does not appear to have reflected an unsustainable strengthening of the peso during 1995. Both the Philippines and Thailand have high current account deficits compared with other Asian countries (Table 17).

(3) Hong Kong

Hong Kong also experienced financial pressures in January. After a 0.23 percent fall in the Hong Kong dollar against the U.S. dollar and signs of a speculative attack on the currency, the Hong Kong Monetary Authority (HKMA) tightened liquidity, which led to an increase in interbank rates of more than six percentage points during January 13, and the currency, which is pegged to the dollar, was stabilized. A speculative attack on the Hong Kong dollar, led to a tightening of rates in the interbank market in order to make it difficult for speculators to cover their short positions.

(4) Other Asian markets

Other Asian emerging markets, including Indonesia and Malaysia, also experienced brief pressures in mid-January. Indonesian overnight interbank interest rates rose from 10.0 percent on January 13 to 15.8 percent on January 17, while Malaysian rates remained stable. The Indonesian authorities also sought to strengthen confidence by leaving the foreign exchange window open on Saturday, January 14, and they tightened the official discount rate 50 basis points on January 16.

Table 17. Current Account Balances for Selected
Developing Countries, 1989-93

(In percent of GDP)

	1989	1990	1991	1992	1993
Argentina	-1.60	3.22	-0.34	-2.86	-2.91
Brazil	0.23	-0.79	-0.36	1.63	-0.15
Chile	-2.50	-2.13	0.03	-1.74	-4.58
Colombia	-0.51	1.35	5.53	1.87	...
Mexico	-2.82	-3.05	-5.19	-7.53	-6.45
Indonesia	-1.17	-2.82	-3.65	-2.17	-1.64
Malaysia	0.68	-2.14	-8.99	-3.16	-3.89
Thailand	-3.46	-8.50	-7.71	-5.75	-5.60
Philippines	-3.41	-6.11	-2.28	-1.89	-6.05

Sources: International Monetary Fund, Balance of Payments Statistics; and
World Economic Outlook.

IV.   The Mexican Foreign Exchange Market Crises
From the Perspective of the Speculative Attack Literature 1/

1.   Introduction

When a country pursues the policy of a fixed exchange rate or controls its rate of depreciation, it is widely understood by market participants that the exchange-rate policy will continue as long as it does not impinge on other, more important economic or political constraints. If investors believe that the exchange-rate policy will be altered eventually, their actions can precipitate a series of events, a speculative attack, that tests the credibility of the commitment, and the ability, to maintain the exchange rate policy. This chapter examines, from the perspective of the speculative attacks literature, some of the developments in Mexican financial markets surrounding the devaluation of the Mexican peso in December 1994, and the subsequent floating of the peso. Data on the key economic and financial variables suggest that developments in Mexico surrounding the devaluation were consistent with the classic properties of a speculative attack driven by investor perceptions of deteriorating fundamentals, with some variations that might have created uncertainty in the post-attack floating-rate regime.

Section 2 introduces some definitions and concepts that are prevalent in the literature. Section 3 presents some key indicators and develops extensions of the standard models of speculative attacks that are germane to developments in Mexico in late 1994. Section 4 discusses and evaluates the post-attack policy options that might have been relevant in setting pre-attack expectations. Section 5 concludes with a summing up of recent Mexican events in relation to the speculative attack model.

2.   Speculative attacks are not market pathologies

A speculative attack on a fixed or managed exchange rate is a sudden and massive restructuring of portfolios in which market participants attempt to reap gains or prevent losses from an expected change in the exchange rate regime. 2/ It was once thought by economists that speculative attacks were market pathologies that would not be present or possible in healthy markets. Recent research has considered that a speculative attack is a market's rational response to a perceived inconsistency in economic policies. 3/ In this research, a country tries to sustain a fixed exchange rate using a limited quantity of reserves and pursues other, higher priority, objectives, such as inflation objectives, that might be inconsistent with the fixed exchange rate. Private market participants-- called speculators--who recognize the policy inconsistency and the limited

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1/ Prepared by Robert Flood and Charles Kramer.
2/ The exchange rate is defined as the domestic currency price of foreign currency.
3/ See Salant and Henderson (1978), Krugman (1979), and Flood and Garber (1984).

availability of reserves, come to realize that the fixed exchange rate cannot be sustained. In foreseeing the unsustainability of policies, market participants anticipate profits and/or losses and enter into foreign-exchange transactions that ultimately hasten the collapse of the exchange rate regime.

a. A simple rarefied example of a speculative attack

As an example, consider a small country that fixes its exchange rate to the currency of a single large trading partner and suppose that the small country is following a domestic policy that implies a higher inflation rate than its partner. Further suppose that speculators can foresee perfectly the future collapse of the exchange rate regime and know that a flexible exchange rate will be adopted once the fixed rate becomes unsustainable. While the exchange rate is fixed, the short-term domestic interest rate will be equal to the foreign interest rate for very short-term interest rates (overnight rates, for example); after the devaluation, the domestic interest rate will rise above the foreign rate to reflect the higher domestic rate of inflation.

In this simple model, the increase in domestic interest rates reduces the demand for non-interest bearing domestic-currency assets and leads to the depreciation of the currency. A well financed single speculator can successfully attack the fixed-exchange-rate regime, if after correctly anticipating the exchange rate devaluation, the speculator buys the entire stock of international reserves from the authorities, at the fixed exchange rate, and consequently reaps a capital gain equal to the exchange rate depreciation multiplied by the stock of reserves. The earlier the attack takes place, the larger would be the stock of reserves that can be purchased and the smaller would be the depreciation at the time of the attack because the attack absorbs domestic-currency assets.

Unfortunately for the wealthy single speculator in this rarified example, other speculators also can foresee the opportunity for risk-free profits. This recognition, in effect, begins the process of a concerted speculative attack on the currency. This process ends when the reduction in demand for domestic-currency assets due to the interest rate increase exactly matches the decrease in supply of these assets due to the purchases of reserves. At such a time the exchange rate need not jump at all and speculators, in their frenzy to obtain profits at the expense of the exchange authority, will have competed away all profits.

This example illustrates that a speculative attack need not be viewed as a market pathology. Instead, it can be seen and modeled as a competitive market's response to perceived inconsistencies in economic policies. The essential feature of the speculative attack example is the sudden and massive restructuring of portfolios as market participants react to their knowledge of the unsustainable economic policies. Such a sudden and massive restructuring of portfolios can just as easily occur when investors sell foreign exchange in spot markets in order to avoid losses as when

speculators sell foreign exchange short in forward markets in order to reap profits.

b.   Kinds of speculative attacks and the shadow exchange rate

In the economics and finance literature, speculative attacks arise from three sources: (1) an attack due to misaligned fundamentals; (2) a preemptive "attack" by the government to alter its policies before the market attacks; and (3) an attack based on multiple equilibria. 1/ Of these three types only the last one might be considered a market pathology and it will be seen below to be irrelevant for explaining recent events involving the Mexican peso.

Each type of attack can be modeled as evolving according to the relationship between the actual exchange rate and a hypothetical construct known as the shadow exchange rate, which is defined as the floating exchange rate that would prevail immediately after a successful attack in which reserves are exhausted and in which base money contracts by the domestic currency value of the attack. 2/ A speculative attack is worthwhile only if the shadow rate is above the controlled rate (that is, if the shadow rate is depreciated relative to the actual rate). At the time of the attack, market participants buy all available foreign exchange at the controlled rate from the authorities and resell them at the depreciated shadow rate, thereby reaping a profit equal to the shadow rate less the controlled rate on each unit of foreign currency. Before an attack, the shadow rate is below the controlled rate and rises toward the controlled rate as reserves decline.

The shadow exchange rate provides a means of quantifying the compensation investors demand for holding domestic-currency-denominated assets prior to the attack; its value depends on expectations about the effects of the attack on reserves and future monetary and exchange-rate policies. This compensation is related to the probability of an attack during an asset's holding period and the size of the currency depreciation in the event of an attack. The literature on speculative attacks primarily addresses the estimation of the probability of an attack in the future and the determination of the shadow rate. 3/

1/ The literature also recognizes the possibility of attacks due to speculative bubbles in the post-attack exchange rate. That possibility is ignored here since rational bubble models are consistently rejected in the foreign exchange market. (See Chapter V of Background Paper II.)

2/ These methods were first applied to Mexico by Blanco and Garber (1986); some of their analysis is illustrated in the next section.

3/ In models, the probability that an attack will occur during a given interval of time in the future is equal to the probability that the shadow rate will exceed the controlled rate during that same period of time because currency speculators would then find it worthwhile to restructure their portfolios at the controlled price.

c. <u>The relevant arbitrage condition</u>

Much of the literature is organized around one measure of the financial market's perception of the health of a controlled exchange rate regime, namely "the" short-term domestic-currency interest rate on domestic treasury securities. As a matter of definition investors are in equilibrium when: 1/

$$i = i^* + E\Delta s + \epsilon. \tag{1}$$

According to the equation the domestic-currency interest rate, i, must equal the comparable foreign interest rate, i*, plus two additional elements. The first element is the expected percent change in the exchange rate, E∆s, with E indicating the expectation and ∆s the percent change in the exchange rate. The second element, ε, is a residual that can incorporate a risk premium that investors demand as compensation for undiversifiable risk.

The term E∆s is usefully divided into two conditional parts:

$$E\Delta s = (1 - \pi)E\Delta\bar{s} + \pi E\Delta\hat{s}. \tag{2}$$

The first term combines the probability of its occurrence, (1 - π), with the expected change in the exchange rate if the current exchange-rate policy stays in place, E∆s̄. In the second term, π is the probability of an attack over the holding period and E∆ŝ is the expected movement of the exchange rate if the current policy is abandoned either in a regime-ending attack or in a preemptive adjustment in policies by the authorities.

While the equations summarize the effects of exchange-market arbitrage, they do not explain the determination of the crucial variable ŝ. To determine ŝ it is necessary to refer to a model of government and private behavior that addresses four questions: What triggers an attack? How does the government behave during and after an attack? Will the government engage in a preemptive "attack" on its own policy? How does the private sector behave during and after an attack?

1/ For simplicity dating has been suppressed in the equations.

To demonstrate how useful these ideas have been, consider the following application of them to Mexico. 1/ Chart 14 presents estimates of the one-quarter-ahead devaluation probabilities for the Mexican peso--that is, the values for π in equation (2) for the period 1973-82. The estimated probability increases from less than 4 percent in early 1974 to more than 18 percent just before the devaluation of 58 percent in August 1976. It then declines precipitously in the third quarter of 1976 and begins to rise-albeit with a few dips--until it reaches devaluation in February 1982. The peak reached in 1982 is a convincing application of this approach because this peak was projected "out-of-sample" using only data that was available at the time.

In the literature, a speculative attack usually begins with an expansionary policy that is given higher priority than the exchange-rate policy so that the policy mix is unsustainable. Prior to the attack, the unsustainability of the policy mix becomes clear to investors who recognize that the exchange-rate policy will likely be abandoned in a crisis. Investors know neither the precise timing of the regime change nor the successor policy.

In the speculative attacks literature, in the period just before the "crisis," three fundamental indicators move in anticipation of the crisis. First, international reserves are slowly depleted under the controlled exchange-rate policy as a reflection of the expansionary policy. The reserve losses end with a large, final portfolio reallocation reflecting the exchange of reserves between the authorities and private market participants.

Second, in most of the literature the country that suffers the attack is a price taker, so that domestic inflation matches foreign inflation. In actual experience, however, the country often has higher inflation than its trading partners and experiences a large increase in the real exchange rate, which increases the speed with which reserves are depleted.

Third, domestic-currency interest rates rise, at all maturities, as the attack becomes more likely. The larger is the expected depreciation rate of the shadow exchange rate relative to the controlled rate and the more likely it is that reserves will reach some limit, the larger is the spread between

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1/ See Blanco and Garber (1986). Two shadow exchange rates are relevant: (a) the shadow floating rate corresponding to expectations that the post-attack regime will be a floating rate regime; and the shadow rate in (a) above plus an increment to allow for the devaluation. Current interest rates are determined by the possibility of a shift to the second shadow rate. The shadow rate provides the lower bound for the devaluation of the peso. Blanco and Garber use a model of the shadow rate and its stochastic behavior to estimate the probability distribution of next period's shadow rate, which provides an estimate of probability that the shadow rate will be above the fixed rate (that is, that a devaluation will occur).

the domestic interest rate and the foreign rate. 1/ In the models in the literature, the usefulness of these indicators depends on the prompt release of information on reserves and prices. 2/

3. The Mexican peso devaluation: key attack
   indicators and modifications of the standard model

The developments involving the Mexican peso in late 1994 and early 1995 do not conform precisely to the conditions hypothesized in these simple speculative attack models in two respects: the monetary policy response to reserve losses and movements in the real exchange rate. In this section, reserve movements, aspects of monetary policy, and movements in the real and nominal exchange rates are examined. With these elements at hand, consideration is given to modifying the standard attack model to encompass the recent experience in Mexico. Finally, this subsection examines the course of Mexican interest rates during the period of turbulence.

   a. Mexican international reserves and monetary base

The first important element of a successful attack is the large portfolio reallocation that exhausts the ability or desire to defend the controlled parity. The amount of reserves used in the defense also influences the shadow exchange rate. The nature of a reserve defense is that reserves are exchanged for domestic currency at the controlled parity. Following a successful attack, speculators end up holding reserves and the exchange authority holds the amount of domestic currency acquired at the controlled exchange rate. How soon an attack occurs in the presence of exchange market pressures depends on the amount of reserves expended in the defense of the fixed parity and the anticipated post-attack interest rates and prices.

Chart 15 presents gross and net Mexican international reserves since 1990. There was initially a long period of increasing net reserves, which reached a peak of more than $25 billion in February 1994. The subsequent decline in reserves was dramatic and rapid; more than $3 billion in reserves

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1/ The effort to preserve a regime may involve other policy instruments also. In the 1992 European Exchange Rate Mechanism (ERM) crisis some countries were able to mount temporary interest rate defenses of their currencies, for example. Such a defense boosts short-term domestic-currency interest rates temporarily above that suggested by equality in equation (1), draws capital into the country, and makes speculation against the currency expensive. Such a defense is limited by the vulnerability of the private sector to high domestic-currency interest rates. Private floating-rate financing of mortgages and inventories, for example, is particularly sensitive to the interest-rate defense and political pressures arising from such sources can limit a government's ability to mount such a defense.

2/ Information delays in the models can postpone an attack at the cost of post-attack credibility.

Chart 14.   Probability of Devaluation Next Quarter, 1973-82
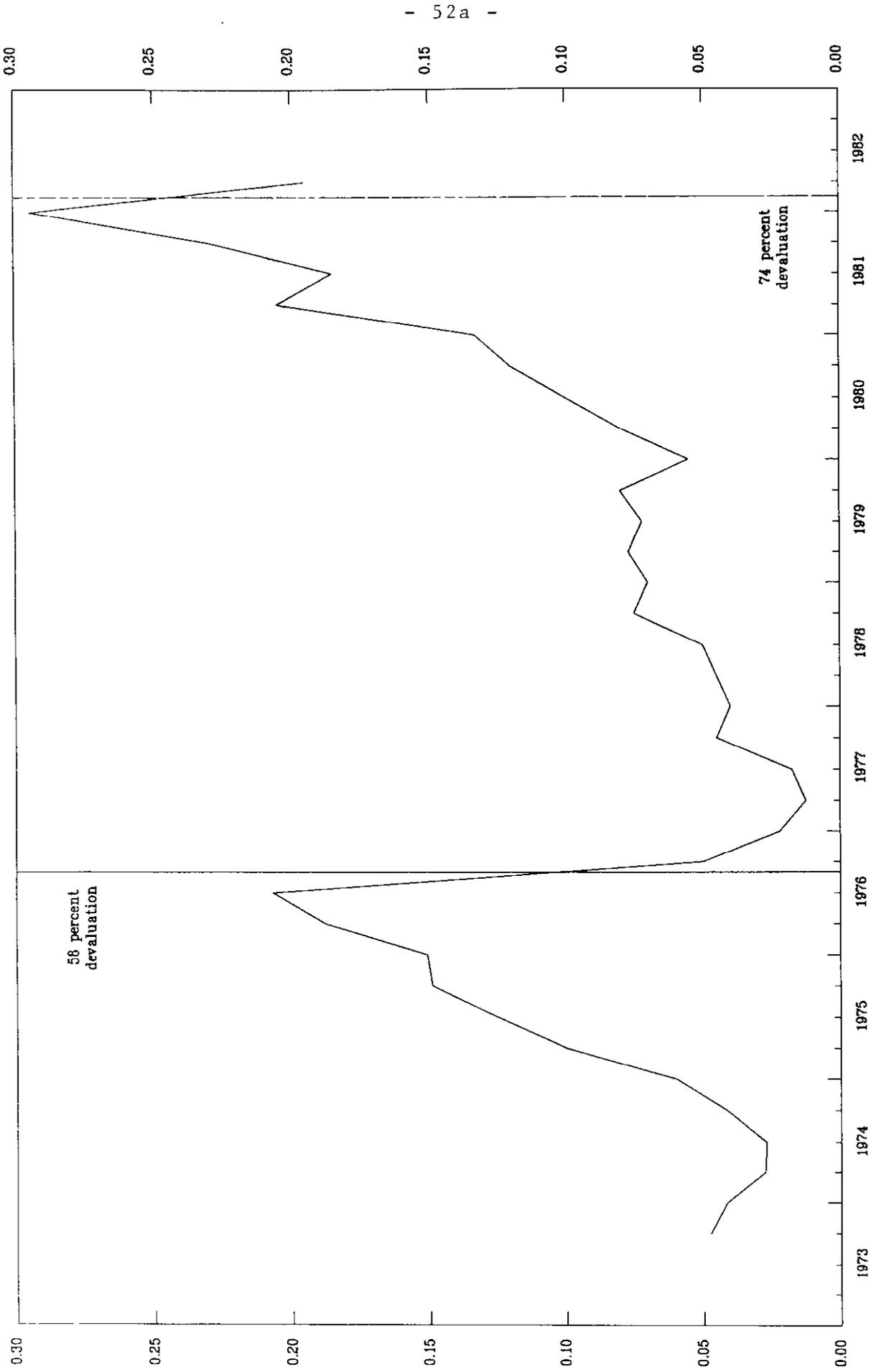
Source: Blanco and Garber (1986).

Chart 15. Mexico: International Reserves, 1990–94
(In billions of US. dollars)

Gross foreign
assets

Net international
reserves

1990   1991   1992   1993   1994
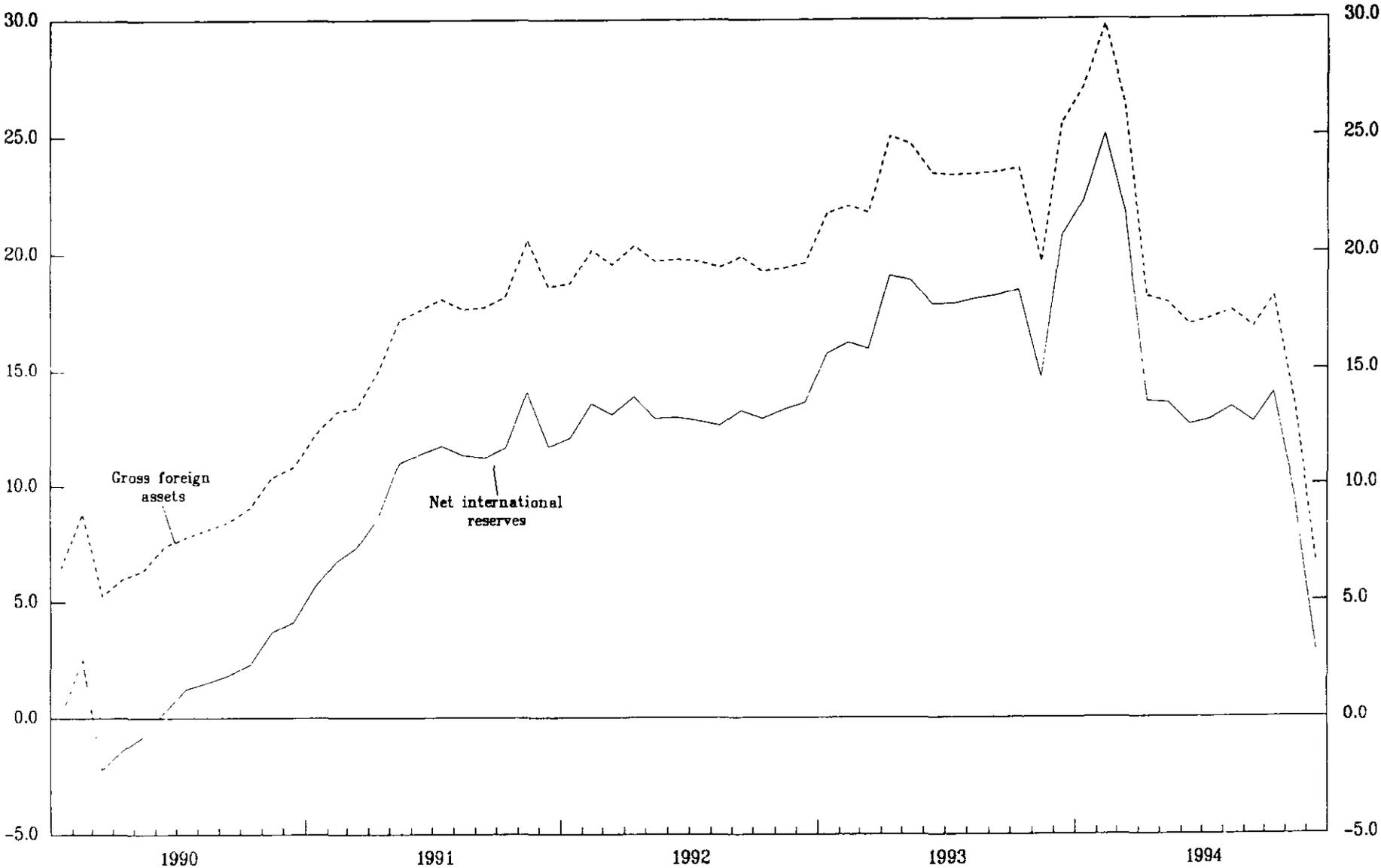
Source: Banco de Mexico.

Note: Net international reserves exclude short-term foreign-currency liabilities.

were lost in March; more than $8 billion were lost in April; there was then little movement until November, when $4.5 billion was lost; and then finally $6.5 billion was lost in December.

The pattern of reserve losses mirrors the current account balance less external financing (Chart 16). While external financing was robust in the early 1990s, the large current account deficit was over-financed by external sources and allowed a massive build-up of net international reserves. In early 1994 external financing began to dry up (see Chapter III) requiring current account deficits to be financed more directly by accumulated reserves. In the period 1990-93, the current account deficit averaged about 5 percent of GDP, but by February 1994, it had risen to more than 8 percent of GDP. To provide some perspective on this pattern, in the period 1990-93, current account deficits averaged 1.9 percent of GDP in Argentina, -0.1 percent in Brazil, and 1.1 percent in the United States.

In the speculative attack literature, economic policy ensures that: (1) the net domestic credit component of the monetary base is unaffected by the foreign exchange market; and (2) foreign exchange reserve are residuals that balance the domestic money market at the policy-designated exchange rate. The events in Mexico followed a different course between January 1992 and December 1994. In Mexico, reserve losses and gains during this period usually were sterilized so that the monetary base, rather than domestic credit, proceeded on a smooth growth path with some acceleration in the final months of 1994 (Chart 17).

b.   The Mexican real exchange rate

The second departure from the standard model one can see in the recent events in Mexico involves the real exchange rate. In the literature, the country that experiences an attack is a price taker and its real exchange rate--the domestic price level divided by its trading partner's price level multiplied by the controlled exchange rate--is presumed to be fixed (say at unity). 1/ In reality, real exchange rates are not controlled by exchange rate policies: they can change dramatically when nominal exchange rates are flexible because goods prices respond relatively slowly. When the nominal exchange rate is fixed, large and extended movements in the real exchange rate will occur if there is inflation and this can have important real economic effects and influence the shadow rate indirectly by changing the current account balance.

1/ Speculative attack models where the real exchange rate is not fixed are reviewed by Agenor and Flood (1994).

During the 15-year period ending in 1994, the real effective exchange rate (REER) in Mexico changed significantly (Chart 18). 1/ The three long cycles that can be seen in the Chart correspond to major changes in exchange rate policy. 2/ They involve long periods during which the REER increased fairly smoothly followed by precipitous declines. These declines are associated with either large peso devaluations or the floating of the peso.

An increase in the REER makes domestic goods less competitive in international markets (unless matched by productivity gains), which exacerbates the rate of reserve loss, raises the shadow rate over time, and, thereby, raises estimates of the future shadow exchange rate. In addition, because a rise in the REER is normally correlated with low and declining reserves, foreign investors anticipate a future peso depreciation and make intertemporal substitutions that further depress exports. The other side of trading suffers equally. Imports are as attractive to Mexicans as exports are unattractive to foreigners. While reserves were rising in Mexico, up until early 1994, as a result of foreign investment, the high and rising REER was not an immediate problem; but, it may have served as a warning, along with the rise in the current account deficit, that the underlying trade and competitiveness conditions in Mexico were unsustainable.

c.   Model adjustments relevant to the Mexican experience

In models of speculative attacks, reserve losses mirror domestic credit increases until the time of the attack. During the attack, reserve losses are not sterilized and the monetary base declines by the size of the attack. In Mexico, however, before and during the exchange market turbulence, the authorities sterilized reserve losses, which kept the monetary base on a relatively smooth trend. Reserve losses that are sterilized do not affect the money supply. When sterilization occurs, a speculative attack becomes a portfolio adjustment in the markets for domestic and foreign securities rather than the markets for domestic money and foreign securities. 3/

With this model adjustment--the introduction of securities markets--the attack is set up by the shift in wealth from domestic to foreign residents associated with the current account deficit. The wealth transfer increases the overall demand for foreign securities, which requires the monetary authority to expend international reserves to accommodate demand at an unchanged exchange rate. The process ends, as before, in a final

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1/ The Mexican REER as calculated in IMF, International Financial Statistics (IFS), is equal to the Mexican CPI multiplied by the U.S. dollar price of the peso, for example, 1/6 dollars/peso, divided by a trade-weighted average of trading partner CPIs multiplied by their respective dollar currency prices. The REER is indexed at 1980 = 100.
2/ The Annex recounts all of the events surrounding the major changes in the real exchange rate during this period.
3/ In this case there would be an adjustment in the risk premium in equation (1).

Chart 16. Mexico: Current Account Balance, December 1992–September 1994

(In percent of GDP)
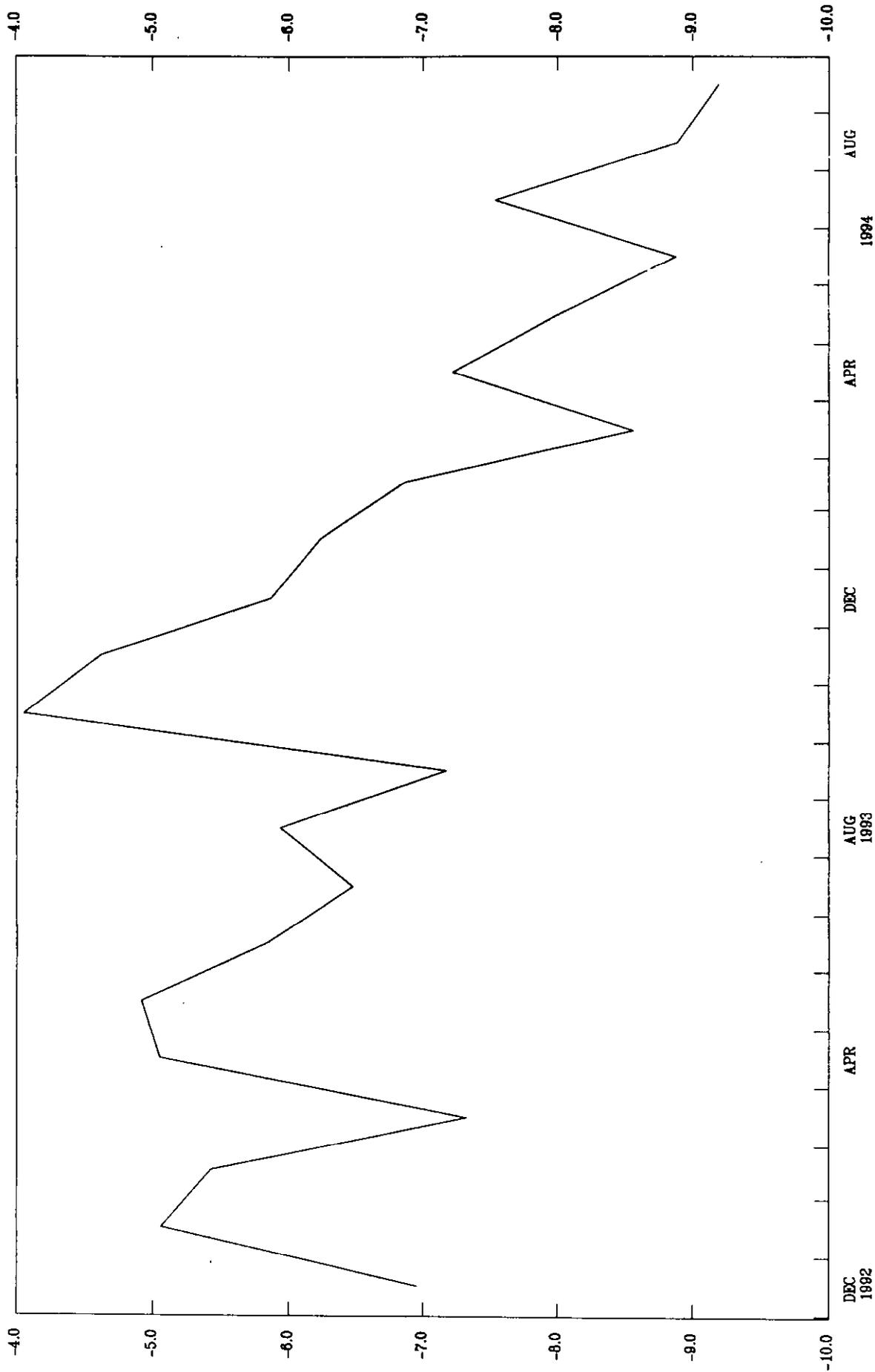
Sources: Banco de Mexico, *Indicadores Economicos*, various issues; and International Monetary Fund, *International Financial Statistics* and staff calculations.

Chart 17. Mexico: Base Money by Component, January 1992-December 1994
(In billions of new pesos)

International reserves

Monetary base

Net domestic credit

| JAN | MAY | SEP | JAN | MAY | SEP | JAN | MAY | SEP |

1992   1993   1994

Source: Banco de Mexico, *Indicadores Economicos*, February 1995.

Chart 18. Mexico: Real Effective Exchange Rate, Jan. 1979–Jan. 1995

(1980 = 100)
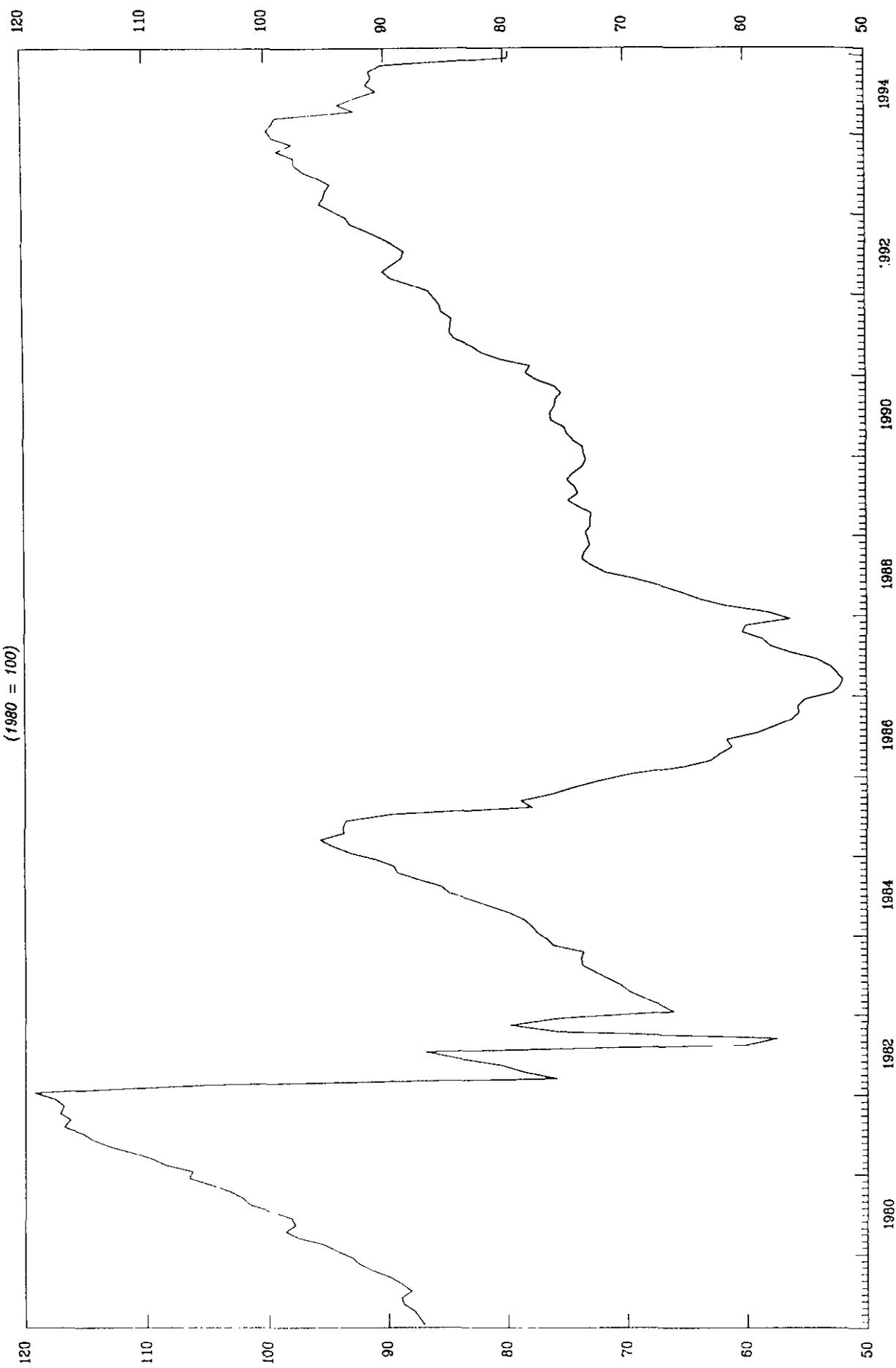
Sources: International Monetary Fund, Effective Exchange Rates database and *Exchange Arrangements and Exchange Restrictions,* various issues.

speculative attack that has the domestic monetary authority exchanging domestic securities for foreign securities to keep the monetary base constant. The portfolio reallocation is accommodated by a shift in domestic interest rates and in the expected change in the exchange rate.

d. 1994 Mexican interest rates

The third element of an attack involves the movement of the interest rate before the attack and the jump in the interest rate after the attack.1/ According to equation (1), movements in the pre-attack interest rates should reflect two elements: during 1994, U.S. short-term interest rates increased by 263 basis points; 2/ and, the probability of collapse, π, increased as reserves were depleted. The expected rate of change of the exchange rate in the event of an attack would be above the depreciation rate of the controlled rate; and an increase in π will increase domestic interest rates. 3/

Chart 19 presents 91-day cetes, tesobonos, and U.S. treasury-bill rates. Cetes are peso-denominated government securities; tesobonos are peso-denominated government securities with the principal indexed to the U.S. dollar exchange rate. The evolution of Mexican interest rates and interest rate differentials relative to U.S. interest rates conveys useful information about market perceptions about the exchange-rate regime in Mexico (see Chart 19). In early 1994, cetes interest rates were around 10 percent. Cetes rates then shot up to the 14-17 percent range in April, reflecting an increased spread over tesobono rates and U.S. treasury-bill rates. Despite the decline in the REER, reserve losses, and the increase in the current account deficit during the remainder of 1994, the markets apparently did not demand a very large increase in premium for peso lending.

Following the 15 percent devaluation on December 20 and the subsequent floating of the peso against the dollar, both cetes and tesobono interest rates rose dramatically. Cetes rates rose to more than 30 percent in January 1995 and then jumped temporarily to more than 40 percent. Tesobono rates rose dramatically as well despite the fact that they were indexed to the dollar. As emphasized above, the final element of an attack is an upward jump in domestic-currency interest rates that reflects perceptions about the post-attack inflation rate and that is consistent with the post-attack portfolio allocation.

1/ If the authorities mount an interest rate defense then interest rates drop after the attack.

2/ Increase in Federal Funds rate from December 12, 1993 to December 28, 1994.

3/ In addition, policy uncertainty reflected in contradictory announcements concerning the regime may increase the risk premium which is embedded in ϵ in equation (1).

4.   Post-attack policy

In the speculative attack literature, the shadow exchange rate depends on anticipations of reserve losses during an expected attack and expected policies after the attack. Thus, the policy options that can be expected after the collapse of the exchange rate regime are important for fully implementing the concept of the shadow exchange rate. Four options, which are not mutually exclusive, are typically considered: (1) a freely-floating exchange rate; (2) a step devaluation followed by a new fixed rate; (3) the imposition of capital controls or some other default; and (4) changes in other government policies.

The shift to a freely floating exchange rate is the most commonly analyzed option in the literature. 1/ The domestic currency interest rate rises, possibly dramatically, as reserves are depleted and the probability of an impending attack rises. Domestic-currency interest rates rise to compensate investors for the possibility that an attack will force the abandonment of the exchange rate regime during the life of a domestic-currency denominated loan. Following the attack, domestic interest rates are free to reflect the domestic inflation rate. Real domestic-currency balances decline because of the portfolio shift at the time of the attack and due to the increased opportunity cost of holding currency. 2/

The second option is, in some ways, a special case of the first option. 3/ The devaluation may reflect a preemptive policy adjustment to avoid having to mount an expensive defense. The devaluation is effective only if it reduces the value of the currency by more than the currency would have been devalued in a move to a free float. Otherwise, it still would be worthwhile to attack the fixed exchange rate regime. Consequently, the interest rate must rise before the devaluation by even more for a step devaluation than for a freely floating regime. This second option appears to characterize reasonably well the 15 percent devaluation of the Mexican peso that occurred on December 20, 1994, which was then followed by a freely floating exchange rate after reserves continued to decline.

The third option, the imposition of capital controls, is a form of default because capital controls, in effect, usurp, without compensation, either the rights of investors to freely move capital across borders or a portion of the invested proceeds. As an example of such an option, suppose that, after the attack, convertibility of current and capital account transactions are treated differently, by maintaining the old regime for current account transactions but using a floating rate for capital account transactions. Investments in securities are capital account items, and the

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1/ This is the option used by Salant and Henderson (1978), Krugman (1979), and Flood and Garber (1984).

2/ In the Mexican case both domestic credit and the overall monetary base increased at the time of the crisis.

3/ This is the option studied by Blanco and Garber (1986).

Chart 19. Yields on Mexican and U.S. Government Securities, January 1994–February 17, 1995 [']

(In percent)
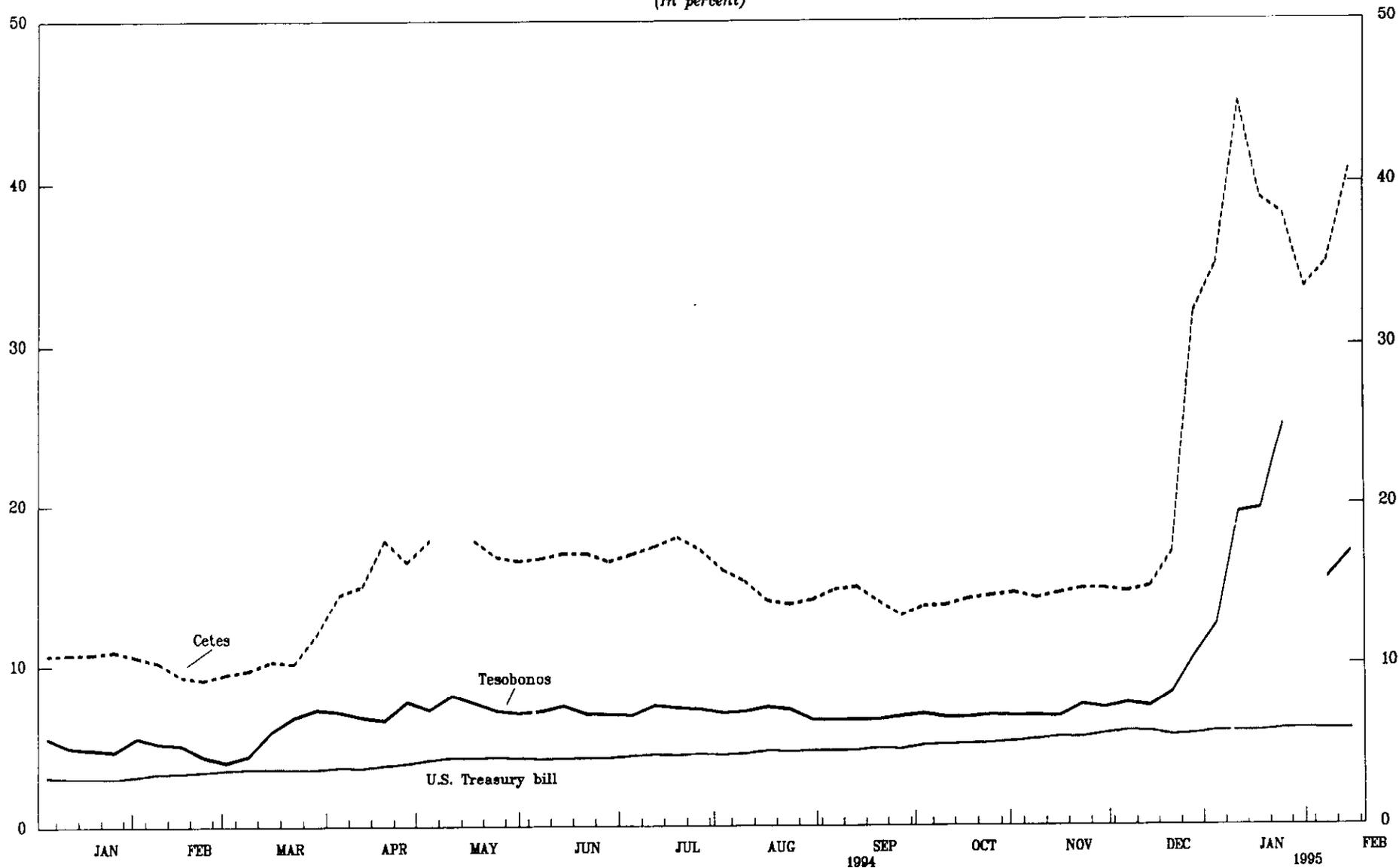
Sources: Bloomberg Financial Markets; and Board of Governors of the Federal Reserve System.

['] Weekly auction data for 91-day cetes (Mexican government treasury bills) and 91-day tesobonos. The break in the cetes series reflects the fact that there was no auction during the week of May 11, 1994. The break in the tesobonos series is due to cancellation of the January 31, 1995 auction by the Bank of Mexico.

capital proceeds of investments then must be repatriated at the lower
floating rate. Investors would perceive this as a tax on their investment
returns. In 1982, Mexico imposed a two-tier market, and in 1994, investors
might have given some weight in the formation of the shadow exchange rate to
the possibility that such a policy might be pursued again. 1/

The potential importance of this option in the formation of investor
views about the Mexican peso shadow exchange rate is underscored by changes
in the interest rate on tesobonos in late 1994. Although tesobonos are
nominally indexed to the dollar, tesobono contracts were, in principle,
potentially subject to some form of capital controls or some other form of
direct or indirect "default," including restructuring, involuntary
conversion, and other options. The observed increase in tesobono yields in
December 1994 and January 1995 can be viewed, therefore, as the compensation
demanded by investors for incurring the risk of these various potential
forms of taxes.

Finally, consider the fourth option; other policy changes in addition
to exchange rate policy changes at the time of an attack. This option opens
up the possibility that an attack on a fundamentally-sound fixed-rate regime
could create a change in policies that inadvertently validates the attack
and leads to a devaluation. For example, consider a country in which a
fixed exchange rate regime provided the nominal anchor that effectively
contained inflationary pressures, and in which in the absence of the anchor
the economy would have moved to an equilibrium with significantly higher
inflation and a less valuable currency. In such a situation, an attack that
provokes the policy response of floating the exchange rate would in effect
lead to higher inflation and a lower exchange rate. Thus, by acting as a
policy-switching trigger the attack is self-validating. In the academic
literature such a possibility is referred to as multiple equilibria, but so
far actual examples of this possibility have not been documented.

This fourth option does not appear to be a reasonable characterization
of what occurred in Mexico, because of the losses in reserves, the rising
current account deficit, and the rise in the real exchange rate.

5.   Conclusions

Events in Mexico in late 1994 and early 1995 appear to conform to some
of the elements of the first three post-attack options including foreign
investor misperceptions. In 1994, both internal and external imbalances
emerged and yet for quite some time domestic interest rates did not rise to
fully reflect these imbalances. The devaluation on December 20, 1994 can be
interpreted as a preemptive strike against speculation that the Mexican peso
was overvalued in the presence of a persistent decline in reserves from
$25 billion in February 1994 to $10 billion by the end-November 1994. The
15 percent devaluation was followed by further pressure on the peso, after

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1/   See Annex.

which the peso was allowed to float freely. Immediately following the move to a floating rate, cetes interest rates jumped to almost 32 percent on December 30, 1994 and continued to rise to more than 40 percent by January 13, 1995. Models of speculative attacks would predict this reaction in the presence of expectations by market participants of a continuation of downward pressure on the exchange rate. In addition, the rise in interest rates on tesobonos to 25 percent by January 30, 1995, also is consistent with the predictions of models of speculative attacks in situations when investors expect the imposition of capital controls, as in 1982, or some other form of "default."

In short, the devaluation of the Mexican peso and the events that followed during the weeks of the freely floating peso are consistent with all of the classic elements of a speculative attack in the economics literature, with two interesting twists. First, reserve losses were sterilized at the time of the attack, and this may have inhibited the normal tendency in such circumstances for monetary tightening to stabilize financial markets. Second, there was a reporting lag for Mexican reserves that may have prevented investors from observing the decline in reserves and interest rates from rising to reflect the problems of the exchange rate regime. The devaluation of the Mexican peso, by most accounts, caught many investors by surprise and later precipitated a reevaluation of economic conditions in Mexico. In such a climate, it is natural for investors to demand a greater interest-rate risk premium for holding peso denominated assets. It is a prediction of models of speculative attacks that such a risk premium would be reflected in the value of the peso once it was allowed to float (Chart 20). 1/

V. Monetary, Exchange Rate, and Fiscal Policy Responses to Previous Surges of Capital Flows 2/

1. Introduction

Most developing countries that experienced heavy capital inflows in the early 1990s took measures to limit the impact of the inflows on their economies. One approach was simply to allow the exchange rate to respond to

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1/ The foreign exchange market in Mexico is dominated by a few big banks. Banamex has about 30 percent of the market with Bancomer and Serfin with about 10 percent each. Nafinsa, the government development bank is also a large player. Since the market is concentrated in the hands of a few large participants, volume is more than proportionately lower than in U.S.-based dollar markets. The volatility in the foreign exchange market was minimal during most of 1994 and foreign exchange bid-ask spreads were 25-50 basis points. Since December 29, 1994, however, when volatility increased enormously (see Chart 20) spreads increased by an order of magnitude sometimes reaching 500 basis points.

2/ Prepared by Carmen Reinhart and Steven Dunaway.

Chart 20. Mexico: Daily Exchange Rate, November 1, 1994–March 6, 1995
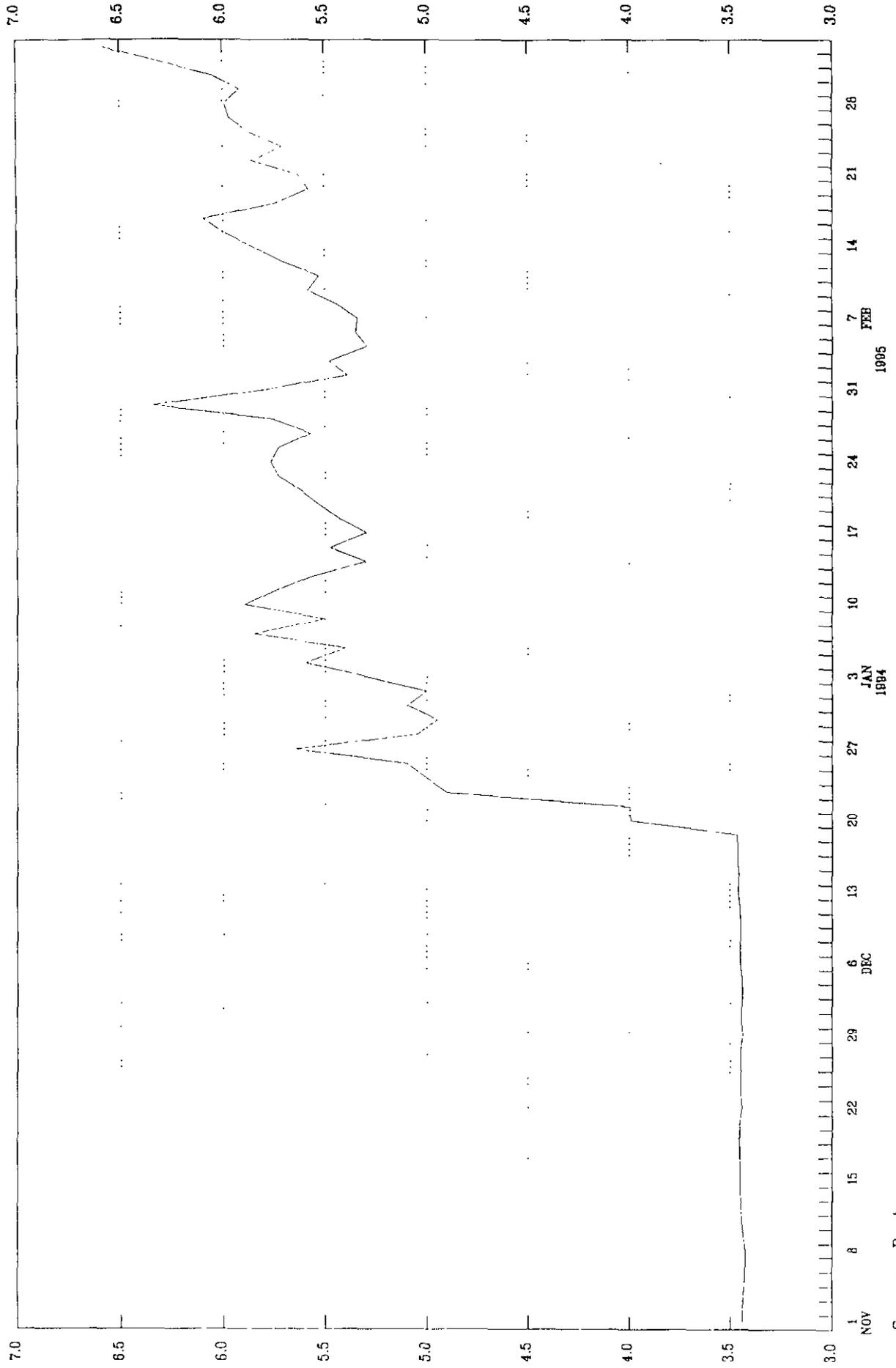
Source: Reuters.

the pressures created by the capital inflows, either through a revaluation of the fixed exchange rate or an appreciation of the exchange rate in a flexible exchange rate system. Another approach was to use monetary or fiscal policy to offset the pressure on the currency to appreciate. The motivation for the macroeconomic policy response was that an appreciation either jeopardized the effectiveness of the fixed exchange rate policy or that the inflows and, hence, the pressure on the exchange rate, were only temporary. In either case, appreciation of the currency was considered to have an adverse effect on international competitiveness and it was worthwhile, therefore, to attempt to offset the pressures on the exchange rate associated with capital inflows. In addition to the reluctance to allow the exchange rate to appreciate, there have been concerns that the volatile nature of these flows could add to the vulnerability of the financial sector, particularly if the banking system plays a dominant role in intermediating these flows.

Section 2 of this chapter discusses the primary measure that has been used to resist nominal exchange rate appreciation--sterilized intervention. A wide variety of country experiences is examined and the impact of sterilized intervention on interest rates and on the level and composition of capital flows is documented. A key finding is that sterilized intervention is not very effective and may even exacerbate inflows. Section 3 examines a second policy response, namely, exchange rate policy, including realignments and changes in the exchange rate regime, which have been used to reduce pressure on the exchange rate. The chapter then examines fiscal policy responses to rising capital flows, including the implications of these measures for monetary policy. The final section of the chapter addresses issues related to the interaction and sequencing of these various policy measures. 1/

2.   Monetary policy: sterilized intervention

Sterilized intervention seeks to accomplish two things. First, foreign exchange market intervention seeks to reduce pressure on the nominal exchange rate. Second, sterilizing the intervention seeks to avoid the monetary expansion that intervention creates (when there are heavy capital inflows). 2/ Although sterilization policies have been used extensively in developing countries, relatively little is known about the impact sterilization policies have had on domestic interest rates, monetary growth, and the volume and composition of capital flows.

The scope for using sterilization policy hinges on the cross-border mobility of capital. Specifically, if capital is perfectly internationally

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1/ The use of capital controls to deal with capital inflows and outflows is analyzed in the following chapter.

2/ Sterilized intervention may also influence the exchange rate by "signaling" policy intentions; see Mussa (1981).

mobile, the scope for sterilization is limited. 1/ Although the evidence is somewhat mixed, it generally suggests that capital mobility is less-than-perfect in the short run, implying that there is some scope for short-run sterilization policies in developing countries. 2/

Sterilization policies affect capital flows through their impact on domestic interest rates. Domestic interest rates would likely rise if the domestic currency assets investors (including domestic banks) want to hold (that is, loans, bank CDs, stocks, bonds) are poor substitutes for short-term central bank paper or treasury bills being supplied by the central bank. Another reason why interest rates might rise is that money demand may increase due to lower inflation or a higher level of income, as the latter often accompanies large capital inflows. Hence there are two disadvantages with using sterilized intervention. First, the rise in domestic interest rates may stimulate further short-term inflows. Second, the wider domestic and foreign interest-rate spread entails larger quasi-fiscal costs because the interest rate paid on debt issued by the central bank exceeds earnings by the central bank on international reserve holdings. Overall, the evidence presented in this section suggests that sterilized intervention is not very effective and may even create problems when the exchange rate is pegged.

Sterilization policies have taken a variety of forms, and country experiences with these policies can best be understood by examining each of these forms. There are three main types of sterilization policies: open market operations, changes in reserve requirements, and the management of government deposits. 3/

a. Open market operations

Sterilization through open market operations usually takes place through the sale, by the central bank, of either government or central bank securities. The objective of these sales is to remove the liquidity generated by central bank purchases of foreign currency. Mexico, for instance, sterilized inflows by selling government debt, including cetes and tesobonos. In many countries (Chile, Colombia, Indonesia, Korea, and the Philippines), the central bank issued its own debt for the purpose of conducting open market operations. In some countries (Malaysia and Sri Lanka), open market operations were initially conducted by selling public sector debt and then subsequently by selling central bank debt as the central bank depleted its own holdings of government debt (Table 18).

1/ Indeed, the empirical evidence on the effectiveness of sterilized intervention in industrial countries is mixed. Some studies argue that intervention has not played an important role in currency realignments in recent years. See Obstfeld (1990), Dominguez and Frankel (1995), and Taylor (1993).
2/ See Schadler and others (1993).
3/ See Folkerts-Landau and others (1995).

Table 18.   Sterilization Through Open Market Operations 1/

Chile (1990)

January 5, 1990
        Large scale sterilization efforts begin with the Central Bank increasing its long-term real
        interest rate on its bonds from 6.9 percent to 9.7 percent and its 90-day paper from 6.8 percent to
        8.7 percent.

August 17, 1990
        Short-term rates begin a moderate decline (from 8.7 percent to 8.2 percent).

March 18, 1991
        Further easing of policy with 90-day paper reaching 5.7 percent and 360-day paper declining from
        9.2 percent to 5.9 percent.

April 2, 1992
        Further easing with bond rate reducing from 9.7 percent to 6.6 percent.

August 20, 1992
        Policy begins to tighten with short-term rate rising to 5.7 percent.

November 2, 1992
        Further tightening with short-term rate rising to 6.5 percent and long-term rate rising to
        7.7 percent.

September 1993
        Yield curve becomes inverted with 10-year bond rate at 6.4 percent and short-term rate remaining at
        6.5 percent.

November 2, 1992
        Further tightening.

Colombia (1991)

January 1991
        Heavy sterilization of inflows begins.

October 1991
        Sterilization policies are abandoned.

Indonesia (1990)

February 1991
        Significant monetary tightening. Sales of Bank Indonesia certificates (SBIs) increase sharply.

March 1991
        State enterprises are instructed to convert Rp 10 trillion in bank deposits to SBIs.

May 1993
        Monetary policy begins to ease and sterilization efforts diminish.

Korea (1992)

April 1993
        Korea begins to sterilize through auctions of monetary stabilization bonds (MSBs). Previously open
        market operations consisted of a mandatory allocation scheme whereby the Bank of Korea allocated
        securities at controlled, below-market interest rates.

Malaysia (1989)

1990
        Bank Negara begins to borrow in interbank market.

1992
        Heavy open market operations begin as Bank Negara steps up sales of treasury bills and borrows
        heavily in the interbank market.

Table 18 (concluded). Sterilization Through Open Market Operations 1/

Malaysia (1989) (continued)

February 10, 1993
Bank Negara begins to issue Bank Negara Bills (BNBs), which are similar to Malaysian Government treasury bills. This move is prompted by the need to have an instrument through which to conduct open market operations, since Treasury issuance is dwindling in line with the shrinking government deficit. During the first half of 1993 issuance is RM 9,300 billion, and during the second half issuance tapers off to RM 4,300 billion.

February 16, 1993
Bank Negara sells the first issues of the Malaysia Savings Bond (MSB) for RM 1 billion.

Mexico (1990)

1990-93
Partial sterilization of inflows through sales of government paper, mostly domestic currency-denominated cetes.

Philippines (1992)

1992
Sterilization efforts intensify through issuance of Central Bank bills and borrowings under the Central Bank reverse repurchase facility. Furthermore, in view of the Central Bank's lack of holding of treasury bills, the government was called to issue government securities and deposit the proceeds with the Central Bank.

Mid-1993
Sterilization efforts diminish and the government shifts its deposits out of the Central Bank to commercial banks. More adjustment comes through allowing the nominal exchange rate to appreciate.

Sri Lanka (1990)

1991 - mid-1993
Intense sterilization efforts through open market operations of treasury bills.

October 1993
After depleting its holdings of treasury bills, the Central Bank begins to issue paper in order to conduct open market operations. Sterilization efforts moderate considerably.

Thailand (1988)

1989-91
Heavy sterilization period. During this period the Bank of Thailand increases its rediscount rate from 8 percent at the end of 1989 to 12 percent at the end of 1990.

Late 1989
The Bank of Thailand reduces commercial banks' access to refinancing facilities. The amount of refinancing is reduced from 100 percent to 50 percent of the face value of qualifying notes.

Mid-1993
Sterilization efforts cease.

Sources: Alfiler (1994); Aziz (1994); Banco Central de Chile, Memoria Anual and Evolucion de la Economia, various issues; Banco de Mexico, Informe Anual 1993; Bank Negara Malaysia, Annual Report, various issues; Harinowo and Belchere (1994); Hettiarachchi and Herat (1994); Kang (1994); Laporan Mingguan Weekly Report, various issues; Nijathaworn and Dejthamrong (1994); and Rodriguez (1991).

1/ The date next to the country name denotes the first year of the surge in inflows.

A key advantage of sterilization via open market operations is that it limits the monetary/credit expansion of intervention without imposing the additional burdens on the banking system that other forms of sterilization impose, such as reserve requirements. 1/ Furthermore, sterilization by open market operations may limit the involvement of domestic banks in intermediating inflows. This limit can be desirable when there are concerns about the resiliency of the banking system or when inflows are considered to be temporary. The main disadvantage of sterilization is that it may entail sizable central bank financial losses, even in a relatively short period of time. 2/ Sterilization efforts also might increase the domestic-international interest rate spread and thereby attract additional short-term capital.

The intensity of these open-market policies has varied considerably across countries and across time (see Table 18). One can gauge the intensity of the sterilization efforts by examining the stock of central bank bills relative to the monetary base, or by analyzing changes in net domestic assets. Chile during the first half of 1990, Colombia in most of 1991, Indonesia during 1991-92, Malaysia from mid-1991 through early 1993, and Sri Lanka in 1991-93, all attempted to conduct open market operations on a scale so as to almost fully sterilize capital inflows. 3/ Chile (mid-1991 to the present), Korea, Mexico, the Philippines, and Thailand used sterilized intervention throughout much of the inflow period to sterilize a portion of the inflows. For example, Mexico sterilized about 25 percent of the inflows in 1993, the year when capital inflows peaked. 4/

b. Reserve requirements

An increase in reserve requirements can be used to reduce the money multiplier and thereby curtail the monetary expansion associated with central bank intervention in the foreign exchange market. Some countries have simply increased the statutory reserve requirement on all domestic currency deposits. Leading examples of this policy are Costa Rica, Malaysia, and Sri Lanka. For instance, when inflows began to accelerate in

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1/ For instance, increased reserve requirements tend to promote disintermediation (see Calvo, Leiderman, and Reinhart (1993)).

2/ Rodriguez (1991) suggests that the central bank losses associated with Colombia's sterilization efforts during 1991 amounted to 0.5-0.7 percent of GDP. Kiguel and Leiderman (1994) indicate that during 1990 to mid-1992 Chile's central bank losses due to sterilization policies were about 1.4 percent of GDP. Gurria (1993) estimates that the quasi-fiscal losses for Mexico were in the 0.2-0.4 percent per annum range during 1990-92. Central bank losses in Indonesia, Malaysia, and Sri Lanka have also been non-trivial.

3/ In addition to open market operations, Indonesia and Malaysia used other forms of sterilization, which will be discussed later in the chapter.

4/ Banco de Mexico (1993).

Malaysia in 1989, the statutory reserve requirement was 3.5 percent; by early 1994 it had been increased (in multiple steps) to 11.5 percent (Table 19). Other countries (for example, Colombia 1991) imposed high marginal reserve requirements. While this latter measure does not affect the narrow-money multiplier, it reduces the expansion of the broader aggregates. In several countries where banks received foreign currency deposits--Chile, Peru, and Sri Lanka--reserve requirements on these accounts were either newly imposed or increased.

In other countries the period of heavy capital inflows coincided with reductions in reserve requirements. For example, in April 1989, Mexico eliminated reserve requirements and instituted in their place a 30 percent liquidity ratio that could be held in the form of interest-bearing government paper. 1/ Argentina also reduced reserve requirements during the inflow period. In the case of the Philippines, the central bank announced a reduction in reserve requirements in August 1994 with the objective of decreasing domestic interest rates and therefore capital inflows. 2/

Reserve requirements are a tax on the banking system. As banks are likely to pass on all or a part of any tax to its clients, an interesting issue is whether an increase in reserve requirements reduces deposit rates or increases loan rates. Lower domestic deposit rates will discourage capital inflows, but increased loan rates may induce firms to borrow abroad, and therefore further stimulate inflows. The empirical evidence suggests that in the majority of cases mentioned above, much of the adjustment took place through higher lending rates. 3/ Therefore, just as open market operations may increase interest rates and have the opposite effect of what was intended, increasing reserve requirements may in fact increase borrowing costs and further increase inflows. In addition, if disintermediation is significant, and leads to a shift of funds to the nonbank financial sector (which is not subject to reserve requirements), then this too could mean that a reserve requirement will not have the desired effect. 4/

c. Management of public-sector deposits

Several developing countries (for example, Indonesia, Malaysia, Taiwan Province of China, and Thailand) sterilized the effects of capital inflows by shifting deposits of the public sector or of pension funds from the banking system to the central bank (Table 20). 5/ During 1991, the

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1/ See Coorey (1992).

2/ See Alfiler (1994).

3/ For example, in Malaysia deposit rates rose during the period in which reserve requirements were raised (see Tables 20 and 21); a similar pattern emerges in Sri Lanka (see Hettiarachchi and Herat (1994)).

4/ See Calvo, Leiderman, and Reinhart (1993), and Folkerts-Landau and others (1995).

5/ See Reisen (1993), and Folkerts-Landau, and others (1995).

Table 19. Changes in Reserve Requirements 1/

Chile (1990)

__January 1992__
> Nonrenumerated 20 percent reserve requirement on deposits and loans in foreign currency held by commercial banks. The reserve requirement must be maintained for one year.

__May 1992__
> Reserve requirement on foreign currency deposits and loans held by commercial banks is increased to 30 percent. The requirement is designed to make the tax rate fall as the maturity increases.
>
> A 30 percent marginal reserve requirement on interbank deposits is introduced.

Colombia (1991)

__January 1991__
> Marginal reserve requirement of 100 percent is imposed on all new deposits. The reserves are held as interest-bearing central bank bonds.

__September 1991__
> The marginal reserve requirement is replaced by an increase in reserve requirements on most deposits.

Malaysia (1989)

__May 2, 1989__
> Reserve requirement is increased to 4.5 percent from 3.5 percent for commercial banks and 3.0 percent for finance companies.

__October 16, 1989__
> Reserve requirement is increased from 4.5 percent to 5.5 percent.

__January 16, 1990__
> Reserve requirement is increased from 5.5 percent to 6.5 percent.

__August 16, 1991__
> Reserve requirement is increased from 6.5 percent to 7.5 percent.

__September 16, 1991__
> All outstanding ringgit received through swap transactions with nonresidents, including offshore banks, is to be included in the eligible liabilities base and be subject to the statutory reserve requirements.

__May 2, 1992__
> Reserve requirement is increased from 7.5 percent to 8.5 percent.

__January 3, 1994__
> Reserve requirement is increased from 8.5 percent to 9.5 percent.
>
> The reserve requirement is extended to cover foreign currency deposits and transactions (such as foreign currency borrowing from foreign banking institutions and interbank borrowing). Previously it had only applied to ringgit-denominated transactions.

__1994__
> Reserve requirement is increased in two steps to 11.5 percent.

Mexico (1990)

__April 1992__
> A compulsory liquidity coefficient for dollar liabilities is set at 15 percent. This coefficient must be invested in liquid securities denominated in the same currency.

Philippines (1992)

__August 15, 1994__
> The reserve requirement is reduced from 19 percent to 17 percent (excluding reserves held in the form of government securities) with the objective of inducing a decline in domestic interest rates.

Table 19 (concluded). Changes in Reserve Requirements 1/

<hr>

Sri Lanka (1990)

November 1, 1991
  Reserve requirement is raised to 13 percent.

January 24, 1992
  Reserve requirement is raised to 14 percent from 13 percent.

September 4, 1992
  Reserve requirement is extended to include foreign currency deposits.

September 24, 1992
  Reserve requirement is lowered back to 13 percent.

January 29, 1993
  Reserve requirement is raised to 13.5 percent.

April 16, 1993
  Reserve requirement is increased to 14 percent.

May 21, 1993
  Reserve requirement is raised to 15 percent.

August 1993
  Reserve requirement on foreign currency deposits is increased to 15 percent.

<hr>

Sources: Aziz (1994); Banco Central de Chile, Memoria Anual and Evolucion de la Economia, various issues; Bank Negara Malaysia, Annual Report, various issues; Gurria (1993); Hettiarachchi and Herat (1994); and Rodriguez (1991).

1/ The year next to the country name denotes the first year of the surge in inflows.

Table 20. Sterilization Through Management of Government Funds 1/

Malaysia (1989)

April 1990

The Money Market Operations (MMO) account of the accountant general maintained at Bank Negara is reactivated. Government deposits that are placed with the banking system maturing that year (about RM 3.7 billion) have been withdrawn from the system and are deposited in the MMO account.

1992-94

Transfer of government deposits and Employee Provident Fund (EPF) deposits to Bank Negara.

Philippines (1992 and 1994)

The National Government issues securities and deposits proceeds with the Central Bank.

Singapore

Savings of Central Provident Fund (CPF) are heavily invested in government bonds.

Taiwan Province of China

Postal savings are transferred from the domestic banks to the central bank.

Thailand (1988)

1987 - mid-1992

Government deposits held at the Bank of Thailand increased from 25 percent of total deposits at end-1987 to 82 percent in mid-1992.

Sources: Aziz (1994); Bank Negara Malaysia, Annual Report, various issues; and Folkerts-Landau, and others (1995).

1/ The year next to the country name denotes the first year of the surge in inflows.

Mexican government also placed the proceeds of privatizations in the central bank to assist sterilization efforts.

If government deposits are counted as part of the money stock, then their transfer to the central bank works in the same way as an increase in reserve requirements (the reserve requirement on those deposits is effectively increased to 100 percent). If the deposits are not counted as part of the money stock, then the shift is more akin to a liquidity-draining open-market operation; the key difference is that the central bank may not have to pay a market rate of interest on its deposits as it would on its sterilization bonds.

This type of sterilization operation has several advantages. It acts like a tax on the banking system, and it does not appear to increase short-term interest rates as much as sales of sterilization bonds. Further, if the deposits are not remunerated, then there are no quasi-fiscal costs associated with sterilization operations; if they are remunerated at below-market interest rates, there is a quasi-fiscal cost, but it is below the cost of sterilization via open market operations. 1/

There are some drawbacks to the shifting public sector deposits, however. Large and unpredictable changes in bank deposits make it difficult for banks to manage their cash positions. For example, when Indonesia forced state enterprises to move their deposits out of the state banks, these banks not only lost liquidity but they also had to reduce their amount of loans outstanding. In addition, some of the deposits are not strictly public sector deposits (for example, Malaysia's Employee Provident Fund (EPF) or Singapore's Central Provident Fund (CPF)). In these cases, the cost of shifting deposits may be borne by those who contribute to the fund, depending on whether payouts from the funds are tied to the return on the funds. Finally, the shifting of deposits may be limited in scope by the availability of eligible funds. For example, government deposits held at the Bank of Thailand increased from 25 percent of total government deposits at the end of 1987 to a peak of 82 percent in mid-1992. In this case, the scope for further sterilization operations via deposit shifting was clearly limited.

d.   Effects on interest rates and capital flows

This section documents some of the experiences with sterilization efforts discussed above in order to gauge the macroeconomic effects of these policies. The episodes examined include Chile during the first half of 1990, Colombia in most of 1991, Indonesia during 1991-92, and Malaysia from mid-1991 through early 1993.

1/ Quasi-fiscal costs are reduced or eliminated by transferring these costs to the government (that is, by making them explicit fiscal costs).

There are several conclusions one can draw from these case studies. First, there is a particularly marked accumulation of international reserves, which points to significant central bank intervention (Chart 21). Second, despite heavy foreign exchange market intervention by central banks, in all of these countries either the rate of devaluation slows down, or there is a revaluation (Malaysia) (see Chart 22). Although this may seem puzzling in light of the objectives of intervention, these two observations together highlight the limitations of sterilized intervention in the presence of very large capital inflows.

A third conclusion is that the magnitude of central bank note issuance (in both absolute terms and relative to the monetary base) has been dramatic over a relatively short period of time in all countries. The scale of open market operations was substantial. In Colombia, the ratio of open-market paper to the monetary base increased from less than 30 percent in late 1990 to over 80 percent by October 1991. In Chile, this ratio increased by more than 100 percent in a period of six months. In Indonesia, there was a similar surge in outstanding Bank Indonesia Certificates (see Chart 23).

In Malaysia, the central bank sold treasury bills and Bank Negara Bills (BNB) and it borrowed heavily in the interbank market. A more comprehensive indicator of the sterilization effort is, therefore, required. Chart 23 presents a broad measure of central bank liquidity operations. In 1990, during the first year of heavy inflows, Bank Negara increased liquidity by $6.5 billion; by 1993 the last year of the heavy sterilization effort (capital controls were imposed at the beginning of 1994), Bank Negara was draining liquidity at a rate of $40.3 billion a year.

A fourth general conclusion from these four episodes is that domestic short-term interest rates increased when the sterilization efforts began (Table 21). Short-term interest rates also increased during sterilization efforts in Korea (1988-89), Sri Lanka (1992-93), and the Philippines (1992-93). [1] In all of these countries, interest rates increased during sterilization operations despite heavy capital inflows. Furthermore, in several of these countries (including Chile and Colombia), the country risk premia appear to have declined during these episodes, which is likely to have contributed to the downward pressure on domestic interest rates. [2]

The evidence shows that the rise in interest rates often was pronounced and, given the reduced rate of devaluation (or in the case of Malaysia an appreciation), the rise in ex post dollar interest rates was even greater

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[1] See Hettiarachchi and Herat (1994) for Sri Lanka, and Alfiler (1994) for the Philippines. The Colombian experience is detailed in Rodríguez (1991). For a comprehensive study of the Indonesian case see Harinowo and Belchere (1994). For the Malaysian experience see Aziz (1994).

[2] An indication of the evolution of country risk is given by the behavior of secondary market prices for loans, which were increasing sharply during these episodes (see Calvo, Leiderman, and Reinhart (1993)).

Table 21. Interest Rates and Sterilization Policies 1/

(In percent, annualized rates)

	In Domestic Currency			Converted into U.S. dollars 1/		

Chile

	30-89 days loans	30-89 days deposits		30-89 days loans	30-89 days deposits	
Pre-inflow: 1988:1-1989:12	28.54	21.41		16.83	10.39	
Capital inflows and heavy sterilization: 1990:1-1990:7	46.58	37.80		35.16	27.01	
Capital inflows and partial sterilization: 1990:7-1994:5	27.93	21.76		18.91	13.17	

Colombia

	Prime loans	90-day deposits	Central Bank paper	Prime loans	90-day deposits	Central Bank paper
Pre-inflow: 1989:1-1990:12	44.14	34.41	33.79	3.74	3.29	11.25
Capital inflows and heavy sterilization: 1991:1-1991:11	47.16	36.61	42.08	10.31	14.70	18.85
Capital inflows and moderate sterilization: 1991:12-1993:12	36.95	26.20	24.31	11.08	9.42	20.53

Indonesia

	Prime loans	90-day deposits		Prime loans	90-day deposits	
Early stages of inflow: 1989-1990:12	22.54	17.99		17.03	13.24	
Capital inflows and heavy sterilization: 1991-1992:12	25.27	21.88		20.84	17.58	
Capital inflows and moderate sterilization: 1993:1-1994:6	19.22	13.66		15.30	9.93	

Malaysia

	Deposits	Deposits
Early stages of inflow: 1989:1-1991:6	6.21	5.52
Capital inflows and heavy sterilization: 1991:7-1993:6	7.92	13.07
Capital inflows, moderate sterilization, and heavy foreign exchange intervention: 1993:7-1993:12	6.74	-4.87
Capital controls and currency appreciation: 1994:1-1994:6	5.30	18.19

Sources: Bloomberg Financial Markets; International Monetary Fund, International Financial Statistics; and various Central Bank bulletins.

1/ The following formula is used to convert the domestic interest rate into U.S. dollars: $\dfrac{(1+i)_t e_t}{e_{t-1}}$ where e_t is the spot exchange rate and i_t is the nominal interest rate.

Chart 21. Sterilization Policies and International Reserves, 1987-94

(In billions of U.S. dollars)

Chile

Colombia

Indonesia

Malaysia
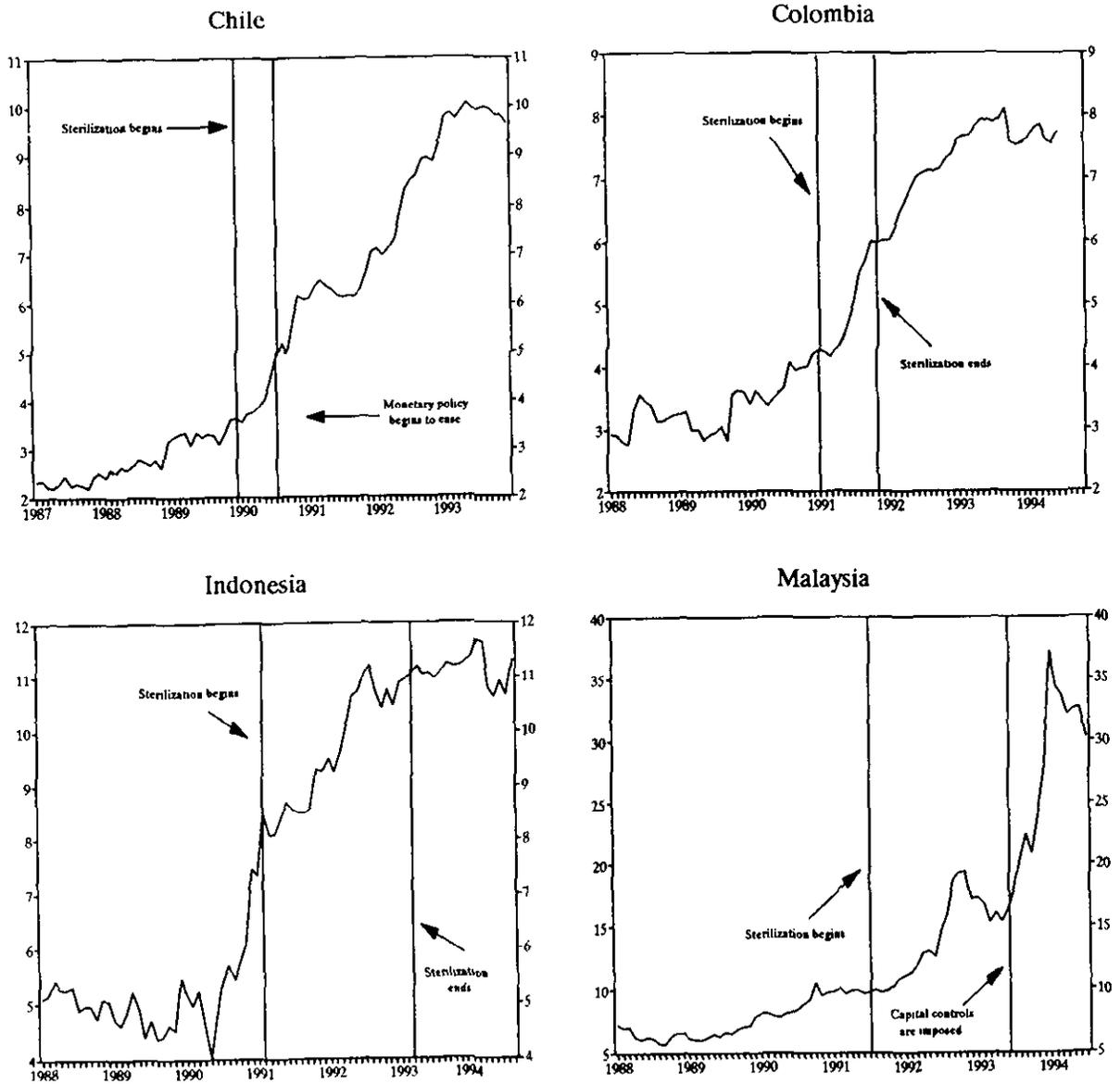
Source: International Monetary Fund, International Financial Statistics.

Chart 22. Sterilization Policies and Exchange Rates, 1987-94

(Three-month percent change, annualized)

Chile

Sterilization begins

Monetary policy begins to ease

Colombia

Sterilization begins

Sterilization ends

Indonesia

Sterilization ends

Sterilization begins

Malaysia

Capital controls are imposed

Sterilization begins
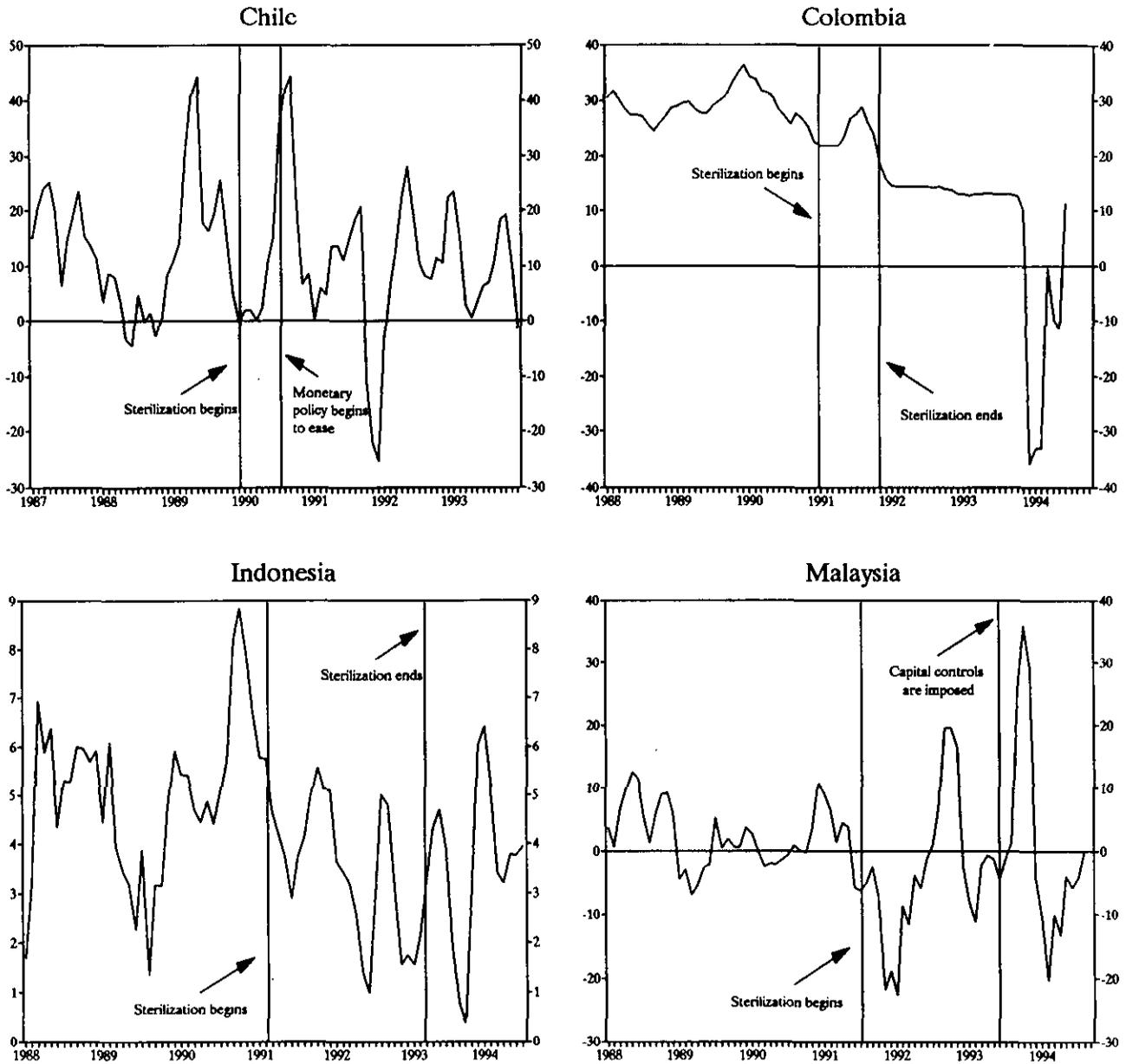
Source: International Monetary Fund, International Financial Statistics.

Chart 23. Indicators of Sterilization Efforts, 1987-94

Chile: Central Bank Notes/Monetary Base
(In percent)

Sterilization begins

Monetary policy
begins to ease
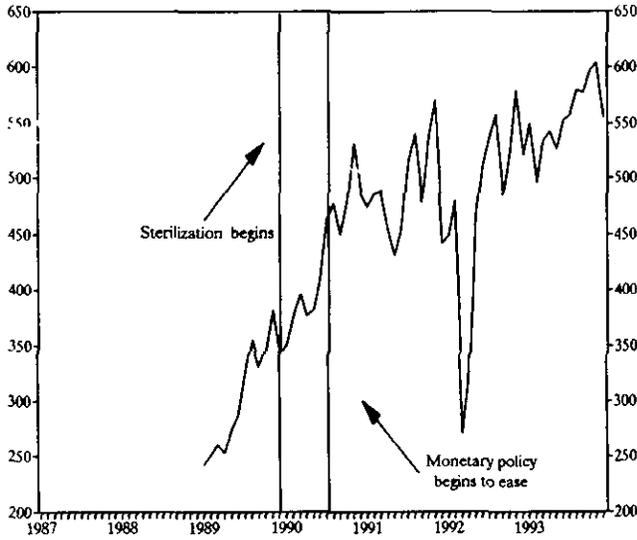
Colombia: Central Bank Open Market Paper/Monetary Base
(In percent)

Sterilization begins

Sterilization ends
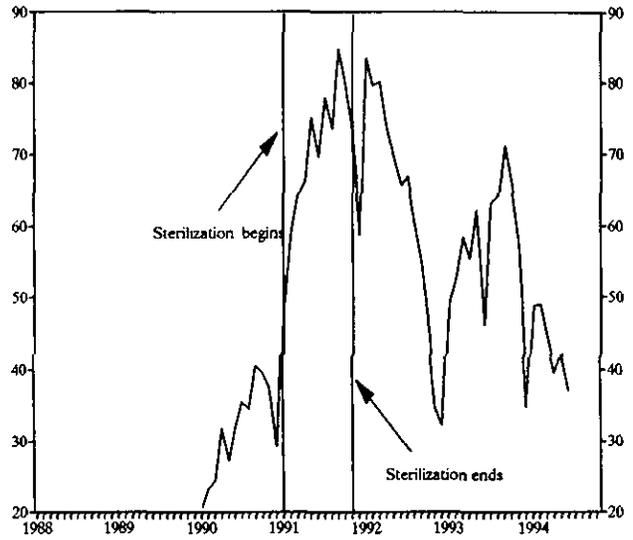
Bank Indonesia: Certificates Outstanding
(In billions of rupiah)

Sterilization begins

Sterilization ends
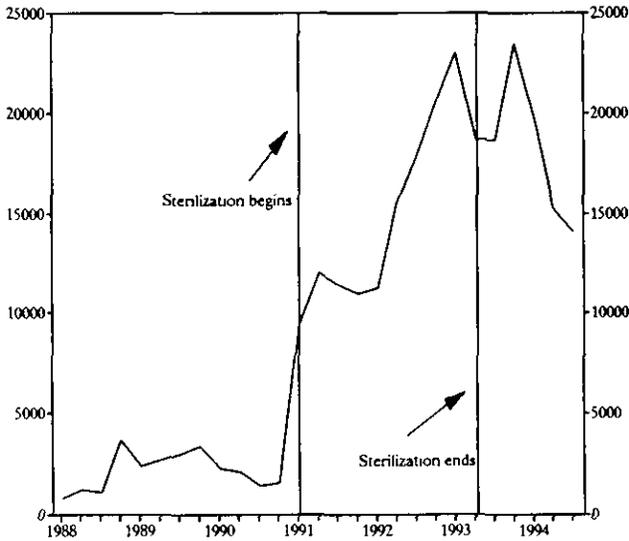
Malaysia: Central Bank Liquidity Operations
(In billions of U.S. dollars)
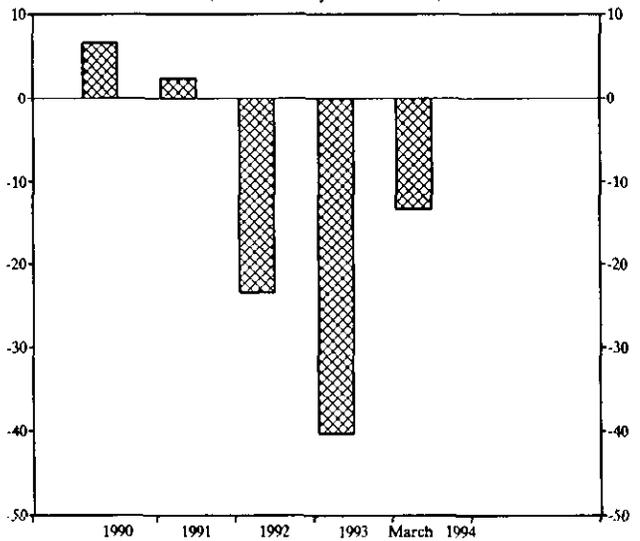
Sources: Banco Central de Chile; Banco de la Republica, Colombia; Bank Indonesia; and Bank Negara Malaysia.

(see Table 21). Further, interest rates fell when sterilization policies were abandoned. One explanation for this is that higher capital inflows were due to an increased demand for corporate securities and direct investment but not for short-term government paper. That is, to entice investors to hold more government securities, interest rates had to increase. Further, capital inflows often coincided with strong economic activity and, therefore, possibly an increase in money demand. The result of sterilization operations may have been that there was an unintended tightening of monetary policy.

A fifth conclusion is that ex post interest rate spreads (in dollars) were large during the period of sterilization. This suggests that sterilization policies do have an impact, at least in the short run, on how quickly domestic interest rates converge to international levels. 1/ In all of the countries considered, domestic short-term interest rate spreads remained high relative to those of some countries (for example, Argentina) that did not undertake any form of sterilization (Chart 24). Although sterilization policies appear to have slowed the convergence of domestic interest rates to international levels, the ability to affect domestic interest rates and control the money supply appears to have eroded over time. 2/3/ In all four countries considered, sterilization policies were either abandoned altogether, scaled back, or complemented by capital controls, because the high domestic interest rates were attracting more inflows.

The effect of sterilization policies on the size and composition of capital flows is illustrated in Charts 25-29. 4/ Sterilization policies in several of the rapidly growing economies in Southeast Asia in the late 1980s coincided with rising interest differentials and large inflows of short-term capital. In Thailand, the interest rate differential narrowed when sterilization efforts were scaled back and the exchange rate was

---

1/ Frankel (1994b), for instance, has suggested that expected devaluation can fully account for observed interest differentials. However, his result would not be inconsistent with a steady-state offset coefficient of unity.

2/ This is consistent with the findings of Schadler and others (1993).

3/ See Alfiler (1994), Aziz (1994), Harinowo and Belchere (1994), Hettiarachchi and Herat (1994), and Rodriguez (1991).

4/ The charts show for each country (Argentina, Chile, Indonesia, Malaysia, and Thailand) the composition of capital flows, split between total and short-term flows; differentials between interest rates on domestic deposits and U.S. Treasury bills, adjusted for actual exchange rate changes; and international reserves and exchange rates. A widening of interest rate differentials in conjunction with rising international reserves and a relatively constant exchange rate would suggest that the authorities were at least partially sterilizing capital inflows.

allowed to appreciate. Short-term inflows subsequently slowed in
1991-92. 1/ In Indonesia, although the interest-rate differential widened
further in 1991-92, short-term capital inflows declined in part due to steps
taken by the government to limit short-term foreign borrowing by public-
sector enterprises and new limits imposed on the open foreign-currency
positions of commercial banks. In Malaysia, short-term inflows continued to
rise in 1991-92 as the interest differential widened further. After 1991,
the authorities reduced intervention and allowed the exchange rate to
appreciate. Despite a narrowing of the differential in 1993, short-term
inflows rose, and the authorities imposed capital controls in early 1994.
In Chile (Chart 28), short-term inflows moved closely with the interest
differential throughout 1989-93. 2/

In all of the countries that pursued sterilization policies, short-term
capital flows rose at least initially during the period of sterilization.
There does not appear, however, to have been any pronounced or sustained
shift in the composition of capital inflows as a result of such
intervention, owing possibly to the fact that the periods of sterilization
were relatively brief or that other mitigating factors (principally those
influencing foreign direct investment behavior) were present.

In comparison to the experiences of countries that pursued
sterilization policies, Argentina provides an interesting comparison because
it did not sterilize over the period 1989-92 (Chart 29). In this case,
there was a change from sizable outflows in 1989 to significant inflows in
1992 following the introduction of the currency board--or "Convertibility
Plan"--in April 1991. In the absence of sterilization policies, interest
rates converged to world levels and short-term capital inflows levelled off
by 1993.

3. Exchange rate policy in the presence of large capital flows

There are several advantages to allowing the nominal exchange rate to
appreciate when there are heavy capital inflows. 3/ First, an
appreciation tends to reduce directly capital inflows. This advantage may
be particularly desirable if the inflows are perceived to be easily
reversible, banking supervision is weak, or there are inefficiencies in
pricing risk. Second, if economic "fundamentals" warrant a real exchange
rate appreciation, the adjustment comes via the exchange rate and not via

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1/ The sharp rise in short-term flows in 1993 primarily reflected a
reclassification of foreign loans from long-term to short-term flows when
they were rebooked in the Bangkok International Banking Facility after the
center was opened.
2/ Note that Chile introduced a tax on short-term flows in mid-1991.
This makes it difficult to distinguish whether short-term flows declined
during that period because of the easing in monetary policy, the
introduction of new capital controls, or both.
3/ See Calvo, Leiderman, and Reinhart (1993).

Chart 24. Deposit Rate Spreads 1/

Argentina: Jan. 1991-Oct. 1994

30-89 day peso deposit

90-day dollar deposit

Chile: Jan. 1989-July 1994

Sterilization begins

Monetary policy begins to ease

30-89 day peso deposit

30-89 day dollar deposit

Colombia: Jan. 1989-Nov. 1993

90-day deposit

Sterilization begins

OMAs 2/

Sterilization ends

Malaysia: Jan. 1989-July 1994

Sterilization begins

Capital controls are imposed

90-day deposit
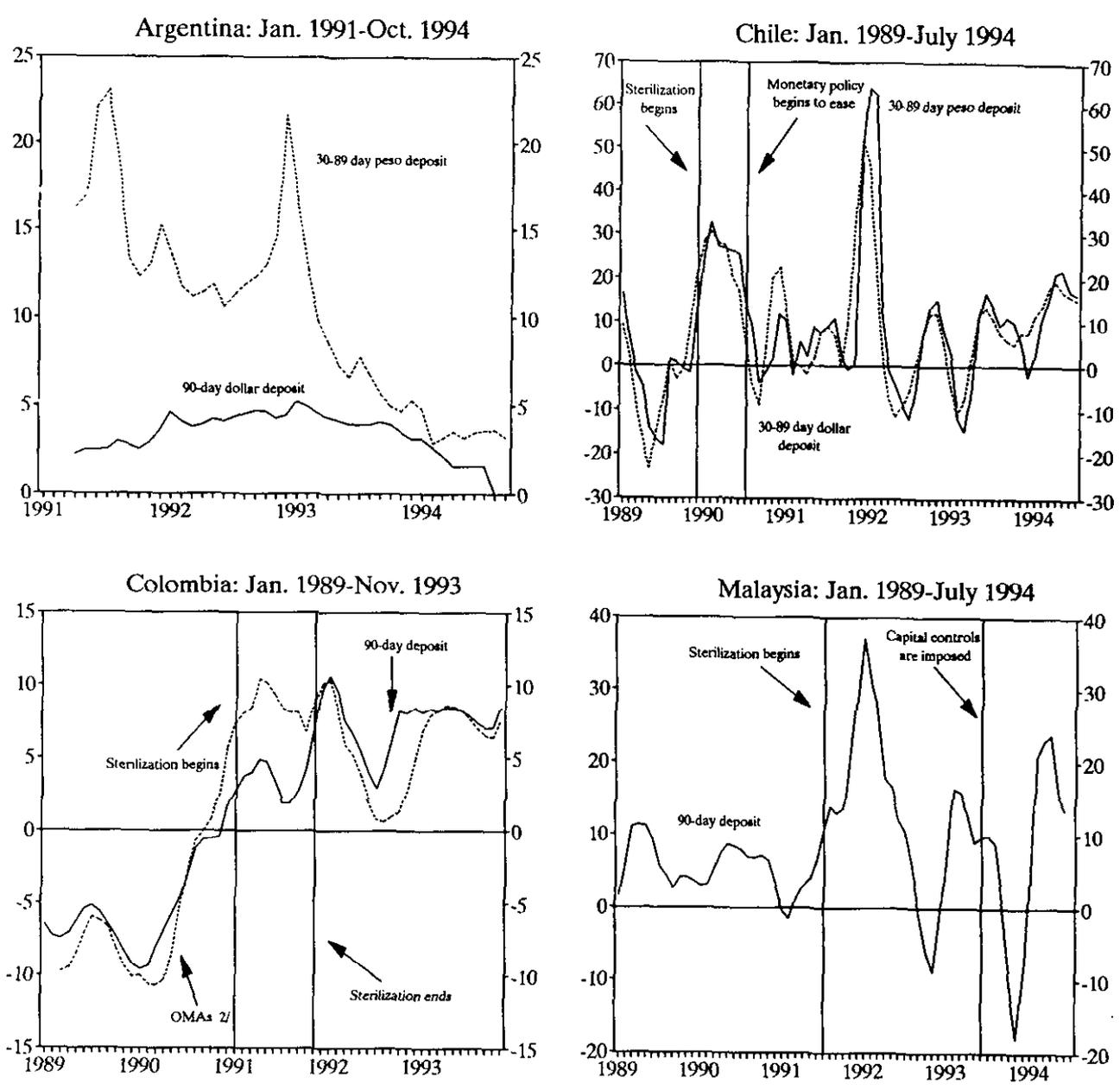
Sources: International Monetary Fund, International Financial Statistics; Reuters; and various Central Bank bulletins.

1/ The spreads are defined as the domestic interest rates converted into U S dollars minus the dollar-LIBOR rate of comparable maturity.
2/ OMA refers to Central Bank open market paper.

CHART 25

INDONESIA

Capital Flows and Interest Rate Differentials, 1988-93
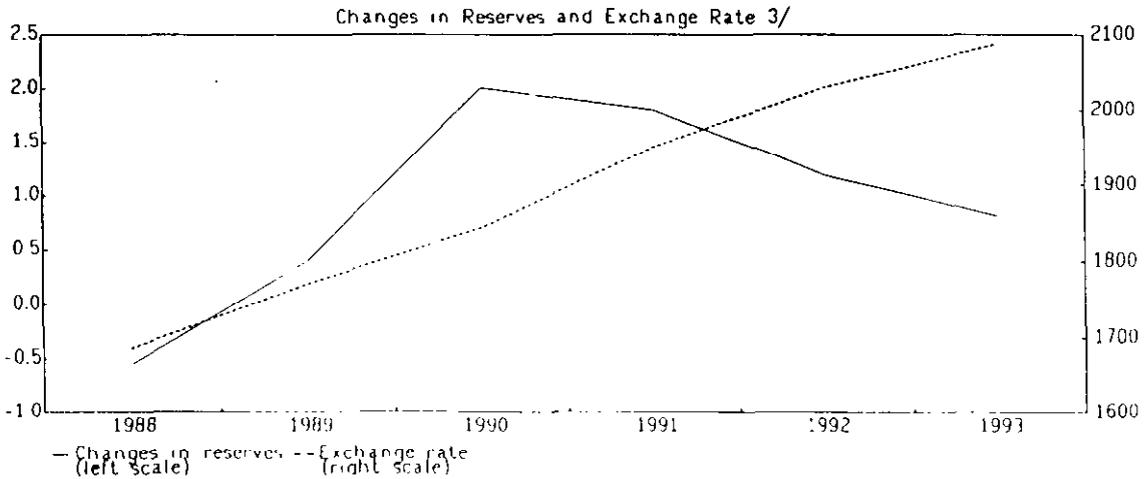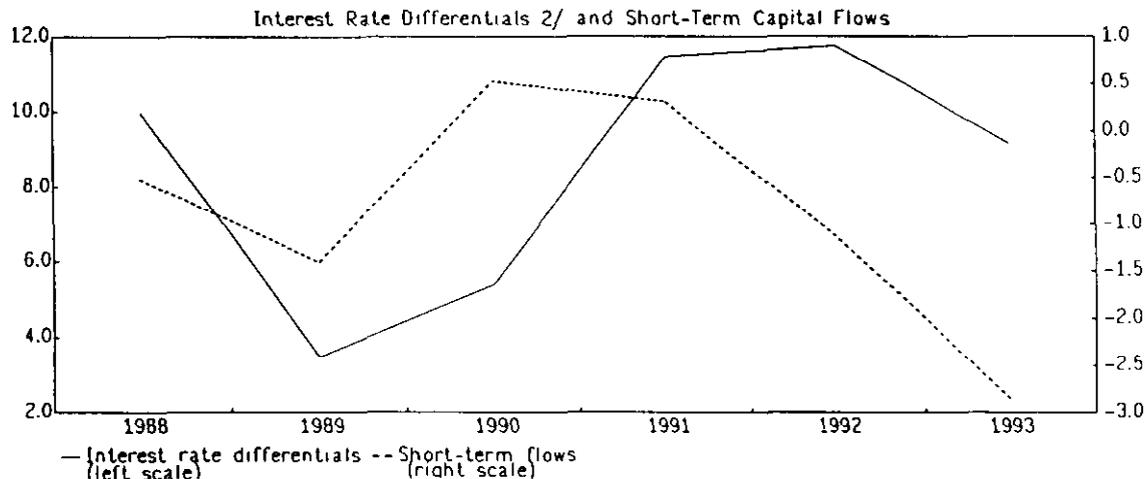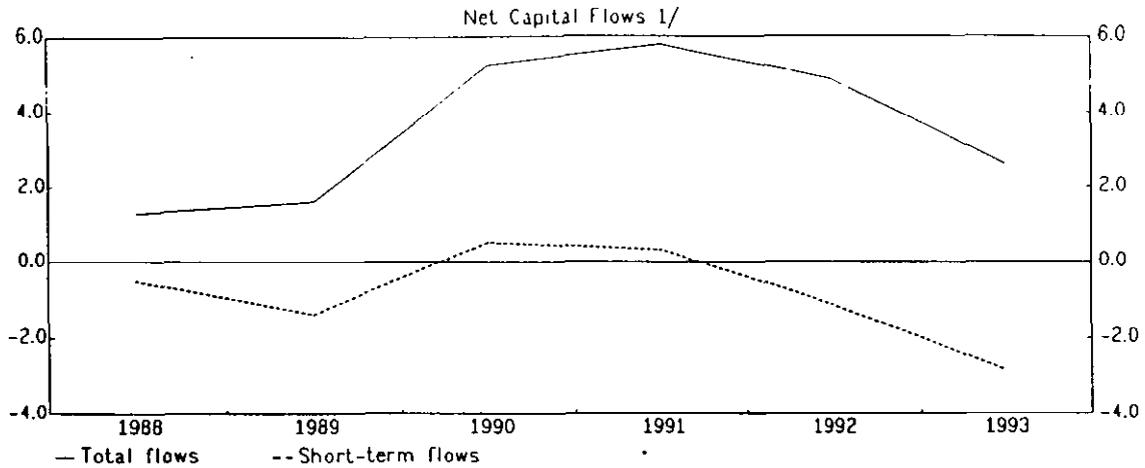
Net Capital Flows 1/

— Total flows   -- Short-term flows

Interest Rate Differentials 2/ and Short-Term Capital Flows

— Interest rate differentials -- Short-term flows
(left scale)   (right scale)

Changes in Reserves and Exchange Rate 3/

— Changes in reserves -- Exchange rate
(left scale)   (right scale)

Sources: International Monetary Fund, Balance of Payments Statistics and International Financial Statistics

1/ In billions of U.S dollars, short-term capital flows include net errors and omissions
2/ In percentage points, measured as domestic deposit rates adjusted for actual exchange rate changes minus the three-month U.S. Treasury bill rate.
3/ Reserves are in billions of U.S. dollars; the exchange rate is expressed in units of domestic currency per U.S. dollar.

CHART 26

MALAYSIA

Capital Flows and Interest Rate Differentials, 1988-93
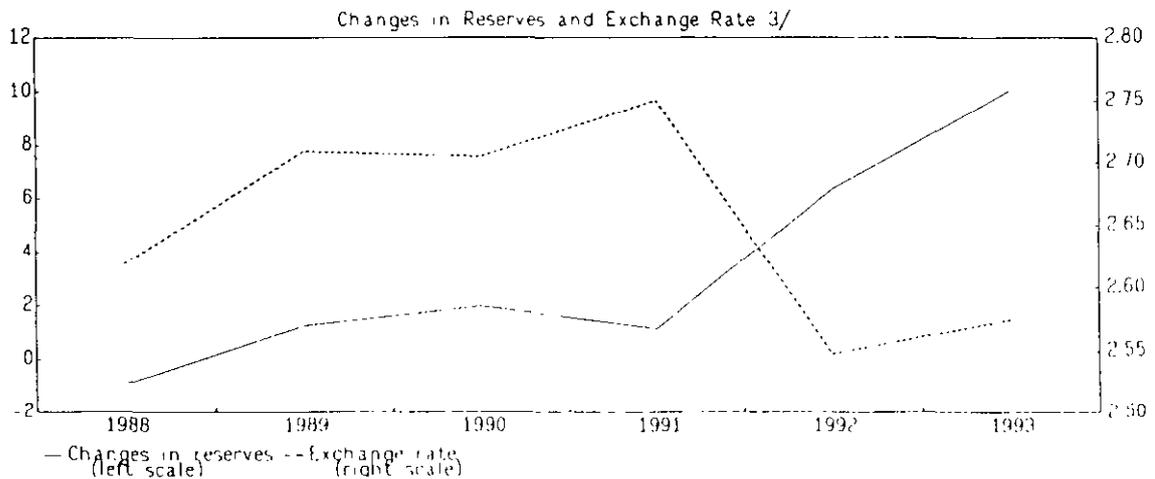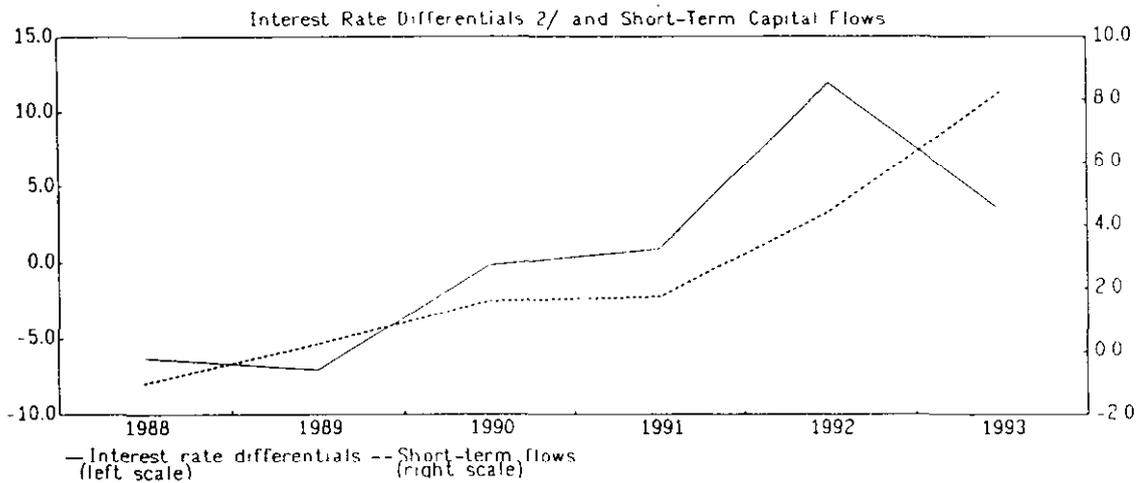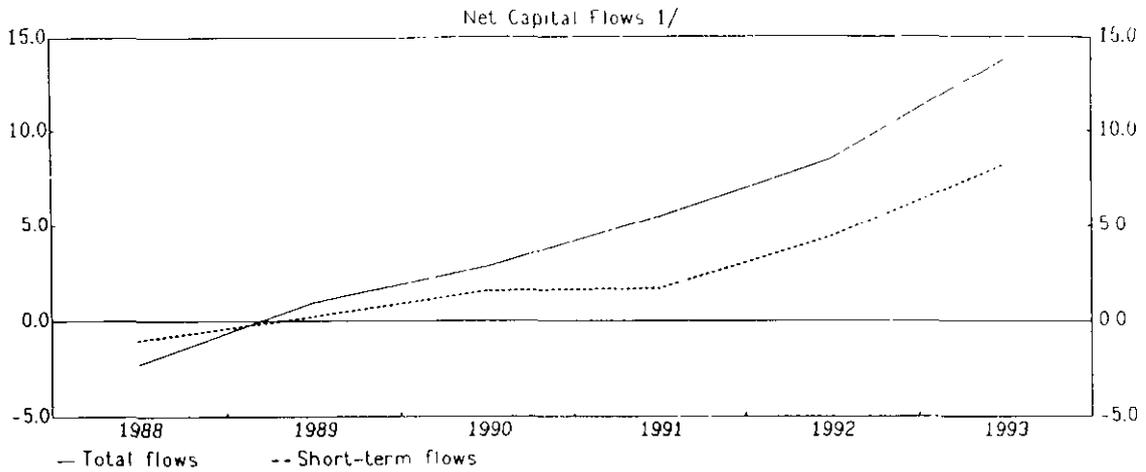
Net Capital Flows 1/

— Total flows   -- Short-term flows

Interest Rate Differentials 2/ and Short-Term Capital Flows

— Interest rate differentials   -- Short-term flows
(left scale)   (right scale)

Changes in Reserves and Exchange Rate 3/

— Changes in reserves   -- Exchange rate
(left scale)   (right scale)

Sources: International Monetary Fund, Balance of Payments Statistics and International Financial Statistics

1/ In billions of U.S. dollars, short-term capital flows include net errors and omissions.
2/ In percentage points, measured as domestic deposit rates adjusted for actual exchange rate changes
minus the three-month U.S. Treasury bill rate
3/ Reserves are in billions of U S dollars; the exchange rate is expressed in units of domestic currency per
U.S. dollar.

CHART 27

THAILAND
Capital Flows and Interest Rate Differentials, 1988-93
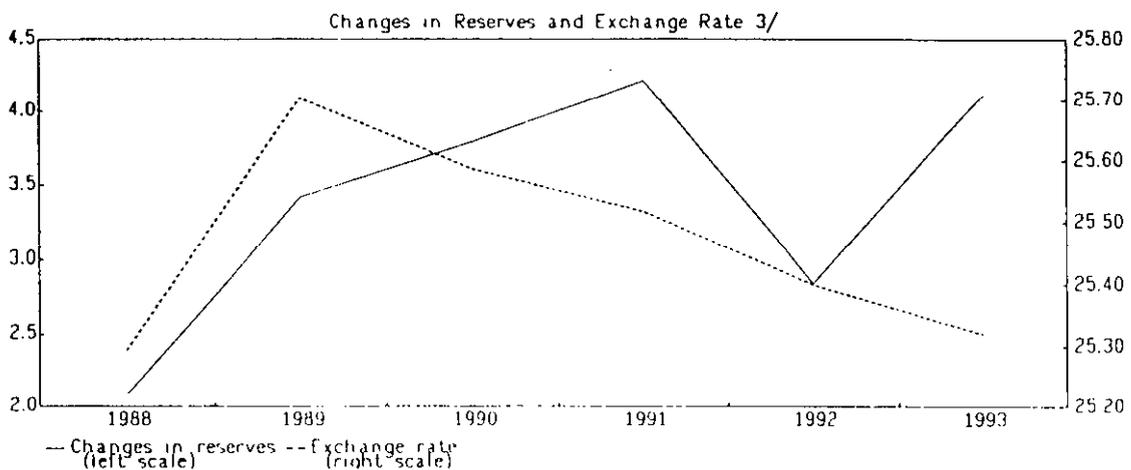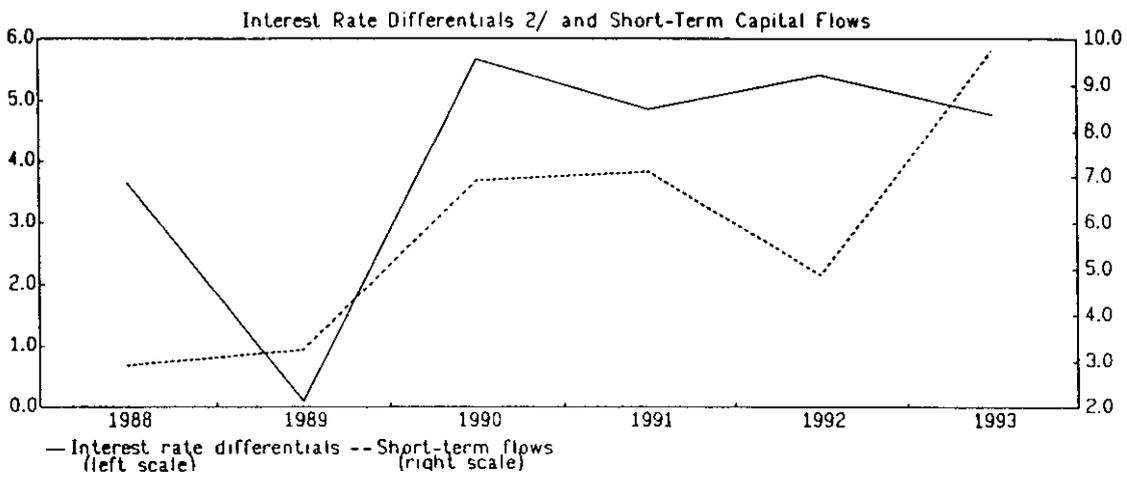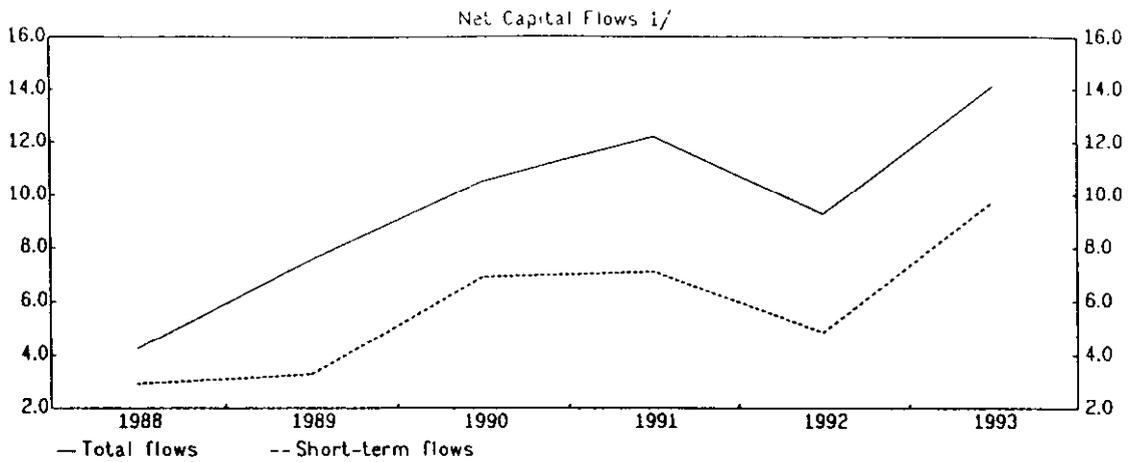
Net Capital Flows 1/

—Total flows   --Short-term flows

Interest Rate Differentials 2/ and Short-Term Capital Flows

—Interest rate differentials --Short-term flows
  (left scale)   (right scale)

Changes in Reserves and Exchange Rate 3/

—Changes in reserves --Exchange rate
  (left scale)   (right scale)

Sources: International Monetary Fund, Balance of Payments Statistics and International Financial Statistics.

1/ In billions of U.S. dollars; short-term capital flows include net errors and omissions.
2/ In percentage points, measured as domestic deposit rates adjusted for actual exchange rate changes minus the three-month U.S. Treasury bill rate.
3/ Reserves are in billions of U.S. dollars; the exchange rate is expressed in units of domestic currency per U.S. dollar.

CHART 28

CHILE

Capital Flows and Interest Rate Differentials, 1988-93
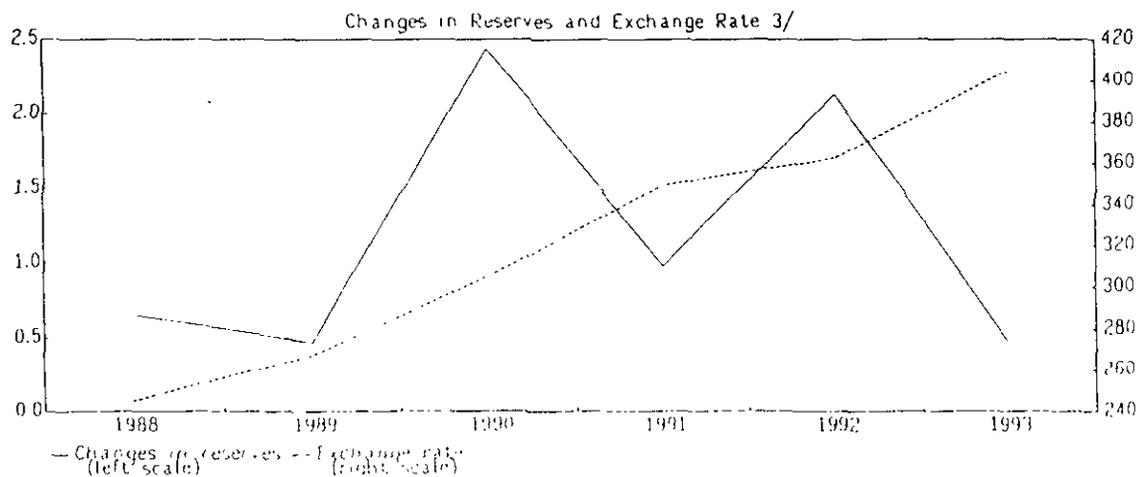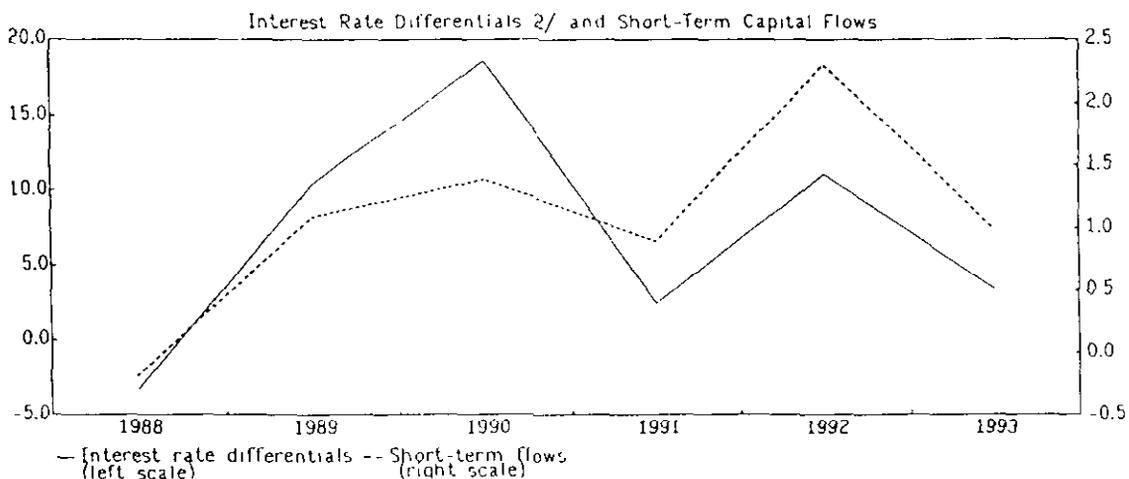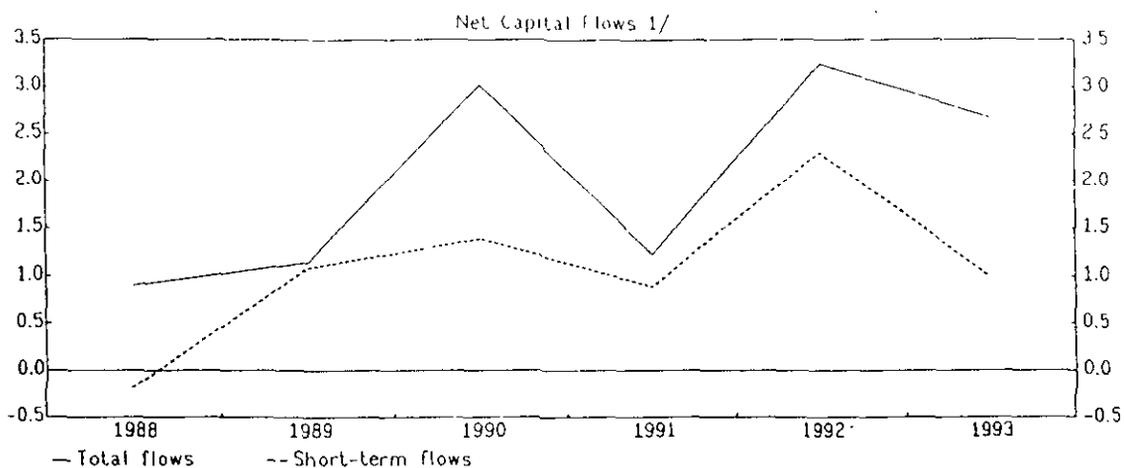
Net Capital Flows 1/

— Total flows   -- Short-term flows

Interest Rate Differentials 2/ and Short-Term Capital Flows

— Interest rate differentials -- Short-term flows
(left scale)   (right scale)

Changes in Reserves and Exchange Rate 3/

— Changes in reserves -- Exchange rate
(left scale)   (right scale)

Sources: International Monetary Fund, Balance of Payments Statistics and International Financial Statistics.

1/ In billions of U.S dollars; short-term capital flows include net errors and omissions
2/ In percentage points, measured as domestic deposit rates adjusted for actual exchange rate changes minus the three-month U.S. Treasury bill rate.
3/ Reserves are in billions of U.S dollars; the exchange rate is expressed in units of domestic currency per U.S dollar

CHART 29

ARGENTINA
Capital Flows and Interest Rate Differentials, 1988-93
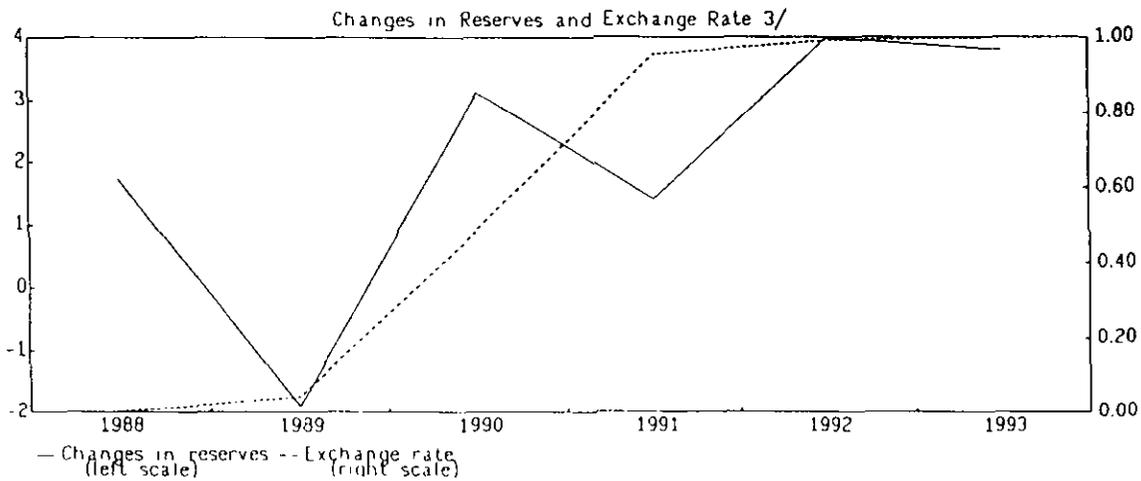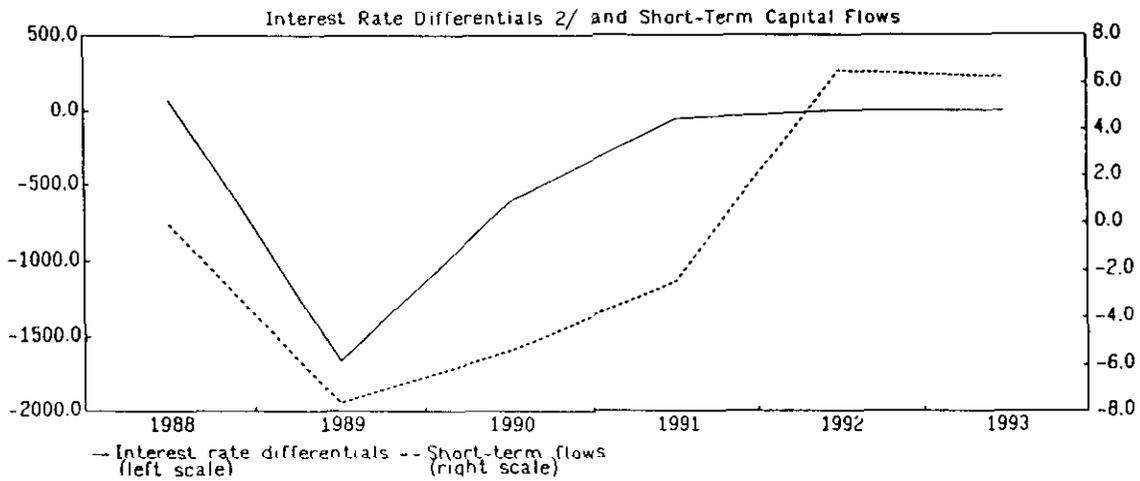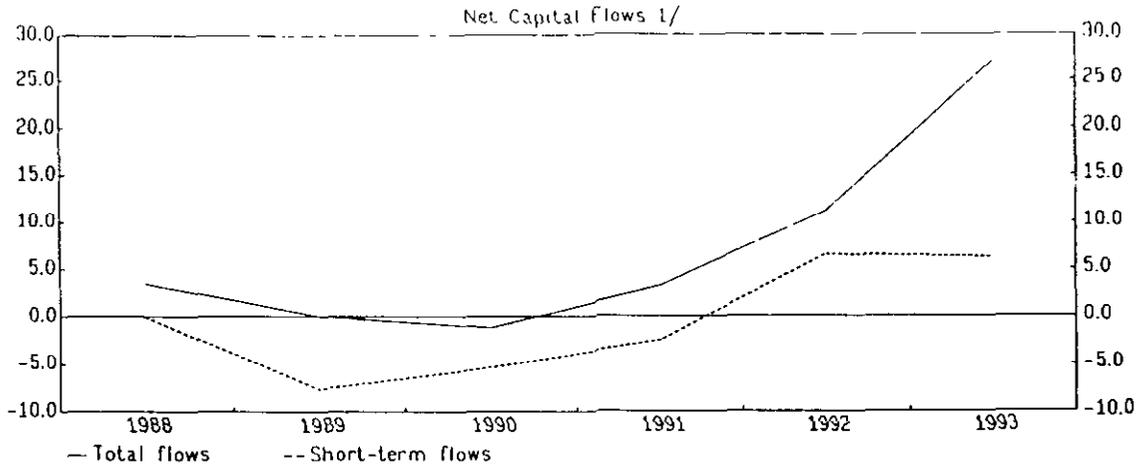
Net Capital Flows 1/

— Total flows   -- Short-term flows

Interest Rate Differentials 2/ and Short-Term Capital Flows

— Interest rate differentials -- Short-term flows
  (left scale)   (right scale)

Changes in Reserves and Exchange Rate 3/

— Changes in reserves -- Exchange rate
  (left scale)   (right scale)

Sources: International Monetary Fund, Balance of Payments Statistics and International Financial Statistics.

1/ In billions of U.S. dollars; short-term capital flows include net errors and omissions.
2/ In percentage points, measured as domestic deposit rates adjusted for actual exchange rate changes minus the three-month U.S. Treasury bill rate.
3/ Reserves are in billions of U.S. dollars; the exchange rate is expressed in units of domestic currency per U.S. dollar.

higher inflation. Third, but related to the previous point, because of a pass-through from the exchange rate to domestic prices, an appreciation may help reduce inflation.

a. Revaluation

If the exchange rate is flexible, an appreciation of the nominal exchange rate in response to capital inflows can occur without any policy action. In contrast, if the exchange rate is set by the authorities (that is, peg, crawling peg, and narrow band), then a realignment decision is the event that triggers an appreciation. Revaluations in fact have been relatively uncommon; sterilized intervention has been the preferred course of action. Chile and Colombia are the two countries of those discussed above in which revaluations have been used. But even in these countries, the realignments were initiated only after it became clear that the inflows were larger than first anticipated. Between April 1991 and June 1991, Chile's exchange rate band was revalued by a cumulative 3.4 percent (Table 22). Larger revaluations followed in January 1992 (5 percent) and November 1994 (9.5 percent) because the exchange rate persistently stuck to the bottom of the band. 1/ In Colombia--where a crawling peg system had been in place for about 25 years 2/--the exchange rate was revalued by 2.6 percent in June 1991. More substantial realignments occurred in 1994 (5 percent and 7 percent in January and December respectively), in the context of a newly established exchange-rate band.

b. Greater exchange rate flexibility

Rather than simply revaluing the exchange rate in response to capital inflows, there are reasons why it is beneficial to allow the exchange rate to fluctuate freely. One reason is that exchange-rate flexibility introduces uncertainty that could discourage some inflows, especially speculative (easily reversible) inflows. Exchange rate uncertainty creates a bias toward domestic assets, dampens the sensitivity of the current account to most types of shocks, and reduces net capital flows. 3/ Indeed, greater exchange rate uncertainty has the same effect as a Tobin-type transaction tax. 4/ Furthermore, in the event of capital outflows, exchange rate flexibility takes pressure off foreign exchange reserves to accommodate the outflows. Finally, exchange rate flexibility grants the monetary authorities a greater degree of independence and permits them to exercise more control over monetary aggregates.

A main disadvantage of exchange rate flexibility is, however, that heavy capital flows could induce abrupt and large movements in the real exchange rate. In turn, this could impose a substantial adjustment burden

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1/ See Budnevich and Cifuentes (1993).
2/ See Carrasquilla (1995).
3/ See Bacchetta and Van Wincoop (1994).
4/ See Chapter VI.

Table 22. Revaluations of the Exchange Rate 1/

<u>Chile (1990)</u>

<u>April 1991</u>
        The band is revalued by 0.7 percent.

<u>May 1991</u>
        The band is revalued by 0.7 percent.

<u>June 1991</u>
        The band is revalued by 2 percent.

<u>January 23, 1992</u>
        The band is revalued by 5 percent.

<u>November 30, 1994</u>
        The band is revalued by 9.5 percent.

<u>Colombia (1991)</u>

<u>June 1991</u>
        Nominal revaluation of 2.6 percent.

<u>January 1994</u>
        The band is revalued by 5 percent.

<u>December 13, 1994</u>
        The band is revalued by 7 percent.

Sources: Banco Central de Chile, <u>Memoria Anual</u> and <u>Evolucion de la Economia</u>, various issues; Carrasquilla (1995); and Schadler, and others (1993).

1/ The year next to the country name denotes the first year of the surge in inflows.

on the economy. Concern with strategic sectors of the economy (for example, the nontraditional export sector) has indeed been a key motivation in many developing countries for not allowing much flexibility in the nominal exchange rate. 1/ Moreover, empirical evidence does suggest that greater real exchange rate volatility may have negative effects on tradable-goods sectors. 2/ One explanation for this finding is that there are incomplete markets to hedge exchange rate fluctuations. Another disadvantage of greater exchange rate flexibility is that it may deter medium-term capital flows, such as foreign direct investment, in addition to deterring the growth of nontraditional exports.

In practice, there is a wide variation in the degree of exchange rate flexibility across capital importing countries. Although some countries (such as Peru and the Philippines) have a float, the common ground is that all central banks intervene in the foreign exchange market to some degree, and *no country has operated a pure float. Among the Asian countries,* Indonesia widened its intervention band twice in 1994 (Table 23) and Malaysia and the Philippines have allowed greater variability of the exchange rate, particularly since 1992 (Table 24). The Korean authorities have stated publicly their intention to further widen the margins for daily exchange rate fluctuations, with the aim of moving toward a free float in *two to three years. 3/ Among the Western Hemisphere countries,* Chile, Mexico, and more recently Colombia, have permitted some exchange rate flexibility because of their operation of exchange rate bands. Both Chile and Mexico widened their bands (Table 23), and in Chile the exchange rate has been allowed to fluctuate considerably within the band. 4/

Despite the fact that many countries have implemented wider bands and therefore presumably greater exchange rate flexibility, the variance of monthly exchange rates has shown little change (see Table 24). The variance of monthly exchange rates in Indonesia, for example, did not change after the band was widened twice in 1994. Similarly, during 1992 and 1993, and most of 1994, the variance of the Mexican peso was small prior to the exchange market turbulence in December 1994--about the same as Argentina's exchange rate variability under the Convertibility plan. In contrast, there was a marked jump in the variance of the exchange rate in Colombia after the introduction of the band in January 1994 and a more moderate increase in exchange rate variability in Malaysia.

1/ Krugman (1987) points out that, if the inflows are temporary and if there are hysteresis effects on exports from the real exchange rate appreciation, then there may be reasons for avoiding or dampening the real exchange rate adjustment.

2/ See, for instance, Grobar (1993).

3/ In the past two years, however, Korea's exchange rate policy has been characterized by massive exchange rate intervention in response to capital inflows.

4/ On various aspects of exchange rate bands in Chile and Mexico, see Helpman, Leiderman, and Bufman (1995).

Table 23. Increasing Exchange Rate Flexibility 1/

Chile (1990)

January 1992
The central parity is revalued by 5 percent and exchange rate band is widened from 10 percent to 20 percent, 10 percent on each side.

July 1992
The exchange rate ceases to be pegged exclusively to the dollar and a peg to a basket of currencies (50 percent dollar, 30 percent deutsche mark, and 20 percent Japanese yen) is introduced.

November 30, 1994
The central parity is revalued by 9.5 percent. The weights of the currency basket are changed to 40 percent dollar, 35 percent deutsche mark, and 25 percent Japanese yen.

Colombia (1991)

January 25, 1994
An exchange rate band is introduced. The width of the band is 15 percent and the rate at which the band is to be devalued is equal to 11 percent per annum.

Indonesia (1990)

January 1994
Intervention band is widened from Rp 10 to Rp 20.

August 1994
Intervention band is widened from Rp 20 to Rp 30.

Malaysia (1989)

mid-1991
Greater degree of flotation allowed.

Mexico (1990)

November 11, 1991
An exchange rate band is introduced. The upper-limit of the band was depreciated at the rate of 20 cents a day and the floor remained fixed. Its total width increased from 1.2 percent in November 1991 to 4.3 percent in December 1992.

October 1992
The rate of crawl of the upper limit is increased to 40 cents per day. The band width reaches 8.7 percent by the end of 1993.

Philippines (1992)

Mid-1992
Foreign exchange intervention is reduced, allowing for a nominal appreciation of the peso.

Sources: Alfiler (1994); Aziz (1994); Carrasquilla (1995); Gurria (1993); Harinowo and Belchere (1994); Helpman, Leiderman, and Bufman (1995); and Schadler, and others (1993).

1/ The year next to the country name denotes the first year of the surge in inflows.

Table 24. Exchange Rate Variability, 1988-94 1/

(Variance of monthly exchange rate changes, in percent)

	Argentina (1991)	Chile (1990)	Colombia (1991)	Mexico (1990)	Indonesia (1990)	Malaysia (1989)	Philippines (1992)	Thailand (1988)
1988	54.18	0.91	0.05	0.56	0.07	0.65	0.21	0.40
1989	12,788.58	2.66	0.01	0.01	0.07	0.80	0.16	0.41
1990	3,768.23	2.22	0.07	0.07	0.03	0.17	6.16	0.27
1991	358.61 2/	1.22	0.05	0.02	0.02	0.76	0.58	0.37
1992	0.06	5.21	0.01	0.40	0.03	2.69	12.38	2.43
1993	0.07	0.76	0.01	0.09	0.02	2.95	6.43	0.15
1994	0.01	0.75	13.95	3.61	0.02	2.63	2.69	0.14

Source: International Monetary Fund, International Financial Statistics.

1/ The years in parentheses indicate the year in which capital inflows began.
2/ Convertibility Plan begins in April 1991.

It is difficult to determine the impact of greater exchange rate variability on short-term capital flows in the cases where the variance changed considerably. In Chile, where short-term flows as a proportion of total flows have declined, there were other impediments to short-term inflows (that is, capital controls). 1/ In Colombia, the composition of flows displays a pattern similar to Chile's, but the introduction of the band coincided with the imposition of a tax on short-term borrowing. Finally, in Malaysia, the effects of increased exchange rate variability may have been offset by the effects of tight monetary policy.

4.   Fiscal policies

A different policy reaction to capital inflows is to tighten fiscal policy. In practice, this could be accomplished by either reducing expenditure, increasing taxes, or both (Table 25). This approach uses fiscal restraint so as to lower aggregate demand and curb the potentially inflationary impact of capital inflows. The manner in which the fiscal gap is closed is likely to determine the macroeconomic consequences of the fiscal policy response. For instance, if government expenditure is more heavily weighted toward non-traded goods than is private expenditure, then a cut in government spending may be more effective than increased taxation for alleviating pressure on the real exchange rate. Furthermore, if consumer credit is readily available--as it typically is during periods of heavy capital inflows--this could offset the reduction in disposable income associated with increased taxation, especially if the tax is perceived as temporary.

A contraction in government expenditure is usually a sensitive political issue and typically can not be undertaken on short notice. Such delays increase the risk that, ex post, the policy is in fact pro-cyclical. One more drawback is that fiscal policy is usually set on the basis of medium- or long-term considerations (for example, infrastructure and social services), rather than in response to what may turn out to be short-term fluctuations in international capital movements. 2/ Finally, there are also important asymmetries in using fiscal policy to deal with fluctuations in international capital flows. In particular, while a fiscal tightening has sometimes been suggested as a means of dealing with inflows, a loosening of fiscal policy would not seem to be a prudent method to deal with outflows. But despite these drawbacks to using fiscal policy in reaction to heavy capital flows, the contribution of fiscal consolidation to the prevention of a liquidity crisis may be substantial. Also, the consequent lowering of interest rates may have a stabilizing effect on capital flows.

1/   See Chapter VI.
2/   See Bercuson and Koenig (1993).

Table 25. Fiscal Austerity Measures 1/

Chile (1990)

1990-94

Moderation of expenditure. Nonfinancial public sector surplus averages 2.5 percent during this period.

Mid-1990

An increase in the value added tax rate to 18 percent. An increase in the corporate tax rate to 15 percent, and an increase in the progressiveness of the personal income tax.

Malaysia (1989)

1992-93

Fiscal consolidation. Real public consumption growth reduces significantly (0.4 percent in 1992). Public sector deficit is reduced to about 1.5 percent of GDP.

Thailand (1988)

1988-91

Moderation of government expenditure. Government budgetary balance (in percent of GDP) swings from *a deficit of 1.4 percent to a surplus of 4.9 percent in 1991.*

1992

Introduction of a value added tax.

Sources: Nijathaworn and Dejthamrong (1994); Schadler, and others (1993); and staff estimates.

1/ The year next to the country name denotes the first year of the surge in inflows.

The clearest example of fiscal restraint as a central policy response to capital inflows occurred in Thailand during 1988-91. 1/ A combination of moderation of government expenditure and a strong cyclical improvement in revenues (real GDP growth averaged 11.3 percent during 1988-91) resulted in changing the government's budgetary balance (as a percent of GDP) from a deficit of 1.4 percent to a surplus of 4.9 percent over the period. However, with significant infrastructure needs, the cost of reductions in government expenditures in Thailand in order to deal with capital inflows could be significant.

Chile, from mid-1990 to the present, has also initiated fiscal restraint through an increase in the value added tax and corporate taxes in conjunction with expenditure restraint. By substantially limiting public consumption, Malaysia also began to downsize its public sector in 1992. In that year, the overall public sector deficit shrank by about 1 percent of GDP to around 1.5 percent of GDP. However, for most of the other capital-importing countries, fiscal policy has not been a key tool in responding to rising capital inflows. Indeed, many of the fiscal austerity measures that were undertaken in a number of developing countries (for example, Argentina, Mexico, and Sri Lanka) in the early 1990s were part of domestic inflation stabilization plans, privatization efforts, and adjustments associated with Fund programs.

5.   Policy mix

A review of the policy response to surges in capital inflows illustrates how individual policies interact either to magnify or reduce the volume of inflows, affect their composition, or alter their macroeconomic consequences. For example, a combination of little or no short-term exchange rate uncertainty (as is the case when there is an implicit or explicit peg), sterilized intervention (which tends to prevent domestic short-term interest rates from converging toward international levels), and no capital controls, is likely to maximize the volume of short-term capital inflows a country receives. This policy mix in conjunction with a substantial stock of government debt characterizes reasonably well the Mexican experience during 1990-93 (Table 26). The pairing of little or no short-term exchange-rate risk with relatively high domestic interest rates favors the short-term investor; the long-term investor always bears some exchange rate risk, even if the currency is not floating. Furthermore, longer-term investments (such as foreign direct investment) tend to be less interest sensitive. It would not be surprising, therefore, to find that this policy mix over the long run would skew the composition of inflows toward short maturities.

It is also possible that sterilized intervention in conjunction with controls on inflows and large central government borrowing requirements will

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1/ See also Schadler and others (1993) and Nijathaworn and Dejthamrong (1994).

Table 26. Policy Mix in Response to the Capital Inflows

Country	Fiscal Adjustment	Revaluation	Increased Exchange Rate Variability	Sterilized Intervention	Controls on Capital Inflows	Liberalization of Capital Outflows	Trade Liberalization Accelerated
Argentina	No 1/	No	No	No	No	No	No
Chile	Yes	Yes	Yes	Yes	Yes	Yes	No
Colombia	No	Yes	Yes	Yes	Yes	Yes	Yes
Indonesia	No	No	No 2/	Yes	Yes	No	No
Malaysia	Yes	No	Yes	Yes	Yes	Yes	Yes
Mexico	No 1/	No	No 2/	Yes	No 4/	Yes	Yes
Philippines	No	No	Yes 3/	Yes	No	Yes	No
Sri Lanka	No 1/	No	No 3/	Yes	No	No	Yes
Thailand	Yes	No	No	Yes	No	Yes	Yes

Sources: Tables in Chapters V and VI.

1/ Fiscal consolidation (including privatization efforts) was a part of the inflation stabilization program and not a response to the rise in capital inflows per se. The Convertibility Plan in Argentina begins in April 1991 while the Mexican plan predates the surge in inflows and begins in December 1987.

2/ Despite announcements of broader intervention bands, exchange rate variability does not change appreciably (see Section 3 of this chapter).

3/ The Philippines and Sri Lanka already had a relatively flexible exchange rate system at the start of the inflow episode.

4/ Caps on foreign currency liabilities of banks are not binding until 1994 (see Chapter VI).

undermine the "individual effectiveness" of these policies. The comparatively high interest rate differentials that usually accompany sterilized intervention and large government borrowing may act as an inducement to circumvent the capital controls (that is, firms and banks may find ways of borrowing offshore). To the extent that they are successful in dodging controls, this tends to offset some of the contractionary effects of the sterilization efforts. Similarly, liberalizing controls on outflows in order to reduce net capital inflows may backfire if domestic interest rates are high relative to international levels, or if it is interpreted as a positive signal of the future policy environment. Indeed, several countries (Chile, Malaysia, and Thailand) liberalized outflows while at the same time engaging in substantive sterilization efforts (see Table 26).

VI. Controls on Capital Flows: The Experience with Quantitative Measures and Capital Flow Taxation 1/

1. Introduction

The measures discussed in the previous chapter are used in most capital-importing countries to reduce the effect of capital flows on the exchange rate. A complementary approach taken in the past has been to employ measures that discourage capital inflows (and outflows) or seek to influence their character. These measures are often generically referred to as "capital controls." In fact, such measures range from prudential controls on the banking system, to market-based measures, all the way to quantitative controls on inflows and outflows. In practice, the usefulness of capital controls hinges on whether they are effective, that is on whether they easily can be circumvented. This is a difficult question to answer because whether or not they are circumvented in practice depends on the types of controls as well as the incentives to evade them. The analysis presented in this chapter suggests that capital controls, if effective at all, appear to be most effective in the short term, and are more effective on inflows than on outflows. This second implication is attributable to the fact that the incentives to evade controls on outflows are generally much greater than for controls on inflows.

The next section summarizes some of the benefits and costs of capital inflows, and reviews the measures taken in this direction during the 1990s by countries experiencing heavy capital inflows. Recent experiences with liberalizing controls on capital outflows as a measure to limit the impact of heavy inflows is also reviewed. The discussion then turns to capital outflows, and addresses the general policy issues regarding the use of controls on capital outflows during a crisis as well as reviews the experiences of selected countries. The subsequent section discusses some of the issues associated with the speed and sequencing of financial-sector and

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1/ Prepared by Carmen Reinhart and R. Todd Smith.

capital-account liberalization. The final section reviews some of the lessons from experiences with capital controls.

2.   <u>Measures to influence capital inflows</u> 1/

   a.   <u>The pros and cons</u>

Greater capital market integration and the associated capital flows can improve economic growth and macroeconomic performance. At the same time, however, capital flows can increase the potential costs of inappropriate domestic policies. Moreover, large capital inflows can pose problems of their own, including an overheated economy, appreciation of the real exchange rate, and an unsustainable current account deficit. On the other hand, large outflows could produce a decline in investment as well as a general recession. Large flows may also complicate the conduct of monetary policy: inflows may cause monetary and credit expansions that conflict with desired inflation objectives, and outflows may lead to high interest rates, placing additional strains on the banking sector. In the past, countries have attempted to avoid the instability associated with large inflows or outflows by first limiting the size of inflows, either through quantitative controls, explicit taxes (for example, a transactions tax), or implicit taxes (for example, a non-interest bearing reserve requirement on foreign borrowing). However, recourse to restricting inflows or outflows with capital controls should be considered within the context of other policies.

If inflows are only temporary, then the motive to implement measures to reduce them may be especially strong. 2/ For instance, the temporary real exchange rate appreciation that often accompanies a rise in capital inflows may have adverse long-lived effects on exports (so-called "hysteresis"). A further motive for restricting inflows exists when the inflows are purely speculative. 3/

With regard to reducing speculative inflows, one proposal that has acquired some recent popularity is the worldwide implementation of a tax on foreign exchange trading or on short-term cross-border bank loans. 4/ The benefits include increased domestic monetary policy autonomy, increased

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1/ It is common to label controls or restrictions on cross-border capital flows as either controls on inflows or outflows, and this convention is used in this chapter. However, many types of controls influence both inflows and outflows. For example, the suspension of convertibility of a currency in order to curtail outflows will make the country less attractive to foreign investors and reduce inflows. Similarly, a liberalization of outflows might increase foreign investor confidence and therefore result in higher net inflows. See Bartolini and Drazen (1994) and Labán and Larraín (1994).

2/ See Krugman (1987).

3/ See Summers (1988).

4/ See Eichengreen, Tobin, and Wyplosz (1995), and "Financial Transactions Taxes," SM/95/100.

costs of speculative attacks on fixed exchange rate regimes and thus a
reduced likelihood of an attack, and a shift in emphasis to longer-term
investments rather than short-term speculative opportunities. This proposal
is a modern vintage of James Tobin's proposal to tax foreign exchange
transactions in order to "throw sand in the wheels of international
finance." Although there are a number of proposals of this sort that differ
by the tax base or tax rate, they all aim to increase the cost of
establishing short positions in foreign currencies, and therefore the cost
of speculative activities. Some countries that have recently implemented
these types of controls are discussed below.

There are a number of practical problems with a "Tobin tax" that may
significantly limit its appeal. 1/ First, to be effective it would
probably need to be adopted worldwide and uniformly; if it were adopted by
just the Group of Ten countries, say, it would likely cause the taxed
activities to shift to untaxed countries. Second, the specific proposal to
penalize cross-border bank loans may not be very effective in restraining
speculative activity if banks do not engage in large position taking. 2/
Third, it is becoming increasingly easy to create synthetic positions in
derivative markets so that taxation of "foreign exchange transactions" is
not a simple matter. Fourth, taxing foreign exchange trading is likely to
remove significant liquidity from these markets.

A more general practical problem with any type of capital control is
provided by the empirical finding that capital controls tend to lose their
effectiveness relatively quickly as individuals find ways of avoiding the
controls. 3/ However, this problem is probably more important for
controls on outflows, because the benefits to foreign investors of gaining
access to one particular country are probably not that large in comparison
to the benefits to a resident of a financially-repressed country of
converting wealth into a foreign currency asset. Indeed, countries that
have controls on outflows often have higher inflation and lower real
interest rates than other countries. 4/

b.   Short-term versus long-term flows: is there much of a difference?

It is currently popular in several countries (which are discussed
below) to promote long-term capital inflows, but to discourage short-term
inflows. The motivation for this policy stems from the fact that long-term
capital inflows take a longer period of time to withdraw from a country.
Therefore, the lower the share of short-term capital in total flows, the
lower the probability of a sudden reversal in capital inflows. Further,
long-term flows, such as foreign direct investment, might be more strongly

1/ See Garber and Taylor (1995).
2/ The experience of Spain during the 1992 ERM crisis highlights the
importance of this point.
3/ See Mathieson and Rojas-Suarez (1993) for a comprehensive review.
4/ See Grilli and Milesi-Ferretti (1995).

guided by medium-term fundamentals and be less sensitive than short-term flows to cyclical fluctuations in domestic or international interest rates. 1/

In addition to the potential reversibility of short-term inflows, there may be other reasons why countries may wish to limit these types of inflows. Notably, a surge in short-term inflows often shows up as an expansion in short-maturity bank deposits; if the domestic banking sector is inefficient or poorly supervised the authorities may want to minimize the role played by banks in intermediating capital flows. In this case, it may be preferable to have a larger share of flows routed through bond and equity markets. 2/

The current practices of several developing countries amount to restricting either the types of external financing of domestic entities or the maturities of external financing. An example of the former approach is restricting the foreign issuance of securities by domestic entities, thereby *encouraging instead direct investment. An example of the latter policy* would be to restrict, say via a tax, short-maturity foreign bond issues or bank loans.

Just as there are practical problems associated with designing capital controls to target only inflows or only outflows, it may be quite difficult to design capital controls that distinguish between short-term and long-term capital flows. Specifically, it is often not clear whether certain brands of capital flows are short term or long term. Standard balance-of-payments classifications--direct investment, portfolio flows, short-term flows, and others--are in general not very informative about the volatility, effective maturity, and liquidity of the flows. Indeed, the distinctiveness of these flows may be significantly less clear than these categories suggest. 3/ Furthermore, it seems likely that even if a set of controls is effective in limiting "short-term" foreign financing, if incentives are strong enough, even flows that are perceived by policymakers to be "long-term" flows may in fact be considerably more liquid. For example, selling direct investments may require time and significant transactions costs, but it is possible to create a "synthetic sale" by obtaining bank loans in the domestic currency that can be initiated rather quickly and with low transactions costs. In addition, to the extent that equity and long-term bonds--and to a much lesser degree, term deposits and bank loans--have reasonably liquid secondary markets, asset sales by foreigners can be expected to require an adjustment in the secondary market, rather than an adjustment in the primary market as is the case when short-term flows dry up. But since large-scale liquidation of "long-term" securities (equity, long-term bonds) positions may well have important spillover effects on primary markets, it is not

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1/ See Edwards (1991).

2/ This point is reinforced by the fact that most countries view stability and solvency of the banking system as a much more important consideration than weakness in equity markets.

3/ See Claessens, Dooley, and Warner (1993).

clear that this sort of policy would be effective precisely at those times when it would be beneficial. Indeed, the sell-off in late 1994 and early 1995 of emerging markets securities has not only reduced securities prices, but it has also sharply contracted issuance activity in primary securities markets by developing countries.

c.   Taxing short-term flows: country experiences in the 1990s

The above discussion suggests that one way to reduce net inflows is the taxation of gross inflows, possibly in the form of a tax that falls more heavily on short-term inflows. This is the type of policy adopted by Chile in 1991 and Colombia in 1993 (Table 27). In both countries, a non-remunerated, reserve-requirement deposit at the central bank was required on firms' liabilities associated with direct borrowing in foreign currency. In Colombia, the reserve requirement is to be maintained for the duration of *the loan and applies to all loans with a maturity of five years or less*, except for trade credit with a maturity of four months or less. The percentage of the requirement declines (at a decreasing rate) as the maturity lengthens; from 140 percent for funds that are 30 days or less to 42.8 percent for five-year funds. In Chile, the tax stems from a nonremunerated 30 percent reserve requirement for a period of one year. 1/ Considering the tax rate for various maturities highlights how such a measure may act as a disincentive to borrow abroad, particularly at short maturities. In principle, these measures affect the household sector, nonfinancial businesses, and the financial sector. In practice, these policies have mainly served as a deterrent to banks from borrowing offshore.

Brazil has also recently implemented a tax on inflows (see Table 27), but with greater variation across assets as well as across maturities than the above policies. 2/ As in Chile and Colombia, the tax on foreign issuance of bonds falls on domestic borrowers. However, some other taxes are paid by foreign lenders in Brazil. Notably, foreigners investing in the stock market until recently had to pay a 1 percent tax, and there is a similar tax to be paid by foreigners on fixed-income investments. 3/ Notice that these taxes fall more heavily on investors that have relatively short horizons and less heavily on longer-term investors. These measures are clearly designed to target the speculative, "hot money" capital inflows.

1/ The taxes in both Chile and Colombia follow a graduated schedule with decreasing tax rates for increasing maturities beginning with a rate of 95 percent and 140 percent for one-month securities in Chile and Colombia respectively, and a rate of 0 percent and 43 percent at a maturity of five years in each respective country.

2/ As capital inflows were reduced in the wake of the Mexican crisis, Brazil eased or eliminated some restrictions on inflows in March 1995.

3/ This was eliminated on March 10, 1995 in order to encourage inflows in the wake of the Mexican crisis.

Table 27. Restrictions on Inflows and Prudential Requirements 1/

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Brazil (1992)

October 1994

A 1 percent tax was imposed on foreign investment in the stock market. Eliminated on March 10, 1995.

The tax on Brazilian companies issuing bonds overseas was raised from 3 percent to 7 percent of the total. Eliminated on March 10, 1995.

The tax paid by foreigners on fixed interest investments in Brazil was raised from 5 percent to 9 percent, and reduced back to 5 percent on March 10, 1995.

The Central Bank raised limits on the amount of dollars that can be bought on foreign exchange markets.

Chile (1990)

June 1991

Nonrenumerated 20 percent reserve requirement to be deposited at the Central Bank for a period of one year on liabilities in foreign currency for direct borrowing by firms.

The stamp tax of 1.2 percent a year (previously paid on domestic currency credits only) was applied to foreign loans as well. This requirement applied to all credits during their first year, with the exception of trade loans.

May 1992

The reserve requirement on liabilities in foreign currency for direct borrowing by firms was raised to 30 percent. Hence, all foreign currency liabilities had a common reserve requirement.

Colombia (1991)

June 1991

A 3 percent withholding tax was imposed on foreign exchange receipts from personal services rendered abroad and other transfers, which could be claimed as credit against income tax liability.

February 1992

Banco de la Republica increased its commission on its cash purchases of foreign exchange from 1.5 percent to 5 percent.

June 1992

Regulation of the entry of foreign currency as payment for services.

September 1993

A nonrenumerated 47 percent reserve requirement to be deposited at the Banco de la Republica on liabilities in foreign currency for direct borrowing by firms. The reserve requirement is to be maintained for the duration of the loan and applies to all loans with a maturity of 18 months or less, except for trade credit.

August 1994

Nonrenumerated reserve requirement to be deposited at the Banco de la Republica on liabilities in foreign currency for direct borrowing by firms. The reserve requirement was to be maintained for the duration of the loan and applied to all loans with a maturity of five years or less, except for trade credit with a maturity of four months or less. The percentage of the requirement declined as the maturity lengthened--from 140 percent for funds that were 30 days or less to 42.8 percent for five-year funds.

Indonesia (1990)

March 1991

Bank Indonesia adopted measures to discourage offshore borrowing. It began to scale down its swap operations by reducing individual banks' limits from 25 percent to 20 percent of capital. The three-month swap premium was raised by 5 percentage points.

October 1991

All state-related offshore commercial borrowing was made subject to prior approval by the Government and annual ceilings were set for new commitments over the next five years.

November 1991

Further measures were taken to discourage offshore borrowing. The limits on banks' net open market foreign exchange positions were tightened by placing a separate limit on off-balance-sheet positions.

Table 27 (concluded). Restrictions on Inflows and Prudential Requirements 1/

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Indonesia (1990) (continued)

November 1991 (continued)
        Bank Indonesia also announced that future swap operations (except for "investment swaps" with
        maturities of more than two years) would be undertaken only at the initiative of Bank Indonesia.

September 1994
        Banks' maximum net open position increased from 20 percent of capital to 25 percent on an
        average weekly basis. Separate limits for individual currencies were no longer applied.

Malaysia (1989)

June 1, 1992
        Limits on nontrade-related swap transactions were imposed on commercial banks.

January 17, 1994 - August 1994
        Banks were subject to a ceiling on their nontrade- or noninvestment-related external liabilities.

January 24, 1994 - August 1994
        Residents were prohibited from selling short-term monetary instruments to nonresidents.

February 2, 1994 - August 1994
        Commercial banks were required to place with Bank Negara the ringgit funds of foreign banking
        institutions (Vostro accounts) held in noninterest bearing accounts. However, in the January-May
        period these accounts were considered part of the eligible liabilities base for the calculation of
        required reserves, resulting in a negative effective interest rate in Vostro balances.

February 23, 1994 - August 1994
        Commercial banks were not allowed to undertake nontrade-related swap and outright forward
        transactions on the bid side with foreign customers.

Mexico (1990)

April 1992
        A regulation that limited foreign currency liabilities of commercial banks to 10 percent of their
        total loan portfolio was passed. Banks had to place 15 percent of these liabilities in highly
        liquid instruments.

Philippines (1992)

July 1994
        Bangko Sentral ng Pilipinas began discouraging forward cover arrangements with nonresident
        financial institutions.

        Central bank approval required for all forward transactions in foreign exchange.

November 1994
        Banks' minimum oversold foreign exchange position reduced from the equivalent of 15 percent
        of unimpaired capital to 5 percent.

        Approvals for foreign loans granted only to cover foreign exchange costs, with the exception
        of exporters and the public sector.

        Liabilities of banks to their head offices counted as unimpaired capital only if converted
        into pesos.

Thailand (1988)

May 1980
        Banks and finance companies' net foreign exchange positions cannot exceed 20 percent of capital.

        Residents were not allowed to hold foreign currency deposits except only for trade-related
        purposes.

April 1990
        Banks and finance companies' net foreign exchange positions limit was raised to 25 percent of
        capital.

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    Sources: Alfiler (1994); Banco Central de Chile (1991 and 1992); Banco de la Republica, Colombia (1993
and 1994); Banco de Mexico (1992); Bank Indonesia, Annual Report, various issues; Bank Negara Malaysia,
Annual Report, various issues; and Conselho Monetario Nacional, Brasil (1994 and 1995).

    1/ The year next to the country name denotes the first year of the surge in inflows.

The main disadvantage of these measures is that flows are likely to be re-routed through other channels. For example, over- or under-invoicing of imports and exports might be used because trade credits are exempt from the tax. 1/ Others have argued that, in the case of Chile, over-invoicing of imports is not likely to be an attractive alternative because imports are taxed at a comparable rate. 2/3/ Indeed, inflows to Chile in 1991 were below those observed in 1990, possibly attesting to the success of this policy. While net inflows increased beginning in 1992, the increases were primarily in foreign direct investment and other long-term flows. A similar pattern emerged in Colombia during 1994, with short-term flows accounting for a declining share of total flows. 4/

d. Prudential limits: country experiences in the 1990s

Capital controls may alternatively be quantitative limits on inflows (see Table 27). Measures implemented have included: prudential limits on, or even prohibition of, nontrade related swap activities, offshore borrowing, and banks' net open-market foreign exchange positions (Indonesia, Malaysia, Philippines, and Thailand); caps on banks' foreign currency liabilities (Mexico); or blanket measures that prohibited domestic residents from selling short-term money-market instruments to foreigners (Malaysia).

In Malaysia, a combination of large domestic-foreign interest rate differentials and widespread expectations of an appreciation of the ringgit during late 1993 led to a surge in short-term capital inflows that led the authorities to impose six measures in order to restrict inflows in January 1994. This response was based on the fact that the inflows were largely associated with short-term bank deposits and were therefore viewed as speculative in nature. 5/ Consequently, most of the measures were directed toward controlling the activities of the financial sector and most were announced as being only temporary--only two of the six measures remain in place.

One of the measures implemented by Malaysia that appears to have been effective was the prohibition of domestic residents from selling short-term money-market instruments to foreigners. The result of this regulation was that maturing Cds could not be rolled over and, therefore, short-term inflows (and monetary aggregates) declined. The combination of abandoning sterilization policies and imposing capital controls were considered to have been successful in reducing domestic interest rates and short-term inflows. However, as with taxation of inflows, as the length of time these kinds of

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1/ See Mathieson and Rojas-Suarez (1993).
2/ See Labán and Larraín (1994).
3/ However, some circumvention of the tax is effected by reclassifying loans as trade-related.
4/ However, total inflows to Colombia continued to increase in 1994.
5/ See Aziz (1994).

policies are kept in place increases, the competitiveness and development of the financial sector may be jeopardized.

Mexico imposed a regulation in April 1992 that limited foreign currency liabilities of commercial banks to 10 percent of their total loan portfolio. However, it is not clear to what extent this measure worked to reduce the size of capital inflows, because banks' total loan portfolios had been expanding rapidly and the initial share of loans in foreign currency was below the 10 percent limit. For example, bank assets in 1992 grew by 41 percent while foreign currency loans grew by 88 percent; a similar pattern emerged in 1993, with foreign currency loans increasing by 50 percent and total loans rising by 25 percent. Indeed, the constraint only appears to have been binding in 1994 when both total and foreign-currency loans rose by 27 percent.

Based on the recent experiences of these selected countries with policies directed toward curbing short-term capital inflows, two conclusions can be drawn. First, reviewing the Chilean and Malaysian experience it appears that these two distinctly different policies were successful in reducing the volume of inflows (at least in the short run) in a relatively brief period of time. If the inflows are largely seen as a temporary phenomenon, such policies could therefore be effective; the longer the inflows persist or the longer the policies remain in place, however, the greater the chances that the controls are less binding and potentially harmful to the financial system. Second, the effect of these policies on the composition of flows (this also applies to Colombia) was in fact the "desired" one of lengthening maturities.

e. Liberalization of capital outflows

A different approach to tempering the impact of large capital inflows is to remove controls on capital outflows. If existing controls are binding, this policy would likely increase outflows and therefore lower net capital inflows. In practice, these policies have usually meant that domestic investors (notably, pension funds) had greater freedom to acquire foreign assets. Chile, Colombia, Malaysia, Mexico, the Philippines, Sri Lanka, and Thailand are among those that have liberalized capital outflows (Table 28).

Reducing barriers to outflows will lower net inflows only if several conditions are satisfied. First, it requires that existing controls on outflows are binding, a proposition that may not be true. 1/ Second, it requires that a greater ability by domestic residents to invest abroad will translate into greater investment abroad. This may not occur if rate-of-return differentials favor the domestic country. Finally, it requires that gross inflows will not be affected in a positive manner by the liberalization announcement. This last condition is probably the most

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1/ See Mathieson and Rojas-Suarez (1993).

Table 28. Liberalization of Outflows 1/

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Chile (1990)

April 1990

New measures liberalizing foreign exchange market operations were brought in. Previously, all
foreign exchange market operations were prohibited unless they were done under Central Bank's
specific authorization. Under new rules, all transactions were permitted unless specifically
restricted by Central Bank.

1991

In a number of steps (February, April, May, and October), commercial banks were permitted to
increase external trade financing and use up to 25 percent of foreign exchange time deposits for
foreign trade financing. Joint venture rules were simplified, and the waiting period for remitting
capital invested in Chile under the debt conversion program was shortened. Procedures for
enterprises to directly invest abroad were modified and made easier. (These types of transactions
were already done through the legal informal market.)

March 1992

Pension funds were allowed to hold a portion of their portfolio in foreign assets (government
bonds, certificates of deposit, and bankers' acceptances). Limit on these investments was
increased gradually to 10 percent of investment portfolio.

Limit on net foreign exchange holdings of commercial banks was doubled. Share of export receipts
exempt from surrender requirements was increased. Allocations of foreign exchange for a variety of
payments abroad (including travel) were raised. Period for advance purchase of foreign exchange
for debt service was extended.

Colombia (1990)

June 1990

Ceiling applicable to foreign currency deposits held by domestic commercial banks was increased to
15 percent (from 8 percent).

October 22, 1991

Foreign investment regime was liberalized (under Resolution 51) to expand existing guarantees and
to ease the way to new investment. Foreign firms were allowed to remit up to 100 percent of net
annual profits.

December 1991

Investors were permitted to buy up to 100 percent of locally listed companies. Restrictions on
capital and income repatriation were abolished.

January 1992

Surrender requirement of export proceeds was eased: all exporters were allowed to retain part of
export proceeds abroad. Previously, this was granted only to coffee growers and to state
enterprises exporting oil and minerals.

Residents were allowed to hold foreign stocks and other foreign portfolio investments abroad up to
$500,000. Higher amounts required approval of the National Planning Department.

February 1992

Minimum maturity on foreign loans was reduced from five years with two years' grace, to one year.
Such loans were permitted only to finance working capital or fixed investment. Limit on
contractual interest rate (LIBOR + 2.5 percent) was eliminated for the private sector.

April 1994

Limits on foreign investments of domestic pension funds, insurance companies, and mutual funds were
raised from 3 percent to 4 percent.

The share of export proceeds subject to surrender requirements was reduced from 90 percent to
85 percent and the period of surrender of foreign exchange was extended from 150 days to 180 days.

October 1994

The share of export proceeds subject to surrender requirements was further reduced from 85 percent
to 80 percent.

Malaysia (1989)

August 1993

The minimum amount of equity that must be held by an indigenous Malay group, company or institution
was lowered from 51 percent to 35 percent.

Table 28 (concluded). Liberalization of Outflows 1/

Mexico (1990)

November 1991

Foreign exchange surrender requirements and related exchange control measures were abolished, permitting unification of controlled and free market exchange rates.

Philippines (1992)

July 1994

Bangko Sentral ng Pilipinas raised the limit on outward investments sourced from the banking system from $1 million to $3 million.

Restrictions on repatriation of investments (and earning accruing therefrom) funded by debt-to-equity conversions under the old debt restructuring program were lifted.

Sri Lanka (1990)

1993

Limits on foreign currency working balances of commercial banks were removed.

February 1994

Reserve ratio was lowered on foreign currency deposits to the extent that the funds were invested abroad.

Thailand (1988)

April 1991

Foreign exchange earners were allowed to open foreign exchange accounts with commercial banks in Thailand up to $500,000 for individuals and $2 million for corporations. Thai investors could freely transfer up to $5 million abroad for direct investment. Bank of Thailand approval requirement of repatriation of investment funds was eliminated.

February 1994

The amount of Thai baht that could be taken out to Viet Nam and bordering countries was raised to B 500,000.

The ceiling on the amount of foreign exchange that could be taken abroad for travelling expenses was eliminated (the previous ceiling was $20,000).

Sources: Alfiler (1994); Banco de la Republica, Annual Report, various issues; Bank Negara Malaysia, Annual Report, various issues; Gonzalez (1995); Hettiarachchi and Herat (1994); Labán and Larraín (1994); Nijathaworn and Dejthamrong (1994); and Schadler, and others (1993).

1/ The year next to the country name denotes the first year of the surge in inflows.

tenuous. Specifically, both economic theory and insights based on the evidence from a number of well-documented country cases show that liberalization of outflows has actually induced heavier inflows. Examples include: Italy and New Zealand in 1984, Spain in 1986, Yugoslavia in 1990, and Chile in 1990s. 1/ The reason for this is that lifting restrictions on capital outflows appears to send a positive signal that increases the confidence of foreign investors and further stimulates capital inflows. 2/ In addition, the effectiveness of this policy may be further jeopardized if domestic interest rates are being kept high relative to international levels (say by sterilization polices). 3/ Certainly, stock market returns (in dollars) during 1990-93 for several of the countries that liberalized (including Chile, Colombia, Malaysia, Mexico, and Thailand) far exceeded the returns available in major industrial countries.

3. Controls on capital outflows

There are a number of reasons why controls on capital outflows (for example, a tax on purchases of foreign assets) may exacerbate problems in the financial sector and worsen a crisis. Paralleling the discussion above, a failure to remove controls on outflows or the imposition of new controls may send an adverse signal about the future ability to move capital out of the country. In addition, foreign investors might require a higher risk premium on their investment in order to compensate them for the implicit tax resulting from controls. Further, a tax on residents' holdings of foreign assets may result in a transitory trade deficit (or a widening of the existing one) as agents shift to domestic assets. 4/ However, a large number of countries have imposed controls on capital outflows, and it is therefore useful to study more closely the types of controls imposed and whether they were effective.

a. Issues in using capital controls to slow a crisis

Although controls on capital outflows may be effective in delaying a balance-of-payments crisis, the length of the delay is not obvious. On the one hand, restrictions that slow inflows of capital may prevent a crisis from occurring in the first place if the swing in the capital account is reduced by the controls. On the other hand, on the eve of a balance-of-payments crisis, the implementation of controls on outflows seems extremely unlikely to avert a crisis, and the amount of time that is bought is likely to be only a few months, and possibly less. However, it is difficult to determine precisely the benefits of controls on outflows during a crisis. The extent of the benefits depends on the types of controls imposed, how easily they are circumvented, the effect of leakage through the controls,

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1/ See Bartolini and Drazen (1994) and Labán and Larraín (1994).
2/ See Bartolini and Drazen (1994).
3/ See Chapter V.
4/ See Reinhart (1991).

and how divergent are actual policies from what market participants perceive to be "equilibrium" policies.

There may be important adverse consequences of capital controls from a policymaker's perspective. Chief among these is the effect of the temporary imposition of controls on foreign investors' preferences for investing in the domestic economy in the future. In addition, introducing temporary capital controls can have important effects during relatively normal times, even if they do not affect the ability to repatriate capital. Specifically, a rise in the perceived probability that capital controls will be imposed at any future moment could itself spark a run on a currency, even though one would not have occurred had this probability been much lower. 1/ But notice that this then may introduce a time-inconsistency problem: if it is expected that controls on outflows will be implemented with high probability, then this could spark a run sooner, which could lead to controls being implemented sooner, leading to a possibly worst-case equilibrium. The implication is that if the authorities implement controls on capital outflows when a crisis appears imminent, then this results in an additional component of uncertainty for foreign investors which may be central to speculative outflows. If this effect is important, then it leaves as options either not imposing controls or implementing preemptive controls on capital inflows--that is, controls on capital inflows before a crisis has occurred.

b.   Evidence from the ERM crisis

The ERM crisis in the Summer and Fall of 1992 provides a recent experiment for examining the role of capital controls in the aftermath of a sudden reversal of capital flows. After experiencing a wave of capital outflows, the authorities in Ireland, Portugal, and Spain relied on capital controls to slow speculative runs against their foreign exchange reserves. Of these three countries only Spain implemented new controls, while Portugal and Ireland tightened existing ones (Table 29). Although there were differences in the types of controls implemented, all three countries generally sought to restrict speculative portfolios--short positions in the domestic currency and long positions in foreign currency--much like the sand-in-the-wheels taxes discussed above are supposed to.

Since a run on a currency affects directly a central bank's foreign exchange reserves, an obvious way to measure the impact of imposing controls is to study the behavior of reserves around the time that the controls were imposed. Of course, reserves may not tell the whole story if central banks tap lines of credit. Although it is impossible to know what would have happened to reserves in the absence of the controls, it appears that during the ERM crisis those countries that implemented controls did not significantly reduce the pressure on their stock of reserves (Chart 30). Indeed, if one takes into account the fact that lines of credit were tapped

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1/   See, for example, Dellas and Stockman (1993).

Chart 30. Foreign Exchange Reserves, Jan. 1991-Dec. 93

(In billions of U.S. dollars)
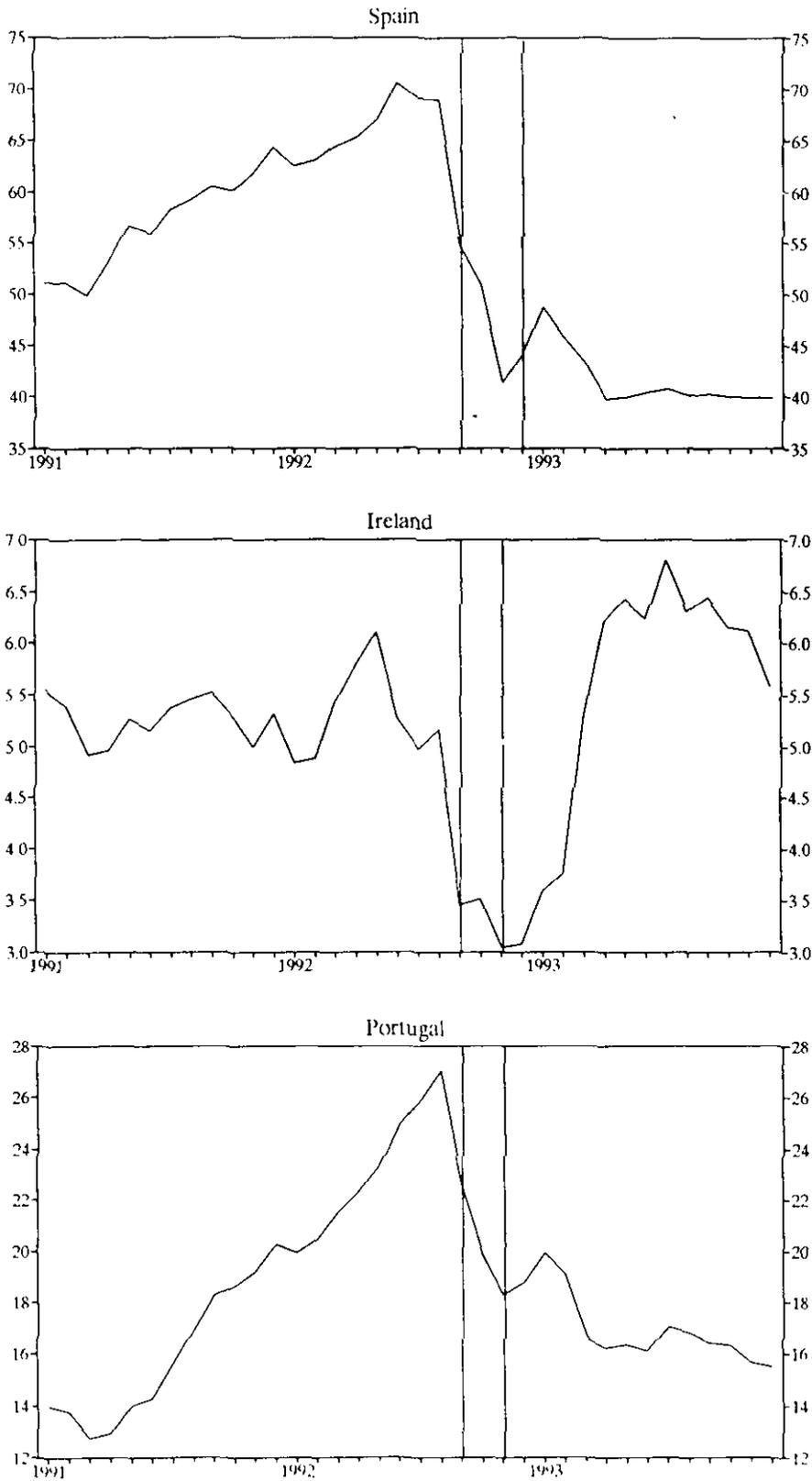
Spain

Ireland

Portugal

-
-

Table 29. Use of Capital Controls to Defend Currencies
During the ERM Crisis

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Ireland

September 1992

No new capital or foreign exchange controls were introduced; enforcement of existing controls
tightened. Controls included: (i) all credits to nonresident Irish-pound-denominated accounts in
excess of £250,000 must be reported to the Central Bank unless the credit was trade related;
(ii) residents were not allowed to make financial loans in Irish pounds for periods of less than
one year to nonresidents without the permission of the Central Bank; (iii) foreign-currency
accounts were available to residents with some restrictions. One such restriction was that
deposits made with funds converted from Irish pounds must be for a fixed term of three months; (iv)
forward foreign exchange transactions in Irish pounds for speculative purposes were prohibited.
The minimum maturity of allowable forward transactions was 21 days; and (v) on September 24, 1992
the delegated approval system for swap transactions was suspended. Henceforth, swaps required
Central Bank approval.

January 1, 1993

All controls were eliminated.

Portugal

September 1992

No new capital or foreign exchange controls were introduced; enforcement of existing controls
tightened. Controls included: (i) commercial banks were obligated to get approval from the Banco
de Portugal for foreign currency exposures. Whereas formerly such approval was generally
forthcoming, in September, the Banco de Portugal withheld approval; and (ii) among other existing
restrictions were prohibitions on the acquisitions of money market instruments by nonresidents,
short-term escudo-denominated lending to nonresidents, and forward foreign exchange transactions.

December 16, 1992

Controls were lifted.

Spain

September 24, 1992

A compulsory one-year, noninterest bearing deposit to be held at the Bank of Spain was introduced
against the increments from the September 22 level of long positions taken against the peseta in
foreign exchange markets and in peseta-denominated lending to nonresidents.

The reserve requirement ratio on the increases in peseta-denominated liabilities of domestic credit
entities (national or foreign) with their branches, subsidiaries, or parent companies abroad was.
raised to 100 percent.

October 5, 1992

The above controls were removed, and replaced by a compulsory noninterest bearing deposit, to be
held by commercial and savings banks or the Bank of Spain, against the increase in peseta lending
to nonresidents through swaps on foreign exchange markets.

November 22, 1992

Controls were removed.

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Sources: International Monetary Fund, Exchange Arrangements and Exchange Restrictions, various issues;
and Country authorities.

heavily during the crisis, reserve losses understate actual dollar losses. At best, the controls may have temporarily slowed the rate of contraction of reserves. Moreover, all three countries eventually devalued their currencies--the Spanish peseta and Portuguese escudo were devalued by 6 percent on November 23, 1992 and the Irish pound by 10 percent on January 30, 1993. It is noteworthy that in the case of Spain and Portugal, the currencies were devalued roughly a month after the controls were implemented or strengthened, whereas in the case of Ireland the devaluation occurred four months later.

Another way of gauging the effectiveness of controls is to study the spreads between onshore and offshore interest rates. Specifically, if controls are effective in limiting outflows of capital then this effectiveness should be reflected in the extent to which a domestic interest rate is lower than the comparable eurocurrency rate. That is, the more costly it is to penetrate capital controls, the lower should be the required return on domestic deposits. 1/ If controls are effective in limiting domestic interest rates, then they may be of considerable value in such circumstances since the costs associated with high domestic interest rates (for example, from stress on the banking system) may be avoided to a large degree relative to a pure interest rate defense of a currency.

The evidence suggests that the effectiveness of the controls varied widely across time, countries, and types of controls (Chart 31). 2/ The evolution of onshore-offshore spreads also suggests that the Portuguese controls were more effective than the Spanish controls, a belief that seems to have been widely held during the crisis. In addition, it has been shown that domestic interest rates in several Scandinavian countries during the ERM crisis were actually considerably higher than the corresponding eurodeposit rates, which may reflect a credit risk premium for the domestic banking system. 3/

One problem with Tobin-type transactions taxes is that the incidence of the tax falls on all traders and not just speculators. The question arises as to whether it is feasible to structure the policy to target only speculators. Although the answer to this question will in general depend on the specific policy measure, during the ERM crisis, France had some success with tailoring a policy in this manner. Specifically, as the attack against the franc gathered momentum, the French authorities increased interest rates in an attempt to squeeze speculators. However, to offset the adverse effects of higher interest rates on nonspeculative behavior, banks with

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1/ Grilli and Milesi-Ferretti (1995) find evidence for industrial and developing countries that real interest rates tend to be lower in the countries which had capital controls in place relative to those which had liberal capital accounts.

2/ The unavailability of data for Ireland precludes studying interest rate spreads in that case.

3/ See Fieleke (1994).

Chart 31. Onshore and Offshore Deposit Rates, May 1992-April 1993
(In percent)

Portuguese Escudo

Spanish Peseta
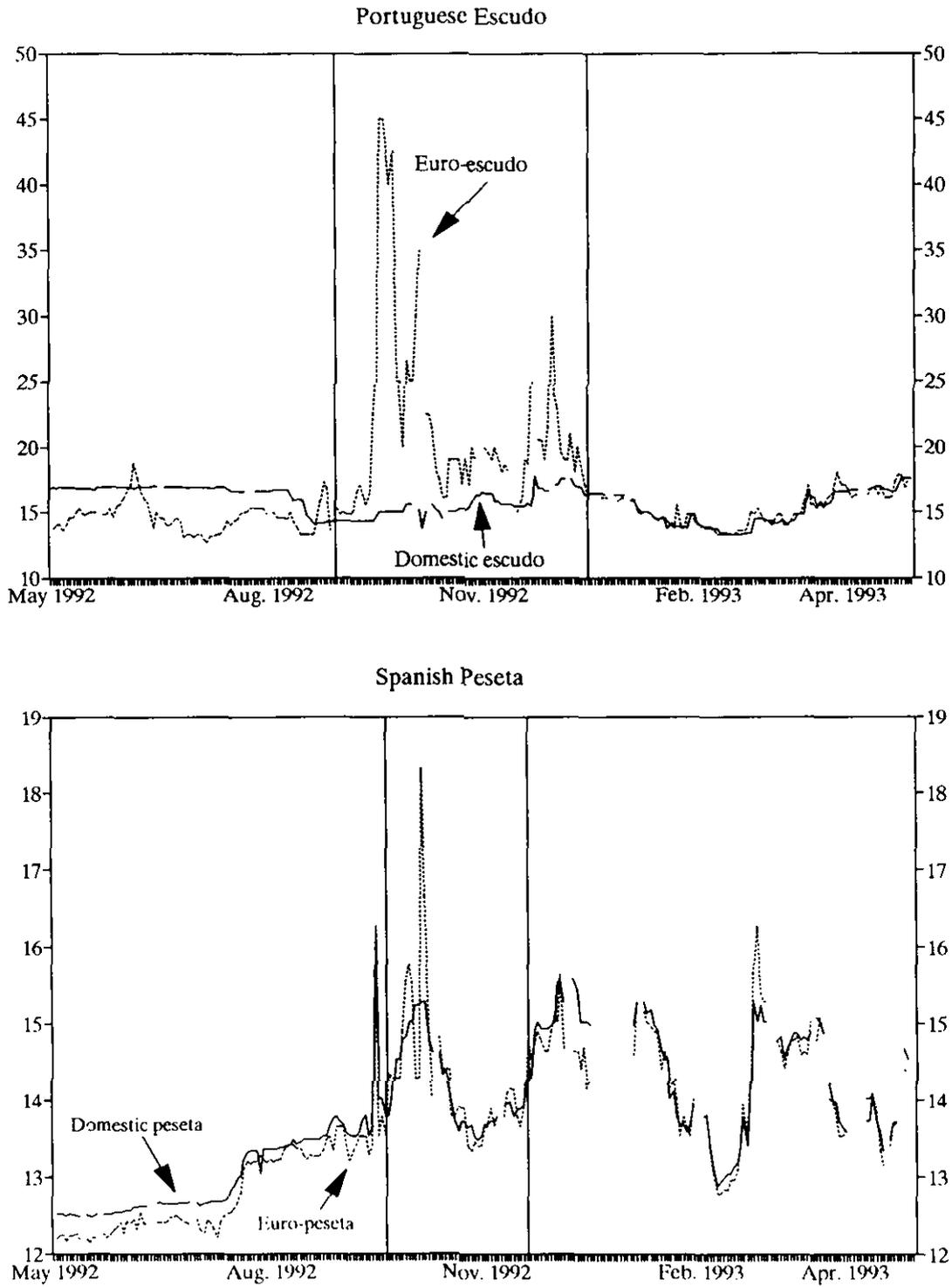
Source: Bloomberg Financial Markets.

normal commercial requirements received relatively cheap funding that could be passed through to customers, and therefore avoid a rise in the base rate. The effect was that many regular customers could obtain near normal rates, while others had to pay higher rates. In contrast to the measures imposed by some of the other ERM countries discussed above, the French distinguished lending not by nationality of the borrower but by class of borrower. However, this is clearly a tactic that can only be used as a very short-term instrument of crisis management, since going beyond that could severely strain the banking system and introduce inefficiencies into the allocation of credit. 1/

c. Evidence from the 1982 debt crisis

The developing country debt crisis in the early 1980s provides a second natural experiment to study experiences with capital controls. Argentina, Mexico, and Venezuela are among the developing countries that implemented controls on outflows during this period. The details of the controls implemented in these cases varied widely, and the array of controls was often quite complex for many countries (Table 30).

It is difficult in this case also to draw firm conclusions from studying the behavior of foreign exchange reserves (Chart 32). Reserves continued their slide for several months after controls were implemented in Mexico, whereas they rebounded in the cases of Argentina and Venezuela. Because of data limitations, it is not possible to examine onshore-offshore interest rate differentials for these countries for that time period. However, the behavior of interest rates denominated in the domestic currency and in U.S. dollars does suggest some reprieve from speculative pressures (Chart 33). Specifically, interest rate spreads declined despite rising risk premia, at least in the short run; drawing longer-run conclusions is difficult without having a useful benchmark interest rate (Table 31).

4. Sequencing issues

There is a general consensus in the literature on sequencing of economic reform that the capital account should be liberalized last. 2/ If the domestic financial system has not been liberalized, and there are interest-rate controls and financial repression, then liberalizing the capital account will result in heavy capital outflows. Even if interest-rate controls were removed and domestic interest rates were above world levels, if credit allocation does not adequately reflect economic fundamentals--say, because there is mispricing of risk or directed credits-- the capital inflows induced by the capital-account liberalization may lead

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1/ See International Monetary Fund (1993) for further discussion of the tactics adopted by various countries during the ERM crisis.
2/ See, for instance, Edwards (1984), McKinnon (1991), and Mathieson and Rojas-Suarez (1993).

Table 30. Controls on Capital Outflows During the Debt Crisis

Argentina

April 5, 1982

Sales of foreign exchange were prohibited except for imports and for principal repayments and interest payments on foreign loans.

April 20, 1982

The right to transfer profits and to repatriate investments under Argentina's foreign investment regulations was suspended. Henceforth, foreign obligations arising from profits, dividends, royalties, and technical assistance could only be paid with U.S. dollar-denominated bonds issued by the Government of Argentina (BONEX bonds) Access to foreign exchange (at the official rate) was restored for these purposes on August 15, 1993.

April 30, 1982

Foreign exchange transactions and transactions abroad without the prior consent of the Central Bank were banned. Requirement lifted July 5, 1982 for imports and for principal repayments and interest payments on foreign loans.

August 2, 1982

Forward transactions were authorized only for imports and exports of goods and with a 180-day limit on maturity.

October 5, 1983

All foreign currency term deposits maturing through December 4. 1983 should be extended for 60 days, and all foreign currency demand deposits were frozen until December 4, 1983.

Mexico

August 5, 1982

Commercial banks were required to surrender to the Bank of Mexico their net foreign exchange holdings, including gold and silver.

August 13, 1982

Foreign currency deposits with Mexican banks were required to be converted into pesos at maturity and at a pre-determined exchange rate. The foreign exchange market was closed. The foreign exchange market was reopened on August 19, 1982 and banks were authorized to deal foreign currencies at a free market rate.

September 1, 1982

By Presidential decree, additional exchange controls were imposed. All foreign exchange transactions were made subject to control, with the Bank of Mexico (and its designated agents) being the only authorized foreign exchange supplier. A 5,000 peso limit was imposed on imports or exports of domestic currency, and limits were placed on amount of foreign currency that could be taken out of Mexico on person depending on the nature of the trip. Exports of gold and silver required authorization. Deposits and loans of Mexican banks could not be denominated in foreign currency, with minor exceptions.

September 20, 1982

Issuance of payments and other transactions in pesos abroad by Mexican credit institutions was prohibited.

October 11, 1982

Profit and royalty remittances associated with foreign direct investment in Mexico were limited to 15 percent of equity, subject to foreign exchange availability.

October 22, 1982

Beginning November 1, 1982, repayment of foreign currency deposits held by foreign banks in local Mexican credit institutions was limited to monthly amounts not exceeding one-sixth of the total amount outstanding on November 1, 1982.

December 1, 1982

Establishment of a controlled market and a free market for foreign exchange. Individual transactions in the free market were limited to $1,000 a person per transaction and $5,000 an enterprise per transaction.

December 17, 1982

Banks were restricted in forward exchange market, and short- or long-positions in foreign currency were limited to 10 percent of total capital and reserves.

Table 30 (concluded). Controls on Capital Outflows During the Debt Crisis

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Mexico (continued)

December 20, 1982
    Gold and silver markets were reopened.

Venezuela

February 20, 1983
    Foreign exchange market was closed; it remained closed until March 4, 1983.

February 22, 1983
    Suspension of free convertibility of the domestic currency and establishment of a multiple exchange
    rate system. Foreign exchange surrender requirements were imposed on some firms.

February 28, 1983
    Only firms of mixed or Venezuelan ownership were given access to the preferential exchange rate.

March 26, 1983
    Irrespective of debt rescheduling agreements, authorities would only authorize amortization
    payments for one third of principal starting from 1984 subject to the availability of foreign
    exchange.

Source: International Monetary Fund, Exchange Arrangements and Exchange Restrictions, various issues.

Table 31.   Argentina: Interest Rates and Country Risk, 1981-85

Period		Interest Rate on BONEX (a)	180-day LIBOR Rate (b)	Implied Country Risk Premium (a)-(b)
1981	III	20.30	18.71	1.59
	IV	18.38	14.66	3.72
1982	I	18.41	15.33	3.08
	II	16.62	15.14	1.48
	III	23.88	12.85	11.03 1/
	IV	20.14	9.96	10.18
1983	I	15.48	9.50	5.98
	II	15.04	9.67	5.37
	III	23.27	10.44	12.83 2/
	IV	22.22	9.79	12.43
1984	I	21.34	10.52	10.82
	II	30.76	12.44	18.32
	III	23.01	12.12	10.89
	IV	19.11	9.73	9.38
1985	I	18.70	9.52	9.18
	II	20.73	8.46	12.27

Sources: Fanelli and Damill (1993); and staff calculations.

1/   Capital controls were imposed.
2/   Capital controls were strengthened.

Chart 32. Foreign Exchange Reserves, Jan. 1981-Dec. 84

(In billions of U.S. dollars)

Argentina, 1981-83

Controls imposed

Mexico, 1981-83

Controls imposed

Venezuela, 1982-84

Controls imposed

Controls strengthened
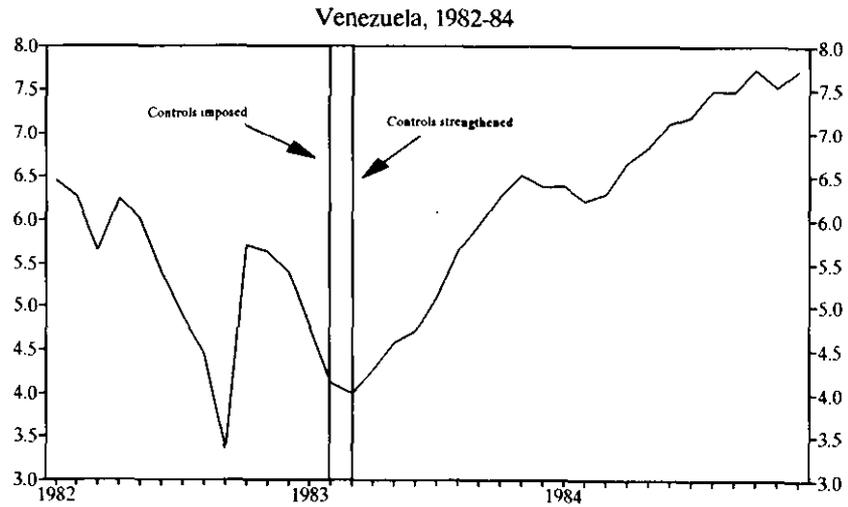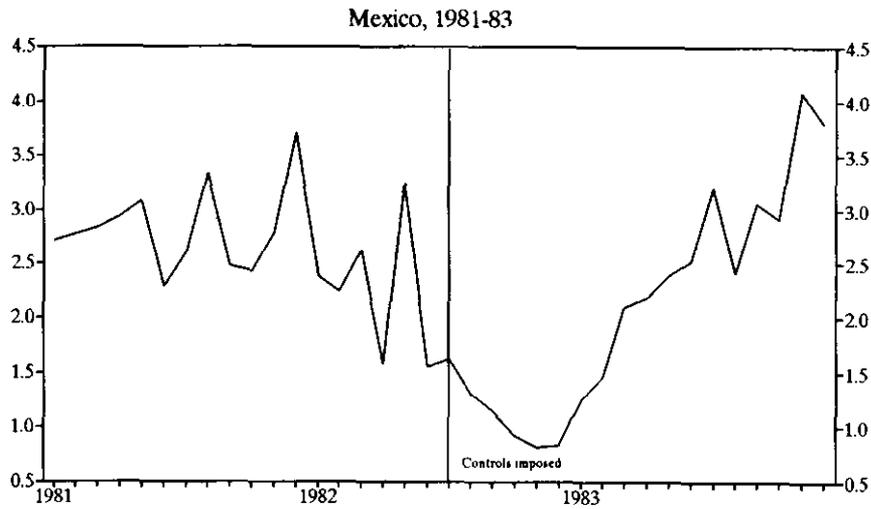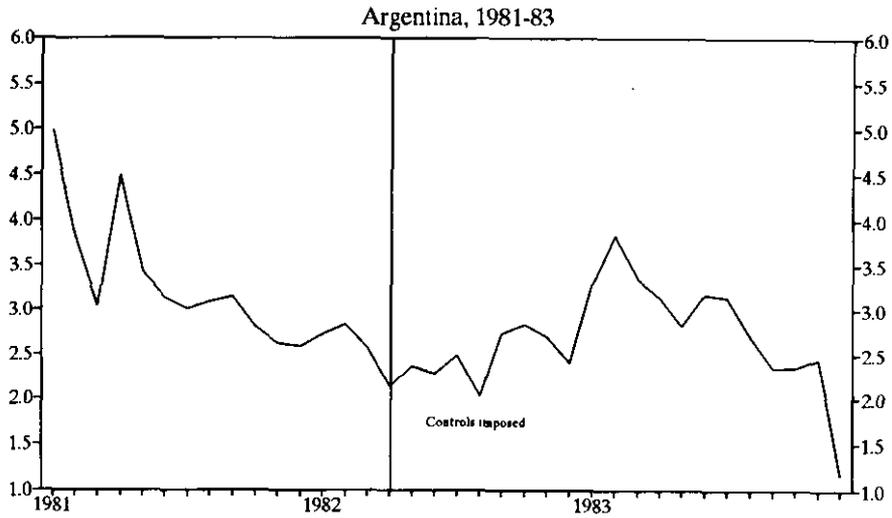
Source: International Monetary Fund, International Financial Statistics.

Chart 33. Deposit Rate Spreads, 1981-83

(Domestic currency/U.S. dollar)

Mexico/United States

Controls imposed

Argentina/United States

Controls imposed
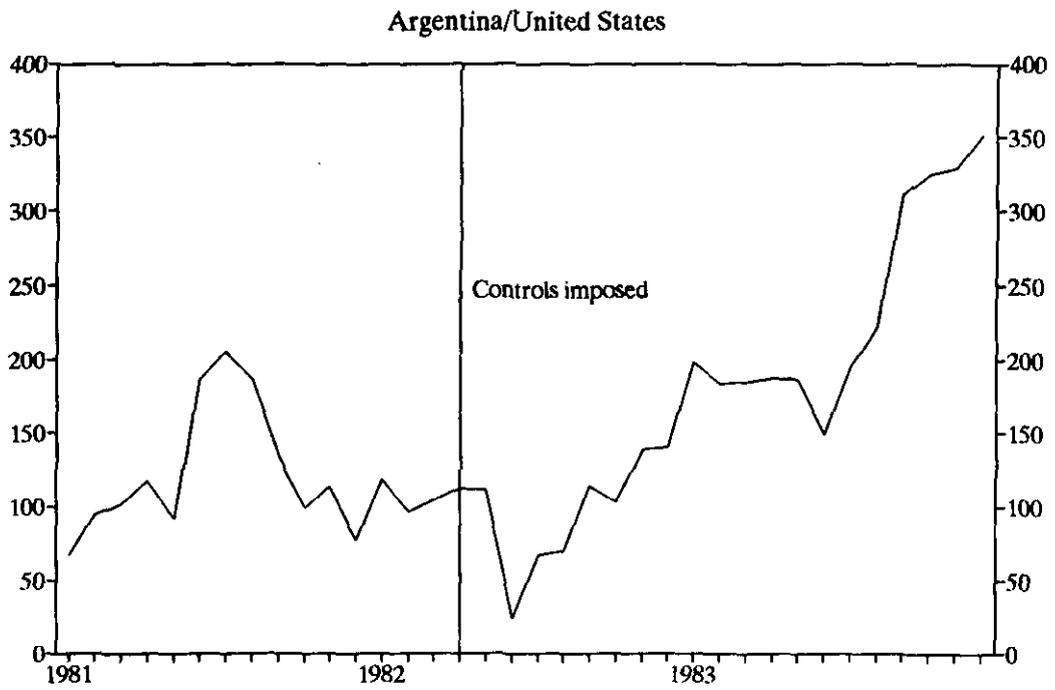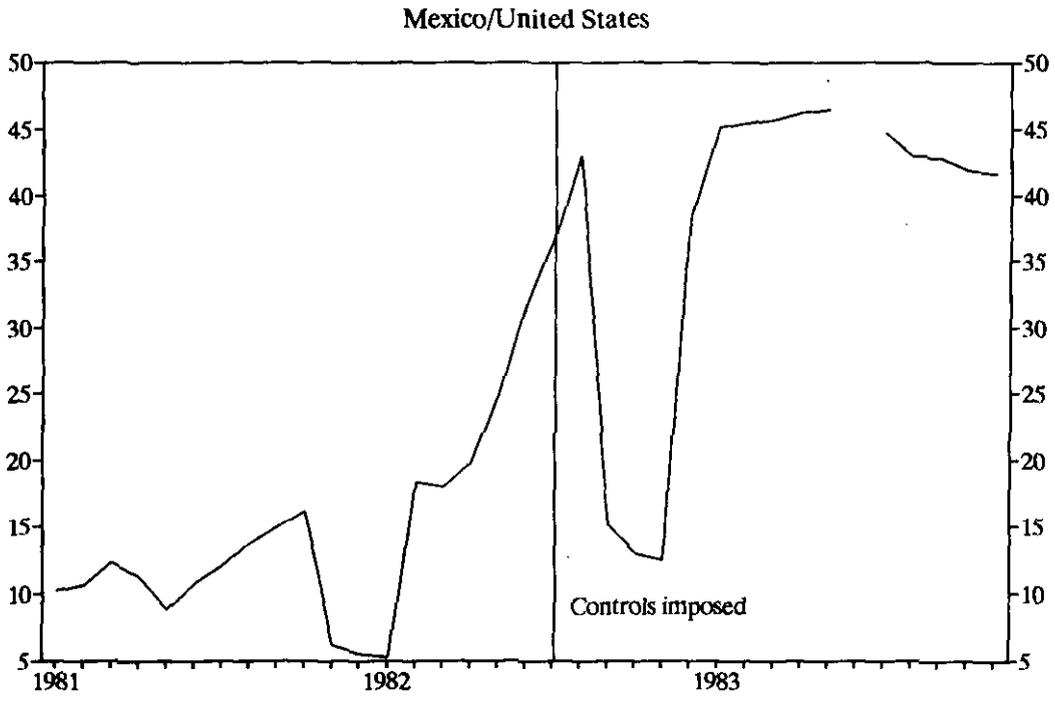
Sources: International Monetary Fund, International Financial Statistics; and The WEFA Group.

to the financing of unproductive activities. 1/ If trade is not liberalized prior to the capital account, then the higher inflows may be funnelled into inefficient protected sectors or industries. Alternatively, if the current and capital accounts are simultaneously liberalized, the capital inflow and the potential real exchange rate appreciation that accompanies it, may adversely affect the tradable sector and generate an expansion in the nontradable sector. If the appreciation is large and persistent, it may jeopardize medium-term objectives, such as the development of a nontraditional export sector. Similar arguments apply to macroeconomic stabilization: if fiscal consolidation and reform have not taken place, the capital inflows will be funnelled to an inefficient public sector and temporarily help finance an unsustainable accumulation of public sector debt.

This discussion suggests that countries already experiencing a surge in capital inflows, irrespective of whether these are primarily due to a favorable external environment, an attractive domestic investment environment, or both, may want to postpone liberalizing the capital account. A liberalization of the capital account may work further to stimulate inflows and reinforce the macroeconomic effects of the inflows (that is, real exchange rate appreciation, wider current account deficits, reserve accumulation, and accelerating money and credit growth). As discussed above, it appears that for a number of countries, a liberalization of capital outflows induced further net inflows. In addition, as Table 27 highlights, in several countries that liberalized controls on inflows, the tendency during the capital inflow surge in the early 1990s was toward reinstating some controls or tightening prudential regulation.

5.   Some lessons

In light of recent experiences of countries that adopted measures designed to curb short-term capital inflows, it appears that, at least in the short run, these policies were effective in either reducing the volume of capital inflows, or affecting their composition, or both. A conclusion, therefore, is that, if the capital inflows are perceived as being temporary, these types of policies may be effective, not least because they reduce potential future outflows and the economic costs of such turbulence. Of course, the longer the inflows persist, or the longer the policies remain in place, the greater the chances that the controls become both ineffective and destructive to the development of the domestic financial system. But more generally, recourse to capital controls must be considered within the context of other policies.

1/ Mathieson and Rojas-Suarez (1993) and Galbis (1994) stress a further preliminary requirement for financial (and capital account) liberalization, namely, the establishment of prudential regulation and supervision. Without these, the increased availability of credit that accompanies a capital inflow could result in adverse loan selection and on eventual financial crisis.

With regard to controls on outflows, the existing empirical evidence on the effectiveness of capital controls in general, and the experiences of some of the countries that implemented capital controls during the recent ERM crisis and during the debt crisis in the early 1980s, suggest that controls on capital outflows offer only limited relief from market pressures. In most instances central bank reserves continued to decline, despite the controls. In all these cases there were either devaluations (the ERM countries) or a substantial depreciation. With regard to interest rate spreads, it does appear that temporary controls on outflows may alleviate upward pressure on interest rates and are therefore potentially most beneficial when the domestic banking system is fragile. However, given the magnitude and persistence of flight capital in the 1980s, due largely to repressed domestic interest rates, controls are never effective in the long run and may in fact make things even worse. 1/

Most of the empirical work on the effectiveness of capital controls concludes that controls lose their effectiveness relatively quickly. However, in most of this work, no distinctions was made among the "types" of capital controls. Specifically, little distinction is made between measures to discourage inflows and controls on outflows. Indeed, there may be reasons to believe that their "lack of effectiveness" is not symmetric and that controls on inflows may be more effective than controls on outflows, and that market-based controls may be more effective than quantity constraints. Such differences may have little to do with the design of the measures per se, but rather have more to do with incentives to circumvent the controls.

Controls on outflows are usually resorted to during balance-of-payments or financial crises. These episodes are characterized by large devaluations of the exchange rate, steep declines in the stock market, increased volatility in financial variables, a higher risk of default, and in some cases, political instability. The imposition of controls, in and of itself, may send a "signal" that worse times are to come. In such circumstances, domestic-foreign interest rate spreads usually reach levels (particularly on a risk-adjusted basis) that provide a powerful incentive for outflows. In contrast, as the experiences of several countries in the early 1990s shows, controls on inflows tend to emerge under more "normal" economic circumstances. While rate-of-return spreads may still provide an incentive to evade controls, the rate-of-return differentials tend to be smaller than those observed during crises, and thus the desire to circumvent controls may not be as great for controls on inflows. Further, from the viewpoint of an international investor, one can always re-direct investments to countries where there are fewer impediments.

1/ See Dooley (1988).

VII. The Role of Domestic Financial Institutions in Intermediating Foreign Capital Inflows 1/

1. Introduction

This chapter examines the effects that capital inflows can have on the domestic financial systems of recipient countries. A rapid expansion of liquidity in the banking system due to a sudden surge in capital inflows can result in a deterioration of bank balance sheets if these funds are not invested efficiently. In addition, portfolio capital inflows may affect the efficiency with which domestic financial assets are priced. Inflows may also lead to greater integration of securities markets, allowing shocks in one country to be transferred to other countries.

Section 2 describes the mechanisms through which capital inflows are intermediated in the domestic financial system. Section 3 provides evidence on capital flows to a number of developing countries since 1980 and identifies those countries which have had the highest net inflows and the greatest potential for domestic credit expansion. Section 4 then looks at the available evidence on bank balance sheets in order to assess the impact capital flows have had on the banking systems in several of these countries. Section 5 discusses the effects of capital inflows on securities markets, focusing on the equity markets in the recipient countries; to date, foreign investment in developing country bond markets generally has been limited, with the exception of Mexico. The chapter then presents empirical work on pricing efficiency and volatility and the linkages and spillovers between developing country and industrial country capital markets.

2. The role of banks in intermediating capital inflows

When capital flows into a country through an increase in foreign liabilities at domestic banks, the impact on the banking system is immediate: a local bank experiences an increase in foreign currency liabilities and obtains a foreign currency asset, usually in the form of a deposit in a bank chartered in another country. If the local central bank purchases the foreign currency from the recipient bank, domestic currency bank reserves will rise relative to the deposit base. If this transaction increases the reserve-deposit ratio above the legal minimum, and if the central bank does not sterilize the monetary base against the increase in liquidity, banks can use their excess reserves to increase credit (by a multiple of that surplus amount). Hence, an increase in foreign liabilities can lead to an expansion of bank balance sheets just as an increase in domestic currency deposits would. If the local authorities permit residents to hold foreign currency deposits, a similar expansionary process would take hold, although there would not necessarily be an increase in central bank holdings of foreign reserves. The local foreign currency deposit base will expand, which may allow an expansion of foreign currency loans.

1/ Prepared by Marcel Cassard, Victor Ng, and Michael Spencer.

Capital flows that enter a country through nonbank financial markets can have a similar impact on the banking system. 1/ When a nonresident invests in a local nonbank financial asset, a local deposit must be used to pay for it, which involves exchanging a foreign-currency deposit for a local-currency deposit. In such transactions, the deposits and reserves of the domestic banking system increase, at least temporarily. Hence, regardless of whether foreign capital flows into the market as foreign direct investment, equity portfolio investment, bond issuance, or bank borrowing, the associated increase in deposits and bank reserves can potentially lead to an increase in bank lending.

However, capital inflows need not necessarily result in a significant expansion of banking sector assets. If the capital inflow is used to finance an equivalent current account deficit, as when a nonresident purchases a domestic asset from a resident, who in turn uses the proceeds to import foreign goods, the funds flow out of the country, causing no further expansion in domestic credit. 2/ When the local bank lends funds to the importer, it simultaneously books a foreign currency loan and a foreign currency deposit to the importer. The local bank executes the transaction by drawing on its deposit in the foreign bank. At the end of the transaction, the local bank has a liability to the foreign bank and a foreign currency loan to the importer, and no increase in domestic assets. Alternatively, the net capital inflow can be deposited in the banking system and completely sterilized by the central bank (as discussed in Chapter V). In each of these cases, net capital inflows do not affect the level of private domestic currency credit, and only in the latter case will the composition of domestic currency financial assets and liabilities be altered.

3.   Capital flows, sterilization, and the banking system

Capital inflows to developing countries increased significantly in the early 1990s, and the composition of these flows changed from bank lending and foreign direct investment to portfolio investment. While a few countries experienced periods of significant capital inflows earlier in the period, net inflows increased in a large number of developing countries in the late 1980s and early 1990s, first in Asia and then in the Western

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1/ For example, most of the bond portfolio inflows, which have dominated portfolio inflows into developing countries in recent years, originated in the Euromarkets and are denominated in one of the major currencies. Thus, when nonresidents purchase Eurobonds issued by borrowers in developing countries, they transfer foreign currency deposits to these borrowers. If these borrowers hold their deposits in the local banking system, bond purchases have the same impact on the domestic financial system as a direct increase in domestic bank foreign liabilities.

2/ For example, foreign direct investment is often claimed to have little effect on bank liquidity since inflows frequently are accompanied by rising imports.

Hemisphere (Table 32). 1/ Capital account surpluses, excluding changes in reserves and exceptional financing, have been particularly large since 1990 in Malaysia, Mexico, and Thailand, but have also been well above the 1983-89 averages in Argentina, Chile, Korea, the Philippines, and Turkey.

As discussed earlier, when net capital inflows exceed current account deficits, or are combined with current account surpluses, the result is an expansion in liquidity--denominated either in local or foreign currency--in the domestic banking system. In many countries, the central bank has acquired a large part of the net inflows in order to prevent an appreciation of the exchange rate. Such purchases lead immediately to an increase in commercial bank reserves at the central bank and, via the usual multiplier effect, to an expansion in the money supply. In fact, more than two-thirds of the capital inflows to developing countries during 1991-94 were absorbed by central banks in recipient countries through increases in foreign currency reserves. The increase in foreign exchange reserves has been highest in Malaysia, where the central bank has aggressively defended the exchange rate. Reserves increased by 18 percent of GDP in 1993 alone. In countries where inflows were not as significant to begin with, and where current account deficits were often higher relative to inflows, there were much smaller increases in reserves.

Sterilization policies have been used aggressively in developing countries that experienced large net capital inflows, in part in order to insulate the banking system from the effects of these inflows. 2/ Sterilization techniques have included: open market operations, increases in reserve requirements, mandatory purchases of government or central bank securities by financial institutions, and transfers of government deposits, including those of government-owned enterprises, to the central bank or into holdings of government securities (see Chapter V). 3/

The decision to sterilize capital inflows generally implies that the balance sheet of the central bank will expand rather than that of the banking system. This effectively transfers risk from the banking system to

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1/ Net errors and omissions and exceptional financing items are not included. Hence, the capital account and changes in reserves generally do not completely offset the current account position.

2/ The emphasis here is on the ability of sterilization to insulate the commercial banking system from capital inflows. Even when sterilized, capital flows can have real economic effects deriving from, for example, changes in the relative prices of traded and non-traded goods.

3/ Some countries have also attempted to curtail net capital inflows by imposing controls on capital inflows (Brazil, Chile, Colombia, Indonesia, Malaysia, and Mexico) and/or by liberalization of capital controls on outflows (Chile, Colombia, Malaysia, Mexico, and Thailand).

Table 32. Balance of Payments Data for Selected Developing Countries, 1980-93 1/

(In percent of GDP)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Argentina														
Current account balance	-2.3	-2.8	-2.8	-2.3	-2.1	-1.1	-2.7	-3.9	-1.2	-1.6	3.2	-0.3	-2.9	-2.9
Capital account balance	1.2	1.0	2.5	0.4	2.3	2.8	1.6	2.2	2.8	0.3	-1.3	1.9	4.8	3.9
Changes in reserves	1.2	1.9	0.8	2.4	-0.1	-1.2	0.8	1.8	-1.5	1.7	-2.4	-1.4	-2.0	-1.0
Brazil														
Current account balance	-5.5	-4.5	-5.9	-3.4	--	-0.1	-2.0	-0.5	1.3	0.2	-0.8	-0.4	1.6	-0.1
Capital account balance	4.2	4.9	4.1	2.8	2.4	0.1	0.8	1.1	-0.5	0.3	1.1	0.2	2.7	2.5
Changes in reserves	1.5	-0.2	1.9	0.9	-2.6	0.2	1.2	-0.7	-0.5	-0.4	-0.3	-0.1	-4.0	-2.1
Chile														
Current account balance	-6.9	-14.1	-9.2	-5.5	-10.7	-8.6	-6.7	-3.9	-0.7	-2.5	-2.1	--	-1.7	-4.6
Capital account balance	11.4	14.2	4.1	2.6	10.2	8.4	4.0	4.9	4.6	4.9	9.9	2.4	6.9	5.7
Changes in reserves	-4.7	-0.4	5.3	2.6	-0.5	0.6	1.4	-0.7	-3.4	-2.0	-7.7	-3.6	-6.0	-0.9
China														
Current account balance	...	...	2.1	1.5	0.7	-3.9	-2.5	0.1	-1.0	-1.0	3.1	3.3	1.3	-2.0
Capital account balance	...	...	0.1	-0.1	-0.3	3.1	2.1	2.0	1.9	0.9	0.8	2.0	-0.1	4.0
Changes in reserves	--	0.3	-2.3	-1.4	--	0.8	0.7	-1.6	-0.6	0.1	-3.1	-3.6	0.4	-0.3
Colombia														
Current account balance	-0.7	-6.9	-10.7	-10.4	-4.6	-5.7	1.1	0.9	-0.6	-0.5	1.3	5.5	1.9	...
Capital account balance	3.4	7.2	7.8	5.0	3.1	7.0	3.3	--	2.4	1.2	--	-1.8	0.3	...
Changes in reserves	-3.2	0.1	3.1	6.4	1.3	-0.5	-3.7	-1.1	-0.5	-1.1	-1.5	-4.3	-2.2	...
Indonesia														
Current account balance	3.7	-0.6	-5.6	-7.4	-2.1	-2.2	-4.9	-2.8	-1.7	-1.2	-2.8	-3.7	-2.2	-1.6
Capital account balance	1.6	2.0	6.0	7.1	3.9	2.0	5.2	4.6	2.6	3.1	4.2	4.9	4.8	3.9
Changes in reserves	-3.2	0.4	2.0	-0.2	-1.1	-0.6	1.3	-0.8	0.1	-0.5	-2.1	-1.3	-1.6	-0.4
Republic of Korea														
Current account balance	-8.4	-6.6	-3.5	-1.9	-1.5	-0.9	4.3	7.2	7.8	2.3	-0.9	-3.0	-1.5	0.1
Capital account balance	9.4	6.7	5.2	2.8	3.1	2.1	-3.7	-6.6	-2.3	-1.2	1.2	2.3	2.3	1.0
Changes in reserves	-0.5	0.5	--	0.3	-0.6	-0.2	-0.1	-1.5	-5.1	-1.4	0.5	0.4	-1.2	-0.9
Malaysia														
Current account balance	-1.2	-9.9	-13.4	-11.7	-4.9	-2.0	-0.4	8.0	5.2	0.7	-2.1	-9.0	-3.2	-3.9
Capital account balance	5.8	10.5	14.0	12.9	8.9	6.2	4.0	-4.8	-5.8	3.5	4.2	11.9	15.1	17.4
Changes in reserves	-1.9	1.8	1.0	--	-1.4	-3.7	-5.3	-3.6	1.3	-3.3	-4.6	-2.6	-11.5	-17.9
Mexico														
Current account balance	-5.2	-6.4	-3.5	3.8	2.3	0.4	-3.9	3.0	-1.4	-2.8	-3.1	-5.2	-7.5	-6.4
Capital account balance	5.8	10.5	5.7	-0.5	--	-0.3	5.7	-1.1	-0.6	0.7	3.5	8.8	8.2	8.8
Changes in reserves	-0.4	-0.5	2.1	-1.3	-1.2	1.5	0.3	-4.0	3.8	-0.1	-0.9	-2.8	-0.5	-2.0
The Philippines														
Current account balance	-5.9	-5.8	-8.6	-8.3	-4.1	-0.1	3.2	-1.3	-1.0	-3.4	-6.1	-2.3	-1.9	-6.0
Capital account balance	8.3	6.2	7.7	3.2	4.5	-2.5	0.5	1.0	1.5	3.2	4.7	6.5	6.1	6.0
Changes in reserves	-2.8	0.9	1.9	6.1	-0.6	0.9	-3.8	0.2	-1.8	-0.7	0.1	-3.9	-3.2	-0.5
Sri Lanka														
Current account balance	-16.3	-10.1	-11.5	-9.0	--	-7.1	-6.5	-4.9	-5.7	-5.9	-3.7	-6.6	-4.7	-3.7
Capital account balance	8.6	8.4	12.2	8.7	4.7	6.3	5.6	5.9	3.6	8.3	6.6	7.7	5.0	9.2
Changes in reserves	7.3	1.1	-0.7	0.1	-4.1	1.5	1.4	0.8	1.5	-0.7	-1.4	-3.6	-2.1	-6.8
Taiwan Province of China														
Current account balance	-2.2	1.1	4.6	8.4	11.8	14.8	21.6	17.7	8.3	7.8	6.9	6.8	3.9	3.1
Capital account balance	5.4	10.0	-0.7	-1.4	-4.4	-5.1	9.2	10.2	-9.4	-8.3	-9.7	-1.3	-3.3	-2.2
Changes in reserves	-2.3	-10.4	-2.9	-6.4	-6.7	-10.5	-30.9	-27.7	1.1	-0.5	2.5	-5.5	-0.7	-0.7
Thailand														
Current account balance	-6.4	-7.4	-2.7	-7.2	-5.0	-4.0	0.6	-0.7	-2.7	-3.5	-8.5	-7.7	-5.7	-5.6
Capital account balance	6.3	7.1	3.9	5.3	6.1	4.0	-0.3	2.1	6.2	9.1	10.6	12.0	8.9	11.7
Changes in reserves	0.6	-0.1	0.2	0.4	-1.3	-0.3	-1.7	-1.9	-4.2	-7.0	-3.8	-4.7	-2.6	-5.8
Turkey														
Current account balance	-4.9	-2.7	-1.5	-3.1	-2.4	-1.5	-1.9	-0.9	1.8	0.9	-1.7	0.2	-0.6	-3.7
Capital account balance	2.9	1.7	1.8	2.4	1.8	2.6	2.8	2.2	-1.1	0.7	2.7	-1.6	2.3	5.1
Changes in reserves	-0.1	0.1	-0.2	--	-0.2	0.2	-0.7	-0.7	-1.3	-2.5	-0.6	0.8	-0.9	-0.2

Sources: Central Bank of China, Taiwan Province of China; and International Monetary Fund, Balance of Payments Statistics and World Economic Outlook data bases.

1/ For changes in reserves, a minus sign indicates an increase. Discrepancies between the combined current and capital account and changes in reserves are due to net errors and omissions.

the central bank. 1/ Because of the high cost of sterilization, and the high potential public cost of financial losses, the allocation of risk between the private and public sectors is an important decision.

In countries where the banking system is sound and efficient and where there are effective regulatory and supervisory controls, capital flows are less likely to create additional risks to the financial system. In these countries, banks have the ability when extending loans to anticipate, at least to some extent, the effect of capital flows on their borrowers' ability to pay. This ability allows banks to price their loans accordingly, to accumulate reserves against potential loan losses, and to reduce the concentration of their loan portfolios to sectors that are more sensitive to capital flows.

In contrast, in countries where credit institutions are not well regulated and supervised, and where there are poorly enforced penalties for misallocating credit and mismanaging balance sheets, capital inflows will create further opportunities for banks to expand lending and to expose the financial system to larger potential losses. In pursuing a policy of nonsterilization in such weak systems, the authorities run the risk of later having to provide liquidity to, or to recapitalize, banks that become illiquid or insolvent as a result of poor management. Moreover, in the event of a reversal of capital flows, weak banks would become especially vulnerable. Due to poor credit ratings, weaker financial institutions would be unable to access interbank or capital markets, and would need public support to remain viable. The history of bank crises, including recent crises in some industrial countries, clearly demonstrates how high the public costs can be of such rescue operations. 2/

Partly because of differences in sterilization policies, the link between changes in central bank reserves and bank balance sheet expansion is mixed across countries. In Thailand, for example, bank assets expanded rapidly after 1987, peaking at more than 100 percent of GDP in 1993 (Table 33). In Malaysia, the ratio of commercial bank assets to GDP increased from 118 percent in 1992 to 134 percent in 1993. The measures taken in 1994 to contain capital inflows and the consequent narrowing of interest differentials contributed to a relative decline in bank assets to 122 percent of GDP in October 1994. In some countries, the expansion in bank balance sheets has been very significant despite only modest net capital inflows. In Indonesia, commercial bank assets expanded as a share of GDP by more than 20 percentage points over 1988-94, although it is likely that much of that expansion resulted from the important deregulation

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1/ The use of sterilization as a prudential policy to prevent the accumulation of risk in the banking sector was explicitly recognized in Indonesia and Chile.

2/ Several industrial countries have recently experienced, or are still experiencing, costly banking problems, including Finland, Japan, Norway, Sweden, and the United States.

Table 33. Indicators of Banking Activity in Selected Developing Countries, 1985-94

(In percent of GDP)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 1/
Chile										
Assets of commercial banks	...	...	...	131.2	119.1	123.3	99.6	95.7	102.5	120.6
Loans 2/	...	...	...	52.8	55.5	53.6	50.7	53.8	58.5	57.2
Holdings of government securities	...	...	...	0.3	0.3	0.3	0.4	0.4	0.5	0.5
Holdings of nongovernment securities	...	...	...	29.9	24.3	27.4	25.3	18.7	16.9	16.9
Deposits	...	...	...	35.6	35.1	37.3	39.5	41.1	42.3	43.9
Foreign currency assets 3/	...	...	...	43.1	36.2	37.3	23.1	22.3	24.0	34.5
Foreign currency liabilities 3/	...	...	...	43.1	36.4	37.5	23.4	22.6	24.3	34.9
Indonesia										
Assets of commercial banks	32.0	36.7	35.7	41.0	51.3	62.6	61.0	61.0	63.5	68.3
Loans to private sector 2/	15.6	19.1	20.4	24.8	33.1	45.4	46.6	45.7	50.3	53.1
Nongovernment deposits	18.1	20.5	21.1	23.7	29.1	36.6	37.3	38.7	41.1	42.1
Foreign assets	6.4	7.9	6.1	5.8	6.3	5.8	4.7	4.8	3.8	3.7
Foreign liabilities	0.6	0.5	0.6	0.8	1.7	5.8	4.7	6.0	6.5	6.9
Korea										
Assets of commercial banks	70.4	63.9	62.2	59.1	61.2	75.5	74.9	75.1	73.4	72.0
Loans 2/	27.5	26.7	24.3	22.2	26.1	29.4	29.9	29.6	28.2	30.0
Nongovernment deposits	23.1	23.0	26.2	28.6	28.1	33.3	31.7	30.2	30.0	29.2
Holdings of government securities	1.1	1.2	1.2	1.3	1.2	1.6	1.6	1.0	1.0	1.0
Holdings of nongovernment securities	2.0	2.4	2.4	2.1	3.3	4.8	4.8	5.5	6.5	6.5
Foreign currency assets 3/	8.3	7.2	7.0	6.0	5.6	8.5	8.6	8.7	9.0	9.6
Foreign currency liabilities 3/	10.9	9.2	8.3	6.9	6.1	8.8	8.9	8.7	9.3	10.0
Malaysia										
Assets of commercial banks	95.7	110.8	106.4	106.5	109.8	111.6	117.3	117.6	134.0	122.4
Loans to private sector	62.5	72.4	64.6	61.4	64.4	68.8	74.2	70.9	69.8	67.3
Nongovernment deposits	59.1	67.7	62.4	58.0	58.4	53.8	58.9	62.7	71.8	68.6
Holdings of government securities	8.6	9.0	11.8	13.0	10.7	9.3	8.7	7.0	5.7	4.6
Holdings of nongovernment securities	2.1	3.2	4.6	5.5	4.3	6.2	8.3	8.9	11.0	10.8
Foreign assets	3.9	5.4	6.3	8.1	7.7	6.6	5.0	3.6	6.3	5.3
Foreign liabilities	8.2	8.6	6.3	5.6	6.2	7.0	9.1	12.6	19.0	9.2
Mexico										
Assets of commercial banks	...	...	...	...	...	...	45.3	45.9	52.4	67.4
Loans to private sector	...	...	...	...	...	...	27.5	33.1	37.3	47.5
Nongovernment deposits	...	...	...	...	...	...	38.2	38.6	44.2	53.7
Holdings of government securities	...	...	...	...	...	...	6.5	2.2	0.3	1.0
Holdings of nongovernment securities 4/	...	...	...	...	...	...	5.5	5.4	8.1	12.1
Foreign assets 3/5/	...	...	...	...	...	...	10.4	10.5	12.3	21.5
Foreign liabilities 3/5/	...	...	...	...	...	...	8.1	7.6	8.2	13.4
Philippines										
Assets of commercial banks	51.8	43.5	42.1	42.8	45.4	50.1	48.0	51.1	58.9	...
Loans to private sector	19.3	13.9	15.3	15.6	16.7	18.6	17.4	20.0	25.7	24.4
Nongovernment deposits	22.1	20.3	20.5	22.2	24.4	26.9	26.9	28.5	32.1	29.6
Holdings of government securities	2.5	3.6	3.4	4.5	5.6	5.1	4.5	6.1	5.3	...
Holdings of nongovernment securities	3.0	2.1	1.3	1.1	1.1	1.6	3.5	2.4	2.9	...
Foreign assets	7.3	7.4	8.1	8.8	8.6	10.3	8.5	8.8	9.1	7.3
Foreign liabilities	13.9	9.6	9.4	9.4	9.6	12.1	10.6	13.1	15.1	13.8

Table 33 (concluded). Indicators of Banking Activity in Selected Developing Countries, 1985-94

(In percent of GDP)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 1/
Sri Lanka										
Assets of commercial banks	39.1	37.0	39.1	43.2	42.2	41.1	41.7	43.6	48.9	50.3
Loans	24.2	23.0	24.9	26.0	26.5	25.4	25.3	26.6	25.1	24.8
Nongovernment deposits	23.9	21.8	22.5	22.1	22.0	21.1	23.1	24.2	25.7	26.0
Holdings of government securities	1.2	1.2	2.4	2.5	2.7	3.8	2.9	2.8	3.0	2.9
Holdings of nongovernment securities	1.3	1.7	0.6	0.6	0.5	0.3	0.3	0.4	0.9	1.6
Foreign assets 3/	2.2	2.5	3.2	3.5	3.0	3.8	3.7	4.3	4.1	4.2
Foreign liabilities 3/	2.4	2.7	3.4	3.4	4.0	3.8	4.8	5.0	5.4	5.5
Taiwan Province of China										
Assets of deposit money banks	110.0	115.2	127.9	140.5	156.3	157.6	168.9	182.8	192.8	204.7
Loans to private sector	59.2	57.5	64.1	84.0	93.0	96.0	106.1	124.0	130.8	140.9
Nongovernment deposits	75.9	80.1	87.8	100.1	108.9	111.8	119.8	127.4	138.3	145.6
Holdings of government securities	1.5	1.5	1.9	2.9	2.3	1.9	3.1	4.6	5.5	5.3
Holdings of nongovernment securities	13.0	22.2	33.3	21.9	19.0	14.8	17.8	13.6	16.0	15.4
Foreign assets	14.8	8.6	4.6	5.5	6.6	8.4	7.8	6.3	6.4	6.8
Foreign liabilities	5.4	9.9	13.3	10.4	8.2	7.1	8.2	7.4	7.8	8.2
Thailand										
Assets of commercial banks	67.5	68.5	72.6	73.4	76.8	82.5	86.6	91.0	102.4	97.3
Loans to nonfinancial private sector	45.5	44.2	47.3	51.0	56.3	64.3	67.7	72.8	79.1	78.4
Nongovernment deposits	50.0	52.9	55.4	54.9	58.5	63.4	67.1	68.9	73.2	64.6
Holdings of government securities	7.3	9.2	8.8	7.9	6.5	5.0	3.2	2.4	1.5	1.3
Holdings of nongovernment securities	0.8	1.0	1.0	1.1	1.2	1.2	2.5	2.9	3.6	3.8
Foreign assets	3.2	3.7	3.0	2.9	3.8	2.6	2.9	2.8	5.0	4.1
Foreign liabilities	4.3	2.8	2.9	4.0	4.6	5.0	4.9	6.0	11.3	15.1
Turkey										
Assets of deposit money banks	...	46.2	52.6	49.9	43.0	39.2	41.8	45.6	49.9	39.5
Loans to private sector	...	16.6	17.5	14.3	13.5	14.0	13.8	15.4	16.3	9.6
Nongovernment deposits	...	22.8	24.0	23.2	22.1	19.2	22.9	23.6	22.2	23.3
Holdings of government securities	...	4.2	5.2	5.1	4.8	4.0	4.8	4.8	4.8	4.0
Holdings of nongovernment securities	...	0.8	0.7	0.3	0.2	0.2	0.1	0.2	0.1	0.1
Foreign assets	...	4.0	4.2	6.9	4.3	3.7	4.4	6.7	8.1	7.8
Foreign liabilities	...	2.3	2.6	2.4	2.0	2.8	3.0	5.0	7.1	3.7

Sources: Bangko Sentral ng Pilipinas; Bank Indonesia; Bank Negara Malaysia; Bank of Korea; Bank of Thailand; Central Bank of China (Taiwan Province of China); Central Bank of Sri Lanka; Central Bank of Turkey; Comission Nacional Bancaria (Mexico); Superintendencia de Bancos e Instituciones Financieras Chile; and IMF staff estimates.

1/ Data as of September for Turkey, October for Malaysia, and November for Korea and Sri Lanka.
2/ Including foreign currency denominated loans.
3/ Foreign assets/liabilities plus foreign currency denominated assets/liabilities.
4/ Operating securities portfolio not including government securities.
5/ Including operations of foreign branches.

109

measures implemented in 1988-90. In Mexico, the banking sector has expanded rapidly, from total assets equal to 45 percent of GDP in 1991 to 67 percent in 1994. This rapid expansion reflected both the effect of capital inflows and the injection of new capital into the industry since privatization in 1991: paid-in capital increased from MexN$1.5 billion in 1991 to MexN$10.2 billion in 1994, which, assuming an 8 percent ratio of capital to risk-weighted assets, could have accounted for half of the expansion in bank assets as a proportion of GDP.

4.   Impact on bank balance sheets

Virtually all developing countries that have received large capital inflows have, at different times and to different degrees, attempted to sterilize these inflows. As was noted in Chapter V, open market operations sterilized almost all capital inflows to Chile in the second half of 1990, but was pursued less aggressively since early 1991. Similarly, Thailand during 1989-91, Indonesia and Malaysia during 1991-92, and Sri Lanka during 1991-93, attempted to sterilize almost all capital inflows through open market operations. Other countries engaged in less than complete sterilization throughout the period of high capital inflows.

The impact that large capital inflows can have on banking systems can be seen by examining elements of the consolidated balance sheets in selected banking systems (see Table 33). The ratio of commercial bank assets to GDP is a measure of the size of a country's banking system, and this clearly has been affected in countries that have received high capital inflows. Moreover, one can also see in the balance sheet data the effect that sterilized intervention has had in those countries that pursued such strategies. In Indonesia, Malaysia, Thailand, and Sri Lanka, periods of aggressive sterilization have been associated with very low growth in bank assets, and the relaxation of sterilization coincided with rapid bank-asset expansions (see Table 33). In Malaysia, the ratio of bank assets to GDP increased by more than 16 percentage points in 1993; the measures adopted in early 1994 to contain capital inflows contributed to a relative decline in bank assets to 122 percent of GDP in October 1994. In Indonesia and Sri Lanka, this same ratio increased by 7 percentage points between end-1992 and November 1994. In Thailand, bank assets grew slowly until the relaxation of sterilization efforts in 1991, after which bank assets increased from 87 percent of GDP to a peak of 102 percent in 1993.

In addition to affecting the size of the commercial banking systems in recipient countries, capital inflows have also changed the composition of bank balance sheets in important ways. Banks in recipient countries relied more heavily on foreign capital and used these funds to expand domestic lending and securities investments.

In the countries with the largest capital inflows--Malaysia, Mexico, and Thailand--there was a greater-than-two-fold increase in foreign-currency-denominated liabilities as a share of GDP during the periods of capital inflows (see Table 33). In each country, the source of the greatest

increase in liabilities was borrowing from foreign banks rather than the accumulation of foreign currency deposits. Foreign liabilities of commercial banks also increased sharply in the Philippines and Turkey during periods of high capital inflows, but in Sri Lanka, the expansion in commercial bank foreign liabilities was relatively small. In Chile, the use of capital controls reinforced the declining trend in foreign liabilities among commercial banks. In countries that imported less capital, foreign liabilities of the banking system expanded more slowly, if at all. In addition, the countries with the largest capital inflows also experienced the greatest expansions in nongovernment deposits in the commercial banking system.

Increases in foreign liabilities will be less expansionary if they result in an increase in foreign assets, as when banks invest in foreign securities or lend funds abroad. The experience suggests that funds were directed mostly toward domestic, rather than foreign investments (see Table 33). Since 1988, net foreign assets declined sharply in the commercial banking systems in Chile, Indonesia, Malaysia, Sri Lanka, and Thailand. For example, in both Indonesia and Malaysia, commercial bank net foreign assets declined from a negligible share of GDP in 1989 to a net liability of about 12 percent in 1993. Similarly, in Thailand, the net-foreign-asset position went from near balance at end-1987 to a net-foreign-liability position of 11 percent of GDP in November 1994. Mexico and Turkey, however, are exceptions to this development. In both cases, while foreign liabilities increased sharply with the onset of capital inflows, net assets rose even faster. In Mexico for example, net foreign assets rose from 1.6 percent of GDP in 1991 to 6.6 percent in 1994 (see Table 33).

The increase in net foreign liabilities of commercial banks, if not sterilized, will lead to an expansion of domestic lending and consumption or investment. In Indonesia, Mexico, and Thailand, domestic lending to the private sector increased by more than 20 percentage points of GDP with the onset of high capital inflows--much more than the increase in foreign liabilities. In Malaysia, lending to the private sector expanded moderately and actually declined as a share of total assets. Banks in Malaysia invested funds in the interbank market by holding excess reserves at the central bank, which pays the interbank interest rate on such deposits. 1/ Loans to other banks in Malaysia rose from 8 percent of total assets in 1991 to a high of 22 percent in 1993. Loan demand was also moderated by a slowdown in economic growth, and because banks were cautious about using short-term foreign liabilities to extend domestic credit. In addition, corporations with direct access to foreign borrowing often used these

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1/ At the end of 1991, the commercial banks had a net credit due to the central bank of RM 3,971 million (International Monetary Fund (1994b), Table 35). In 1992, as commercial bank deposits with the central bank increased, they became net lenders to the central bank. By the end of 1992, they had a net credit from the central bank of RM 12,943 million. This increased to RM 52,064 million at end-March 1994.

borrowed funds to pay off relatively high-cost domestic loans. An expansion
of lending also accompanied high capital inflows in Mexico, where the total
loan portfolio in the banking system expanded from 23 percent of GDP in 1991
to 47 percent in 1994.

Lower capital inflows are associated with lower increases in lending.
While an expansion in lending is generally beneficial, a very rapid
expansion in lending can result in a loosening of credit conditions. Under
these circumstances of extreme liquidity due to rapid capital inflows, the
search for investments may lead banks to extend credit to less
profitable ventures or to less creditworthy borrowers. The history of
banking crises in industrial and developing countries alike has shown that
certain types of lending--particularly real estate finance, lending backed
by shares, consumer credit, and loans to bank insiders or related parties--
have been more important sources of risk than others. 1/

Both the Indonesian and Malaysian authorities have recently expressed
concern over the volume of lending to the property sector and to equity
market participants. In Malaysia, loans to the property sector, loans for
the purchase of shares, and consumer loans amounted to 35 percent of total
commercial bank loans at end-September 1994. However, loans for the
purchase of shares had doubled as a proportion of total loans, from
2.6 percent at the end of 1993, to 5.1 percent in September 1994; these
loans accounted for 71 percent of new loans contracted in the first seven
months of 1994. In Mexico, the fastest rising components of total loans
have been real estate loans, which grew from 12 percent of the portfolio in
1991 to 18 percent in 1994, and foreign currency loans whose share rose from
7 percent to 12 percent. Personal consumption loans rose sharply in 1992,
but actually declined over 1993-94.

Where banks have expanded their balance sheets the most, this expansion
resulted in an increase in securities investments, particularly from
nongovernment issuers. In Malaysia, Mexico, and Thailand in particular,
banks reduced their holdings of government securities and increased their
holdings of private sector securities. Although banks' holdings of all
securities as a share of assets or GDP did not rise significantly in
Malaysia, and actually fell sharply in Thailand, in both countries bank
investment in private securities more than doubled as a proportion of assets
and/or GDP between 1989 and 1993. Total securities investment by the
banking industry in Mexico has changed little since 1991. However,
investment in government securities fell from 50 percent of total assets in
1991 to 2 percent in 1994, holdings of domestic fixed-income securities
tripled to 27 percent of the total, and foreign securities holdings rose
3 percent of the total.

In summary, in countries that have received the most capital inflows,
banks have tended to play an important role as direct importers of capital,

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1/ See International Monetary Fund (1993 and 1994a).

as suggested by the increase in net foreign liabilities of the banking system. Even in countries that initially attempted to sterilize the expansion in liquidity that capital inflows created, the result has generally been a rapid expansion in domestic lending and/or securities investments. Such a rapid expansion in bank balance sheets implies at least the possibility that credit risk exposures and market risk exposures have increased sharply.

The effects of capital controls are also discernible in the balance sheet data. In Chile, taxes on short-term capital inflows introduced in 1991 have constrained the growth of commercial bank foreign liabilities even while total foreign capital inflows have increased. Hence, the expansion in bank balance sheets has been more modest. The situation changed markedly in 1994 however, as foreign liabilities and assets both increased sharply, fueling a significant increase in bank assets. In Malaysia, the imposition of capital controls in February 1994 scaled back capital inflows into the banking system and led to a sharp decline in the size of the banking sector.

5. Impact on securities markets 1/

An important feature of recent capital flows to developing countries is the relative size of portfolio flows, particularly equity investment (see Table 1). Developing country equity markets provide foreign investors with opportunities to diversify their portfolios and to exploit risk/return profiles unavailable in their own markets. Foreign equity investment also provides developing countries with access to a broader investor base, new sources of capital at potentially lower cost, and greater market depth and liquidity. 2/ Thus far, however, preferences for liquidity have limited foreign participation in emerging bond markets; corporate bond markets are underdeveloped in most developing countries, and in most cases foreign investors can satisfy their demand for sovereign risk in international bond markets. 3/

Foreign investment in domestic equity markets is of importance for at least two reasons. First, such investment may affect the way in which some financial assets are priced. At one extreme, for example, is the possibility that foreign capital inflows may initiate a speculative bubble in asset prices. More generally, foreign inflows and outflows can introduce extraneous sources of price fluctuation, resulting in less efficient asset pricing and, therefore, less efficient resource allocation. Second, securities are important assets of banks and other types of financial institutions; in some countries, the definition of regulatory capital includes unrealized gains on securities holdings. Fluctuations in

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1/ See also Folkerts-Landau, and others (1995).

2/ See Feldman and Kumar (1994) for a discussion of the costs and benefits to developing countries of equity markets.

3/ Mexico has been an important exception to this generalization, attracting significant amounts of foreign investment in tesobonos.

securities prices, therefore, can lead to fluctuations in bank earnings and capital. Regulations in many developing countries allow banks to deal in securities, either directly or through subsidiaries; this provides another mechanism through which developments in securities markets can affect bank income. Consequently, sharp declines in securities prices can, through their effects on the banking system, have important systemic consequences.

a. Market efficiency 1/

Information efficiency allows capital markets to perform their allocative function because securities prices reflect all available information. Mispricing can lead to a misallocation of resources to relatively unproductive enterprises and industries, and ultimately raises the cost of capital for efficient enterprises. The presence of international investors might have a number of, possibly conflicting, effects on pricing efficiency. Foreign investment decisions often are influenced by events in other markets (low returns in industrial country markets, for example) and do not always reflect the "fundamentals" in domestic markets. Foreign investors may also have less information about domestic companies, or may place much greater importance on liquidity, which may lead them to exclude many firms from consideration in their portfolio. Hence, relative prices may be distorted by the presence of foreign investors, particularly in those markets, such as Indonesia and Mexico, where foreign investors account for a large proportion of total turnover. Alternatively, foreign investors often are equipped with better valuation techniques and more advanced computer and information processing technology than local investors, and can speed up the adjustment of prices to changes in fundamental economic factors. However, foreign investment often includes a significant amount of "round tripping" in which local investors invest through offshore accounts, in which case foreign investment flows may not be based on less information than flows from domestic investors.

Market efficiency can be tested by examining the ability of local stock returns to predict future returns and the extent to which stock returns in industrial country markets (the U.S. equity market, for example) affect future equity returns in emerging markets. 2/ Predictability of future returns implies unexploited profit opportunities and hence, weak-form

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1/ A market is said to be efficient if all available information is fully reflected in current market prices.

2/ Other forms of pricing inefficiency include anomalies such as seasonality, day-of-the-week effects, and month-effects. Weak-form efficiency can also be tested by looking for serial correlation in returns-- another form of evidence of predictability. Claessens, Dasgupta, and Glen (1993) find significant month-effects for 16 of the 20 emerging markets tracked by the International Finance Corporation. They also find significant autocorrelation for seven emerging markets.

information inefficiency. 1/ For Hong Kong and Korea, initial periods of low and relatively stable inflows were followed by a period of higher average inflows (Table 34). 2/ In both countries, the most recent period has been characterized by significantly higher volatility in flows. In Thailand, investment flows were highly volatile after the opening up of the market in late 1988. By mid-1991 this volatility had subsided, as had the average level of flows, but since late 1992 investment flows have been much more volatile. In Mexico, the initial period of low-level flows was followed by a period of high and volatile investment flows which subsided in 1993.

The first column of Table 34 reports the proportion of variability in daily stock index returns that is explainable from past local market returns alone. 3/ For Hong Kong and Mexico, an increase in the rate of inflows is associated with a slight decline in predictability (that is, greater efficiency), while for Korea there seems to have been no change. For both Hong Kong and Thailand, an increase in the volatility of flows is associated with a decrease in efficiency.

When past returns from the U.S. stock market alone are used to explain variability in local market returns, predictability is found to be greater when portfolio flows are larger, especially when such flows are volatile (Column 2). Using both past local market returns and the returns from the U.S. stock market (Column 3), predictability seems to be higher when flows have been volatile, suggesting that for all countries examined except Thailand, there was some loss of efficiency. Moreover, regardless of the nature of investment flows, combining past local and U.S. equity price returns increases the predictability of the regressions.

1/ Weak-form efficiency holds when current or past market prices cannot predict future prices.

2/ For want of a more complete data set, only data on U.S. equity investment flows are used to identify periods of high inflows or periods of volatile flows.

3/ Predictability is measured by the regression R-squared from regressing daily index returns on returns from the previous ten days.

Table 34. Market Efficiency Tests

	Predictability of Local Stock Market Return		
	Using past local returns	Using past Dow Jones Industrial Average (DJIA) returns	Using past local and DJIA returns
Hong Kong			
Low-inflow period (Jan. 1988 - Aug. 1991)	6.5	6.4	13.2
High-inflow period (Sept. 1991 - Oct. 1993)	4.3	4.1	8.0
Volatile-flow period (Nov. 1993 - July 1994)	7.9	16.8	22.1
Korea			
Low-inflow period (Jan. 1988 - Dec. 1991)	3.5	1.8	5.1
High-inflow period (Jan. 1992 - June 1993)	3.9	3.1	7.1
Volatile-flow period (July 1993 - July 1994)	5.3	3.0	8.0
Thailand			
Volatile-flow period (Jan. 1988 - Apr. 1991)	3.6	14.2	15.7
Moderate-inflow period (May 1991 - Oct. 1992)	7.4	4.5	12.2
High-flow-volatility period (Nov. 1992 - July 1994)	5.5	4.8	9.9
Mexico			
Low-inflow period (Jan. 1988 - Apr. 1990)	8.7	2.3	12.2
Volatile-flow period (May 1990 - Jan. 1993)	6.2	17.2	20.7
More-steady-inflow period (Feb. 1993 - July 1994)	4.4	10.2	14.0

Source: Staff calculations from The WEFA Group data.

Note: Predictability is measured by the regression R-squared from regressing daily local market return on returns from the past ten days. It represents the percentage of the variation in the daily local market return explained by returns from the past ten days. The separation of the overall sample into different subsample periods with different portfolio flow characteristics is performed by inspecting the monthly portfolio flow data from the United States to these emerging markets and the data on the changes in monthly flows. The separation is also jointly determined by the use of common structural-break test statistics including the CUSUM test statistics and the CUSUMSQ test statistics. The return data are the continuously compounded daily return from the Hang Seng Index for Hong Kong, the Korea Composite Index for Korea, the Bangkok SET Index for Thailand, and the Morgan Stanley Capital International Index for Mexico.

b.   Market volatility

The presence of foreign investors can also increase stock price volatility by magnifying price fluctuations in the local market. 1/ For example, a decline in an emerging market's stock price index may lead foreign investors to redeem their shares in country funds invested in that market. Fund managers may then be obliged to sell shares in the local market, unless they have adequate cash funds, which further reduces prices. In this way, the participation of large mutual funds--which in some countries is the only way for nonresidents to invest--might have a destabilizing impact on the local market. In December 1993, for example, U.S. investors purchased $674 million worth of Hong Kong shares, on a net basis; however, in the following month, U.S. investors sold, on a net basis, $708 million of Hong Kong shares, and set the stage for the rapid decline in share prices in the coming months. A similar reversal of capital flows occurred in Mexico. In February 1994, there was a net equity inflow of $280 million from the United States; however, in the following month, U.S. investors sold a net $170 million of Mexican shares. This rapid change in capital flows was accompanied by a rapid stock-price decline in Mexico. This points to the possibility that volatile equity flows can have an adverse effect on the variability of stock prices in even relatively large emerging stock markets.

In this context, three related questions arise: has stock-return volatility increased in absolute terms in the emerging markets; has this volatility increased in emerging stock markets relative to, for example, return volatility in the United States; and has the probability of large declines in stock prices increased? The results in Table 35 show that the absolute volatility of stock returns has shown little evidence of increasing during periods of increased portfolio flows, the exception being Hong Kong in the period when portfolio flows were very volatile. The increased volatility in Hong Kong might have been related to sudden reversals of investor sentiment about the prospects for investment in China and about the impending transfer of sovereignty over Hong Kong to China. In Mexico and

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1/ Kim and Singal (1993) find evidence that the volatility of equity price returns increases when the market is opened to foreign investment. They conclude, however, that this is due not to the transmission of shocks from foreign markets, but from the effect of other domestic liberalization measures. Domowitz, Glen, and Madhavan (1994) explore another mechanism through which foreign equity investment affects volatility in the local market. They find that shares listed on the Mexican stock exchange that are open to foreign investment become more volatile, despite a narrowing of bid-ask spreads, when the company issues depository receipts in the United States. Although pricing margins narrow in Mexico, trading by foreign investors is diverted away from the local stock exchange, resulting in lower turnover and greater variability.

Table 35. Daily Market Index Return Volatility
and Extreme Price Movement Analysis

	Absolute Volatility 1/	Relative Volatility 2/	Probability of Extreme Price Decline 3/ (In percent)
Hong Kong			
Low-inflow period (Jan. 1988 - Aug. 1991)	1.61	1.52	2.06
High-inflow period (Sept. 1991 - Oct. 1993)	1.31	1.98	1.74
Volatile-flow period (Nov. 1993 - July 1994)	2.33	3.68	9.94
Korea			
Low-inflow period (Jan. 1988 - Dec. 1991)	1.51	1.42	3.22
High-inflow period (Jan. 1992 - June 1993)	1.18	2.55	3.40
Volatile-flow period (July 1993 - July 1994)	1.14	2.31	2.01
Thailand			
Volatile-flow period (Jan. 1988 - Apr. 1991)	1.19	1.74	5.51
Moderate-inflow period (May 1991 - Oct. 1992)	1.69	2.14	3.97
High-flow-volatility period (Nov. 1992 - July 1994)	1.17	2.66	3.75
Mexico			
Low-inflow period (Jan. 1988 - Apr. 1990)	1.99	1.88	5.11
Volatile-flow period (May 1990 - Jan. 1993)	1.57	1.76	4.59
More-steady-inflow period (Feb. 1993 - July 1994)	1.61	2.57	3.72

Source: Staff calculations from The WEFA Group data.

Note: The separation of the overall sample into different subsample periods with different portfolio flow characteristics is performed by inspecting the monthly portfolio flow data from the United States to these emerging markets and the data on the changes in monthly flows. The separation is also jointly determined by the use of common structural-break test statistics including the CUSUM test statistics and the CUSUMSQ test statistics. The returns data are the continuously compounded daily returns from the Hang Seng Index for Hong Kong, the Korea Composite Index for Korea, the Bangkok SET Index for Thailand, and the Morgan Stanley Capital International Index for Mexico.

1/ Standard deviation of the daily return.
2/ Standard deviation relative to standard deviation of the daily return of the Dow Jones Industrial Average.
3/ Probability of a larger than 3 percent daily drop.

Korea, absolute price volatility actually declined. 1/ The estimated declines in both absolute volatility and the probability of sharp price declines in Mexico and Korea do not support the view that increased portfolio flows will necessarily cause excessive speculative trading and price fluctuations. The decline in volatility might be due in part to an increase in liquidity associated with the inflow of capital.

The relatively minor change in price volatility in the emerging markets generally reflects a similar pattern in the more developed equity markets throughout the world. For example, volatility in stock market returns in the United States declined during the period 1988-94. 2/ Despite this similarity, however, in all of the emerging markets studied there is strong evidence that stock-returns volatility has increased relative to stock-returns volatility in the United States, especially in the period when portfolio flows were very volatile. The most extreme case is Hong Kong, where the ratio of the standard deviation of stock returns in the volatile-portfolio-flow period is more than twice that in the low-portfolio-flow period. This increase in relative volatility in the emerging markets is consistent with the view that volatile portfolio flows can magnify the sensitivity of stock returns in emerging stock markets to fluctuations in stock returns in the larger developed equity markets, such as in the United States.

With regard to the probability of sharp stock price declines, the most striking example is Hong Kong, where the probability of a price decline larger than 3 percent is about 10 percent in the volatile-flow-period and about 2 percent in the low-flow period. In Korea, the probability of a decline larger than 3 percent turns out to be lower in the volatile-flow period than in the other periods. For Thailand, the volatile-flow period has the highest probability of an extreme price drop. In Mexico, the probability of a sharp decline in the volatile-flow period is lower than in the low-flow period but higher than in the more-steady-flow period. It is such sudden and sharp changes in prices and, the risk of a sudden loss of liquidity--as is discussed below--that can significantly increase systemic risk.

1/ This is also true for Chile, another country that has been experiencing a surge in capital flows and a stock market boom; see Reinhart and Reinhart (1994).

2/ The standard deviation of returns on the Dow Jones Industrial Average declined with each successive time period described for each country in Table 35. For example, using the three time periods identified for Hong Kong, the standard deviations of Dow Jones returns were 1.06 percent, 0.67 percent, and 0.63 percent. For the time period defined for some other countries, the decline in volatility is more pronounced.

c. Market linkages and spillovers

The increased participation of foreign investors in emerging markets can potentially strengthen the linkage between local and foreign markets. Even though foreign investment might not affect the relationship between market fundamentals in industrial and emerging stock markets, it can magnify the effect of industrial country market turbulence on the emerging equity markets. 1/ Disturbances to foreign stock markets affect the relative returns on investments in developing country markets which may cause foreign investors to adjust their positions. In some cases, foreign investors own such a large proportion of the tradable stock that their transactions have a large impact on prices. For example, in Indonesia, foreign investors own about 30 percent of listed equity, but because so much of the locally owned stock is closely held and not traded, foreign investors' transactions account for more than 70 percent of turnover on the Jakarta Stock Exchange.

Spillovers may arise when the behavior of nonresident investors leads to a defensive investment strategy by resident investors. Because local investors generally have no information about whether foreign investors are changing their portfolios because of liquidity constraints, a desire to rediversify, or special information about economic fundamentals in the local market, local investors will tend to react to such moves. Such reactions will magnify the effect of foreign turbulence on the local market.

Table 36 reports correlations between stock price volatility--estimated by the squared daily stock market return--in the United States on one day and stock price volatility in selected emerging stock markets on the following day. The data suggest that there have been volatility spillovers from the U.S. stock market to these emerging stock markets, and that these spillovers have been strongest in periods when portfolio flows have been most volatile. 2/ The correlation measures of volatility spillovers are highest during the volatile-flow periods in all countries examined except Thailand. For both Hong Kong and Korea, the correlation measure of volatility spillovers in the volatile-flow period are more than twice as large as in the low-inflow period. For Mexico, the correlation measure of volatility spillovers in the volatile-flow period (which occurs in a

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1/ Ng, Chang, and Chou (1991) find that active participation of foreign investors on local stock markets is necessary for there to be spillovers. Simply receiving information about developments in other markets, or having correlated economic fundamentals--as one might expect between close trading partners, for example--is not sufficient.

2/ The increase in volatility spillover in Mexico, when portfolio flows became volatile, is statistically significant at the 1 percent level. The subsequent drop in spillover, when portfolio flows became less volatile, is also highly significant. In Thailand, there is a significant drop in volatility spillover when portfolio flows became less volatile.

Table 36. Volatility Spillover Analysis

	Correlation Measure of Volatility Spillover 1/
Hong Kong	
Low-inflow period (Jan. 1988 - Aug. 1991)	0.068 **
High-inflow period (Sept. 1991 - Oct. 1993)	0.023
Volatile-flow period (Nov. 1993 - July 1994)	0.150 * +
Korea	
Low-inflow period (Jan. 1988 - Dec. 1991)	0.055 *
High-inflow period (Jan. 1992 - June 1993)	0.029
Volatile-flow period (July 1993 - July 1994)	0.120 *
Thailand	
Volatile-flow period (Jan. 1988 - Apr. 1991)	0.296 ***
Moderate-inflow period (May 1991 - Oct. 1992)	0.115 ** +++
High-flow-volatility period (Nov. 1992 - July 1994)	0.103 **
Mexico	
Low-inflow period (Jan. 1988 - Apr. 1990)	0.048
Volatile-flow period (May 1990 - Jan. 1993)	0.324 *** +++
More-steady-inflow period (Feb. 1993 - July 1994)	0.003 +++

Source: Staff calculations from The WEFA Group data.

Note: The separation of the overall sample into different subsample periods with different portfolio flow characteristics is performed by inspecting the monthly portfolio flow data from the United States to these emerging markets and the data on the changes in monthly flows. The separation is also jointly determined by the use of common structural-break test statistics, including the CUSUM test statistics and the CUSUMSQ test statistics. The return data are the continuously compounded daily return from the Hang Seng Index for Hong Kong, the Korea Composite Index for Korea, the Bangkok SET Index for Thailand, and the Morgan Stanley Capital International Index for Mexico.

1/ Correlation between squared daily local return and lagged squared daily return of the Dow Jones Industrial Average; ***, **, and * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively. In addition, +++, ++, and + indicate a significant change in the correlation measure from the previous period at the 1 percent, 5 percent, and 10 percent levels, respectively.

different time period than those of Hong Kong and Korea) is more than seven times the correlation measure for the low-inflow period.

VIII. Financial Sector Constraints on Crisis Management 1/

1. Introduction

Financial markets and institutions play important roles in intermediating both capital inflows and outflows. At the same time, in times of financial market turbulence, for example when there is a massive surge in capital outflows, the financial system is profoundly affected. Financial structure, and in particular the health of the banking system, can have an important impact on both the severity of the crisis and the ability to respond to crisis. One implication of these complex relationships is that it may be difficult to operate a currency board in countries with relatively weak banking systems. The automatic adjustment mechanism of a currency board operates directly on the balance sheet of the banking system, and can lead to instability if banks are not well-capitalized.

Section 2 describes the roles of banks and financial markets in intermediating capital outflows, including speculative attacks. This section also examines the virtues of liquid markets and the disadvantages of illiquid markets. Section 3 analyzes the microeconomic and institutional mechanisms of crisis management, first by examining foreign exchange market intervention to defend an exchange rate regime, second by examining the classic interest-rate defense against a speculative attack, and third by analyzing the operational aspects of a currency board. A final section discusses recent developments in the Mexican banking system and recent measures that have been taken to improve asset quality.

2. Financial markets during periods of capital outflow

a. Mechanics of capital outflows and speculative attacks

The domestic banking system provides the main channel for capital outflows by providing essential payment and currency conversion services. When investors, domestic or foreign, want to invest abroad they first must sell their local currency securities. In return they will obtain, in the first instance, a local currency deposit in a domestic bank. This deposit will then be converted to foreign exchange, and then transferred out of the country. The exchange of local currency for foreign currency in the spot market results in a decline in the central bank's foreign exchange reserves and/or puts pressure on the exchange rate depending upon the nature of the exchange rate regime.

1/ Prepared by Marcel Cassard and Michael Spencer.

During a speculative attack, the domestic banking system takes on a somewhat different role that, in effect, increases its credit risk. The mechanisms are as follows. Ultimately, speculators must be able to draw on credit in the country whose currency is being attacked. 1/ While an investor may be able to borrow Mexican pesos in New York, for example, the creditor bank would ultimately have to obtain pesos from the Mexican banking system. Speculators try to profit from currency movements by acquiring a short position in a currency that they expect to be devalued, usually by entering into forward contracts to deliver the currency. Some margin is required by the banks, but this can be leveraged up by a factor of ten or more by the speculator. As standard practice, banks will generally respond to the sale of a forward contract by entering into offsetting spot and swap transactions to eliminate the currency and maturity mismatches. Thus, for example, a bank's forward commitment to acquire domestic currency is balanced by selling domestic currency for foreign exchange in the spot market, and then entering into a swap contract to deliver foreign exchange for spot delivery and receive foreign exchange when the forward contract matures. 2/

Thus, a forward sale of domestic currency by a speculator immediately results in a spot sale by the bank, and although the bank hedges its currency and maturity risk, it takes on credit risk vis-à-vis both the speculator and the swap counterparty. Moreover, the hedging transactions require either a counterparty from outside the banking system or the central bank to buy the local currency on the forward market (the forward leg of the swap). The latter is often the only willing counterparty. In effect, the central bank finances both balancing operations: it eases pressure on the exchange rate arising from the spot sales by buying the domestic currency on the spot market; and it ultimately provides the credit to finance the forward leg of the swap transactions between banks. Lenders of domestic currency in the swap market finance this credit by borrowing through the discount window or other central bank financing devices. In this way, the central bank essentially finances the speculative attack against itself.

When they agree to a forward transaction, banks take on credit risk. They will limit this risk by imposing credit limits on their counterparties. These credit limits constrain the volume of forward contracts that can be issued. Another prudential constraint on the extent of speculation is the foreign exchange exposure limits many banks are required to observe, or choose to impose on their own operations. Because they are also acquiring credit risk, speculators may be reluctant to enter into a large volume of forward foreign exchange contracts with a particular bank out of concern

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1/ While an investor may be able to borrow deutsche mark in London, for example, the creditor bank would ultimately have to obtain the deutsche mark from the German banking system.

2/ See International Monetary Fund (1993) for an illustration of these balancing operations.

that the bank may be unable to honor the contract in the event of a sharp depreciation.

b.   *Constraints posed by illiquidity in financial markets* 1/

There are some obvious constraints on the process just described. In the case of a simple sale of domestic securities to finance the capital outflow, the less liquid are domestic securities markets (as measured by the bid-ask spread) the more costly it is for investors to sell securities. Consequently, the expected exchange rate depreciation would have to be larger to make it worth incurring these costs. In addition, the attempt to sell a large amount of securities in an illiquid market may significantly lower their market price. 2/ Hence, illiquidity effectively increases transactions costs, which inhibits inflows and outflows. In Indonesia, for example, foreign investors own approximately 30 percent of listed equity, but historically have accounted for more than 70 percent of turnover. In the event of a loss of confidence in the currency, illiquidity might make it difficult to find buyers: the dominant traders--foreign investors--would be lined up on one side of the market. At the best of times on the Jakarta Stock Exchange, bid-ask spreads are wide and average transactions sizes are small; it can take some time to sell large shareholdings. There were similar conditions in Mexico in late 1994 and early 1995--foreign investors accounted for a greater proportion of turnover than their ownership stakes would imply. 3/

Similarly, illiquidity in money markets can also increase the cost of foreign investment. Holders of money market instruments in illiquid markets face wide bid-ask spreads that discourage selling except when large depreciations are expected. In addition, illiquidity in money markets (especially the interbank credit markets) increases the cost of credit. This will make it more expensive for banks to finance their forward purchases of domestic currency.

Although it might appear that illiquid markets are less prone to experiencing a speculative attack, there are alternative mechanisms for speculators to attack currency. A simple alternative would be to take out a local currency loan, purchase foreign currency, and hold it until the loan matured. If the exchange rate depreciates by the time the loan matures, speculators will have profited by the difference. The scope of such operations is limited, however, by the prudential limits banks have on loans

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1/   This discussion is closely related to the discussion in Chapter VI on the use of capital controls as a means of deterring short-term capital inflows and outflows. Consequently, capital controls will not be discussed in this Chapter.

2/   Symmetrically, an attempt to purchase a large volume may sharply increase the market price.

3/   In Mexico, as of October 1994, foreign investors held approximately 26 percent of the stock market capitalization.

to single counterparties. Moreover, during a crisis, interest rates may rise more than the expected rate of depreciation, which increases the cost of this strategy.

Illiquid securities markets and tight credit markets clearly limit the speed at which sizable positions against a currency can be taken. However, the benefits to a country during brief episodes of market pressure and turbulence must be considered against the ongoing costs of illiquid markets. While wide bid-ask spreads may limit selling pressure, they may also deter investment in the first place. Illiquid domestic markets, in effect, inhibit both inflows and outflows. Liquid markets have important benefits, including lower capital costs, more efficient resource allocation and price discovery, and constant market feedback for policy makers. In addition, liquid money markets provide an important channel through which domestic financial institutions can manage their day-to-day risk exposures. Likewise, liquid forward foreign exchange markets allow financial and nonfinancial firms the opportunity to hedge their foreign exchange risks.

3.   Crisis management

   a.   Foreign exchange market intervention

The first line of defense against a weakening exchange rate is simply to support the currency by purchasing it in the foreign exchange market. In employing this defense, the central bank increases demand for the domestic currency by depleting its reserves. The ability to defend the exchange rate through spot intervention is clearly limited by the amount of available reserves, including borrowed reserves. While these are often large amounts, one lesson from the ERM crisis in the Fall of 1992 was that market participants together, through leveraging, can mobilize much larger positions in foreign currencies than can be countered, either because of quantitative or political constraints on the authorities.

Central banks can increase their resources by borrowing foreign exchange on the international syndicated loan market or from other central banks. However, even central banks are limited in the amounts they can borrow. When borrowing from the domestic banking system, central bank borrowing is constrained by the prudential limits on credit and foreign exchange exposures that domestic banks are obliged to meet. Although banks may have larger, even unlimited, credit limits on loans to the central bank as compared to loans to other counterparties, the main constraint on lending to the central bank is likely to be the interbank credit limits. When the central bank borrows large amounts of foreign currency from domestic banks, the loaned amounts must be acquired in the interbank market. The size of these amounts is constrained by both foreign-exchange-exposure limits and by large-exposure (single counterparty) lending limits on interbank borrowing imposed by the counterparty banks that provide the foreign currency.

Because the scope for borrowing from the domestic banking system is limited, central banks often turn to official sources of credit, for

example, official swap facilities between central banks such as the very
short-term financing facility in the ERM. Such borrowing is limited by two
factors. The main constraint is actually from the creditor institutions.
The provision of large amounts of credit between central banks can introduce
a conflict in the creditor central bank between the defense of the exchange
rate and its own domestic monetary policy objectives. Unless the creditor
central bank wants to expand the domestic money supply in its own country,
it will sterilize the expansion in credit implied by the use of the inter-
central bank swap facility. Sterilization in this case means selling other
assets--for example, government securities. However, sterilization can be
costly. In the 1992 ERM crisis for example, the Bundesbank was undertaking
currency swaps with German banks in non-ERM currencies at rising deutsche
mark interest rates. Moreover, central banks can exhaust their supply of
securities to sell to the market, and may be limited in their ability to,
for example, issue securities of their own. Consequently, the creditor
central bank soon may be confronted with the need to abandon domestic
monetary policy objectives or to stop lending to the central bank whose
currency is being attacked.

Second, the more a central bank borrows to defend its currency, the
greater are its potential losses if the defense is unsuccessful. Given the
limited resources available to a central bank, if there is a high
probability that the defense will not succeed--for example because of a
declining willingness of creditor central banks to lend--then the central
bank will have to consider other strategies for using its limited resources
in defense of the currency.

b.   The interest rate defense

Because spot intervention is constrained by the amount of reserves that
can be mobilized, the central bank may have to consider other policy
options. In response to gradual capital outflows, one option is to make
local assets more attractive, by increasing interest rates relative to those
in industrial countries. 1/ During periods of great stress, this policy
would be most effective if interest rates are increased on the most liquid
assets--interbank deposits and government bonds. During a speculative
attack, central banks often use sharp increases in interest rates to inhibit
speculation by making it more costly for speculators to finance or settle
their forward positions, or for banks to finance their own positions (for
example, if one-month forwards are financed in overnight loan markets). A
sharp increase in interest rates penalizes those who are short of local
currency, thus making it more costly to speculate; it also increases the

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1/   Empirical studies of the determinants of capital inflows to developing
countries have identified interest rate differentials between industrial and
developing countries as being perhaps the most important.

returns to holding local currency assets. This is the classic interest rate defense of a fixed exchange rate. 1/

In a currency board regime these defensive interest rate increases are automatic. 2/ Under the rules of a currency board, foreign exchange can only be acquired by surrendering an equal amount of local currency assets. Thus, capital outflows reduce the monetary base. This leads to a contraction in monetary aggregates (via the monetary multiplier) and to an increase in interest rates, which encourages investors to hold domestic assets.

To be effective, the central bank must have credibility. Experience suggests that central banks obtain this credibility by taking actions that convince the market that it is prepared to take whatever action is necessary, including enduring high interest rates for a protracted period, in order to defend the exchange rate.

Nevertheless, there are important reasons why the interest rate defense might not be employed. In particular, there may be certain characteristics of the domestic financial system that make the interest rate defense less effective, or too costly. 3/ The initial problem with the interest rate defense is that higher interest rates may not affect the behavior of speculators if they have previously arranged medium-term financing for their positions. The higher interest rates might, however, affect the financial condition of banks that financed the speculation. 4/ For example, if banks had provided one-month credit to speculators and funded the credit through short-term (for example, overnight) interbank loans, then an increase in interbank interest rates would increase the cost of funding the speculators. However, all banks, including those who had no part in the speculative attack, would incur higher costs.

In many countries, including Argentina, Indonesia, and Mexico, some of the smaller banks fund themselves to a significant extent through interbank

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1/ Garber and Spencer (1994) discuss how the widespread use of dynamic hedging operations can actually reverse the effects of the interest rate increase.

2/ See below for a discussion of the adjustment mechanism in a currency board.

3/ There are other important constraints on the use of interest rate increases to defend the currency, including the impact on debt financing costs for the government. This was apparently an important reason why the increase in the discount rate by the Banca d'Italia in August 1994 was not effective. Since a large proportion of Italian government debt is in the form of domestic floating rate or very short-term securities, investors questioned the sustainability of high interest rates.

4/ Higher rates would also squeeze the funding of securities and banking operations, which typically finance their positions through short-term rollover credit.

borrowing. When the central bank increases its intervention rate, interbank interest rates are the first rates to rise. The deliberate increase in interest rates therefore creates losses for the entire banking system. For well capitalized banks with healthy balance sheets, these losses can be incurred without threatening the soundness of these institutions or the stability of the financial system. The HKMA responded to a speculative attack in January 1995 by tightening liquidity and forcing overnight interbank interest rates to rise sharply from 5.38 percent at the end of January 12 to 12 percent in early trading on January 13. This swift policy response imposed much higher funding costs on the banking industry in Hong Kong, which relies on borrowing from the HKMA on the interbank market for liquidity management purposes. However, the HKMA was confident that a brief increase in interest rates and the associated losses could easily be borne by the banking system, in part because the average bank capital/risk-weighted-assets ratio was in the neighborhood of 15-20 percent.

In contrast, in countries where the banking sector is weak, the use of an aggressive interest rate policy is constrained by concerns about the ability of the banking sector to survive the shock. If the banking sector is characterized by low capital ratios and weak balance sheets, the losses resulting from the high interest rates associated with the interest rate defense could raise concerns about the solvency of the banking system. The interest rate defense could potentially result in bank failures or the use of official funds to provide emergency liquidity assistance, capital to the banking industry, to pay out deposit insurance benefits.

The interest rate defense can also affect bank capital through its impact on the quality of bank assets. If the capital outflows are driven by fundamental concerns about the economy rather than by a brief period of purely speculative activity, it may be necessary to keep interest rates high for a protracted period of time. Persistently high interbank interest rates will eventually affect the whole interest rate structure as banks will pass these increases on to their customers through higher loan rates. 1/ In this way, a sustained increase in interest rates designed to prevent capital outflows runs the risk of affecting the quality of banks' loan portfolios. In cases where the banking sector already has a large number of nonperforming loans, a sharp increase in interest rates can reduce cash flows from loans and create severe liquidity problems.

In a country that has had a fixed exchange rate for a substantial period of time, capital outflows pose a particular dilemma. If the exchange rate was fixed as part of a stabilization program, domestic banks and

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1/ Unless of course, the higher interest rates can be applied selectively to banks that are funding speculators, or even to particular liquidity demands. In France, for example, during the ERM crisis in September 1992, the central bank discriminated between requests for funds through the discount window to finance commercial activity rather than speculation, and offered discounts to the former at much lower rates.

nonbanks might have had an incentive to acquire foreign currency liabilities. At least initially, foreign interest rates probably would have been lower (lingering inflation expectations would have kept domestic real rates relatively high) and currency risk might have been perceived to have declined. In such a situation, foreign currency loans might have been much more attractive than loans denominated in domestic currency. In Mexico, for example, a substantial portion of the domestic foreign currency loans were apparently made to firms with no obvious foreign currency income. The dilemma facing the authorities is that, if bank balance sheets are already weak, an increase in interest rates to defend the exchange rate raises borrowing costs to all, resulting in rising loan defaults and declining bank income. However, the alternative, of allowing the exchange rate to depreciate, is also a problem because it raises the cost of foreign currency loans and results in higher default rates.

The crucial factor is the speed with which interest rate increases are passed on to borrowers. In the United Kingdom during the ERM crisis, for example, an important constraint on the interest rate defense was the fact that most mortgages carried floating interest rates tied to the bank rate. Consequently, there was a direct and rapid pass-through from the central bank's interest rate policy to an important interest rate for consumers. *This transmission mechanism was widely seen as imposing large costs on* consumers and businesses. In Mexico and Indonesia, the majority of loans have floating interest rates. In these countries, most loans' would have their interest rates adjusted within three months.

c. Currency boards--the automatic adjustment mechanism at work

A currency board is an institutional arrangement in which the board is committed to exchanging, on demand and without limit, foreign currency and local currency--and in some cases bank reserves--at a preannounced exchange rate. 1/ The credibility of the currency board stems from the complete backing of the currency with foreign assets, usually invested in interest-bearing government securities denominated in the reserve currency. 2/ Currency boards are viewed as implying a stronger commitment than a simple

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1/ Currency boards are operating in several countries, including Argentina (since 1991), Estonia (1992), Hong Kong (1983), and Lithuania (1994).
2/ In a pure currency board regime, foreign reserves are held to back currency in the hands of the public and in bank vaults only. In practice, currency boards differ on the definition of the monetary aggregate that is backed by the foreign reserves, and the extent of coverage of these reserves. For example, in Hong Kong, the Exchange Fund is committed to 100 percent foreign currency backing for Hong Kong dollar bank notes. In Argentina and Estonia, the currency board backs both currency and commercial banks' reserves, but these liabilities are backed in part by domestic government debt denominated in foreign currency. See Bennett (1994) for a discussion of these issues.

pegged exchange rate rule because there are legal constraints to reneging on the commitment to fixed exchange rates. For instance, in Argentina, the abandonment of the convertibility law requires a change in the constitution. In addition, under a pure currency board arrangement, the monetary authority is not allowed to lend to the government, to act as a lender of last resort to the banking system, or to engage in open market operations. 1/

Under a currency board arrangement, capital outflows directly affect the supply of liquidity in local currency money markets. In the simplest currency board regime--in which the currency board exchanges foreign currency for domestic currency only--when a local currency deposit is converted to a foreign currency deposit, it must first be exchanged for local currency and then be presented to the currency board for conversion to foreign currency. Initially, deposit withdrawals from the banking system will be accommodated by a reduction in the banks' cash reserves. As the volume of capital outflows increases, commercial banks will exhaust their supply of local currency cash reserves and be forced either to liquidate domestic assets (including ultimately part of their domestic currency loan portfolio) for cash or to acquire domestic currency from the currency board by selling foreign assets. 2/ This process leads to a decrease in total credit and in the money supply, and to an increase in interest rates. As interest rates rise, the relative return to domestic investment increases, and the incentive for capital to flow out declines. Hence, under the currency board, or indeed any fixed exchange rate regime, capital outflows affect the domestic financial system through an expansion or contraction of bank balance sheets. In this simple currency board regime, capital outflows will eventually cease when the banking system runs out of foreign assets to sell to the currency board. 3/ All cash and commercial bank foreign assets would have been converted to foreign currency, but there will remain a stock of local currency denominated deposits and loans.

In the Argentine, Estonian, and Hong Kong currency boards, capital outflows will quickly lead to pressure on the interbank interest rate. In these regimes, the currency board will convert banks' deposits at the

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1/ This is not true, however, in Hong Kong where the HKMA has an explicit mandate to act as an official lender of last resort and has been involved in open market operations since 1990.

2/ The currency board mechanism effectively adds a step in the process of converting domestic currency deposits into foreign currency: the holder of the deposit demands a withdrawal, which the bank satisfies by selling foreign assets to the currency board, which then sells an equivalent amount of foreign currency to the deposit holder.

3/ Banks will likely be unwilling or unable to borrow foreign exchange from abroad since the potential losses from a devaluation, which at this point most investors would anticipate, would be significant.

central bank into foreign currency. 1/ Hence, banks will initially turn
to the interbank market to acquire reserves. 2/

If capital outflows are sufficiently large, a currency board could
collapse due to a shortage of foreign assets. If it did not initially
provide complete cover for the domestic currency, the currency board might
deplete its foreign currency reserves before the entire domestic currency
stock had been converted. If it did have full backing, massive capital
outflows might lead to the elimination of domestic currency from circulation
and its replacement by the foreign reserve currency. The currency board
would still exist--albeit with a greatly reduced balance sheet--and it would
still be prepared to exchange foreign assets for domestic currency at the
original exchange rate. However, once the domestic currency supply has been
completely converted, and until demand for local currency returned, there
would be no transactions, the currency board would no longer provide
seigniorage, and would be largely irrelevant. 3/

Even assuming the currency board had sufficient reserves to stave off a
collapse, large scale capital outflows would still have serious adverse
consequences for the financial system. As demand for foreign currency
increases, interest rates would increase sharply. 4/ Indeed, this is the
intended effect--the classic fixed exchange rate adjustment mechanism.
Rather than increasing as a matter of policy (as in the interest rate
defense described earlier) under a currency board arrangement interest rates
increase automatically as demand for foreign currency increases.

Under a currency board, fluctuations in demand for local currency may
result in sharper fluctuations in local currency interest rates than would
be the case with a simple fixed exchange rate. 5/ As demand for domestic
currency increases, banks must liquidate their domestic currency reserves

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1/ This is true only for the note-issuing banks in Hong Kong.
2/ Alternatively, banks could liquidate other assets and convert them to
interbank deposits to acquire reserve assets.
3/ Some residual demand for local currency might remain, for example, to
pay taxes and other such obligations to the government.
4/ In fact, interest rates rise as demand for the domestic currency
needed for presentation to the currency board for conversion to foreign
currency rises.
5/ Hypothetically, the interest rate impact of capital outflows under a
currency board would depend upon three things: the demand for foreign
currency (the initial stock of domestic currency assets that investors want
to convert to foreign currency); the foreign assets of the banking system
(the greater the foreign assets, the less reliance upon the domestic money
market); and the monetary aggregate backed by the currency board (if banks
can convert their own reserves at the central bank into foreign currency,
there will be less demand for interbank funds).

and assets to raise cash. 1/ As demand for currency rises, banks will
then have to liquidate their foreign currency assets to convert them to
local currency. Concerns about the ability of a bank to raise sufficient
cash may result in a run on deposits. This is true, of course, under any
exchange rate system. However, under a simple currency board, this may be
more acute. Holders of local currency assets must convert these to cash,
not just to deposits. The smaller base for convertibility to foreign
currency may result in a more rapid flight to cash, and consequently a
sharper increase in interest rates.

Sharp increases in interest rates likely worsen asset quality and
liquidity, at precisely the time that liquidity is most needed.
Consequently, rigid adherence to a currency board in the face of large scale
capital outflows can carry the cost of instability in the banking sector.
The quality and solvency of the banking system would determine the
resilience of the system to the interest rate defense. 2/

4.   The Mexican banking system: recent developments

     a.   Impact of the devaluation on the Mexican banking system

The devaluation of the Mexican peso has affected, and is likely to
continue to affect, Mexican banks. The immediate impact of the devaluation
fell on foreign currency and money market positions, the peso value of net
foreign currency assets and liabilities, and the valuation of their fixed-
income and equity holdings. Another, and potentially more important, impact
is on the quality of loan portfolios, capitalization levels, and on the
condition of the banking system as a whole.

The immediate effect of the peso devaluation on Mexican commercial
banks does not appear to have been severe. The net foreign-exchange
position of Mexican banks is limited by regulation to 15 percent of net
capital, and foreign-currency liabilities are limited to 10 percent of total
peso and foreign currency liabilities. It has been reported that the
banking system had a small net asset position at the time of the
devaluation. This implies that banks realized a gain, on average, on their
net-foreign-currency position. 3/ By contrast, the marked-to-market value
of the fixed-income portfolios of commercial banks is estimated to have

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1/ The liquidation of assets also puts pressure on local currency
securities prices.
2/ The high volatility in interest rates led the HKMA to develop
institutional arrangements to allow it to conduct open market operations in
order to smooth short-run fluctuations in liquidity.
3/ At end-September 1994, commercial banks had net foreign currency
assets of MexN$53 billion. However, the Mexican banking system--commercial
banks and development banks combined--had a net foreign liability of MexN$11
billion. By the end of December this net liability had increased to MexN$23
billion.

declined by MexN$660 million after the devaluation. Moreover, although it is difficult to estimate the impact of the subsequent decline in the Mexican stock market on the value of bank equity holdings, it is likely to have been significant. 1/

After the devaluation and the resulting loss of confidence, some Mexican banks experienced pressures on their liquidity positions because of the difficulties they encountered in refinancing their maturing dollar-denominated certificates of deposit, estimated at $7 billion. 2/ At least part of the problem was that Mexican banks offered tesobonos as collateral for their foreign borrowing. In the first few weeks after the devaluation, foreign investors preferred not to acquire tesobonos; as a result, banks could not sell tesobonos to repay dollar loans, even as interest rates on these loans rose sharply. The resulting tight liquidity conditions in domestic market most affected the smaller and weaker banks that lost their domestic- and foreign-currency interbank credit lines at the same time that they lost deposits--mostly demand deposits in the case of the small wholesale banks.

The more fundamental impact of the peso devaluation has fallen on the asset quality of the banking system. Even before the devaluation, Mexican commercial banks had experienced a decline in asset quality. Past-due loans increased from 3.5 percent of total loans at the end of 1991 to 8.5 percent in March 1994; and by end-1994 it had declined modestly to 7.9 percent. 3/ More significantly, past-due loans increased sharply from 35.1 percent of total capital at end-1991 to 97.5 percent at end-1994.

The devaluation adversely affected foreign-currency loans, which, as of December 1994, represented almost a third of total loans by Mexican banks. As much as 25 percent of these dollar loans may have been extended to firms without an obvious source of foreign currency income. 4/ These firms have encountered difficulties in servicing their loans at the new rates, and these difficulties mean higher default rates and greater strains on the banking system.

The sharp rise in interest rates also affected the domestic currency loan portfolio. Since most loans in Mexico are made at variable interest rates tied to the one-month cetes rate or the TIIP rate 5/, as these rates

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1/ At the end of 1994, banks' domestic equity holdings amounted to MexN$13.4 billion, or 1.6 percent of their total assets.
2/ García-Cantera and Pearl (February 1995).
3/ Because the exchange rate depreciation and interest rate increase occurred in the last ten days of 1994, and since loans are declared past due when payments are fifteen days late, the effects of these price changes is not reflected in end-year data.
4/ Moody's Investors Service, "Asset Quality Looms as Major Problem for Mexican Banks," January 1995.
5/ Tasa Interbancaria Promedia.

increased steadily in early 1995, peaking at over 90 percent in early March, payments ceased on a large proportion of loans of all types. Banks generally chose to restructure these loans, or simply to suspend interest payments, rather than be forced to recognize them as high-risk assets and to make provisions by writing off a certain amount of their already declining capital. Moreover, in Mexico, once a loan is designated as nonperforming, the penalty interest rate that is applied to the loan is 150 percent of the contracted rate. Because interest rates more than doubled, borrowers would actually have an incentive not to service the loan.

A number of factors led to a decline in the risk-weighted capital ratios of several Mexican banks, below the 8 percent minimum. First, the depreciation of the peso resulted in a significant decline in banks' capital ratios: the value of foreign currency assets increased in local currency terms, but they had no foreign currency denominated capital. Second, capital declined as banks increased their provisions against nonperforming assets.

b. Measures to strengthen the banking system

The National Banking Commission (CNB) took several measures in early 1995 to strengthen the Mexican banking system. The first measure requires that banks maintain a minimum level of loan loss reserves equal to the greater of 60 percent of their nonperforming loan portfolio or 4 percent of their total loan portfolio. This measure sought to ensure that bank reserves were increased sufficiently to withstand the anticipated decline in asset quality.

The second measure adopted by the CNB was the creation of the Temporary Capitalization Program (Programa de Capitalizacion Temporal (Procapte)), administered by the deposit guarantee fund (Fondo Bancario de Protectión al Alhorro (Fobaproa)), to recapitalize banks which fall under the 8 percent required capitalization ratio. Under Procapte, banks may borrow from Fobaproa to increase their capital, by issuing five-year convertible subordinated debt. The funds raised from Fobaproa are placed in a blocked account with the central bank so that they will not result in an expansion of the monetary base. Fobaproa, in turn, borrows the funds from Banco de Mexico at the same interest rate as that paid by Banco de Mexico to the commercial banks. 1/ As long as a bank participates in Procapte, it will have to restrict its loan growth and maintain a 9 percent capital adequacy ratio instead of the official 8 percent. In the event that a bank cannot repay its debt by the end of the 5-year period, or if its net capital excluding the subordinated debt issued under the program falls under 2 percent or significantly below that of the other banks participating in Procopte, Fobaproa will convert the subordinated debt into stock and sell it. As of the end of March 1995, six banks had obtained assistance

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1/ The subordinated bonds and the banks' blocked accounts with the central bank will both pay a zero real rate of interest.

totalling MexN$6.49 billion (equal to 14.5 percent of the net worth of all
Mexican commercial banks at the end of 1994) from Fobaproa under the
Procapte program.

The Mexican authorities announced in March 1995 three additional
facilities for restructuring loans, with additional funding totalling
MexN$148 billion. The first program targets small- and medium-sized
companies. Under the plan, banks will transfer about MexN$76 billion of
nonperforming loans--equal to 13 percent of the value of all peso loans, or
150 percent of past due loans, at end-December 1994--from their balance
sheet to off-balance sheet special purpose vehicles or trusts. At that
time, the banks will also transfer a 15 percent reserve to the trust. Each
bank will be allowed to restructure no more than 20 percent of its loan
portfolio.

The nonperforming loans will be restructured into new instruments
based on Units of Investments (UDI), which would increase in line with the
inflation rate. 1/ As UDI, the loan principal would be indexed to
inflation, and will carry a real interest rate of up to 12 percent. 2/
That is, the new restructured loans will have nominal interest rates
significantly below those of the original contracts as the depreciation of
the real value of the principal is eliminated. This approach automatically
capitalizes inflation premia into the loans; it is a way of rolling over
debt service due from borrowers, of lessening their current debt burdens,
and of pushing the problem into the future. The restructuring will extend
the original maturities to between 5 and 12 years, with up to a 7-year grace
period.

The trusts, which will be administered by the banks, will raise funds
by issuing five- to twelve-year UDI-indexed bonds, carrying an interest rate
equal to the UDI rate plus 4 percent, that will be purchased by the central
bank using funds lent by the commercial banks. These loans will carry the
cetes rate, although interest payments from the central bank to the
commercial banks will be capitalized.

The authorities have also agreed to implement restructuring programs,
following the UDI model, for mortgages and dollar-denominated loans. The
program for mortgages will apply to MexN$33 billion in mortgages
(31.6 percent of the current housing loan portfolio). The loans will be
transferred to an off-balance sheet trust along with a 15 percent reserve
(which will be invested at the central bank to earn UDI+2 percent), and
restructured with a maximum interest rate of UDI+6 percent. The trust will
be financed by subordinated debt issued at UDI+2 percent and with maturities

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1/ On April 1, the conversion rate between pesos and UDIs was set at 1.0.
By April 25, the conversion rate was UDI 1 = MexN$1.046896.
2/ This inflation indexing restructuring mechanism is similar to that
employed in Chile.

of 15 to 25 years. The management of the loans, and the credit risk, will remain with the banks.

The program applying to foreign currency loans will cover $6 billion in loans (about 27 percent of foreign currency loans at the end of 1994) and will be distributed among the banks in proportion to their share in the total volume of such loans. Loans will be transferred along with an 8 percent reserve to a trust. The loans will be converted to pesos to eliminate the currency risk and the maturity will be increased to between 5 and 12 years. The loans would be restructured into UDIs plus an intermediation margin, and the trusts would be funded at UDI+4 percent by liabilities with maturities also between 5 and 12 years with a 7-year grace period. The government would acquire these liabilities with funds received from the banking system in exchange for tesobonos with the same maturity and interest rates equal to the average cost of dollar funding. Interest payments will be capitalized.

Mexico: Exchange Market Developments, 1982-94 1/2/

1.   February 18, 1982. The Banco de Mexico announced a temporary
withdrawal from the foreign exchange market. On February 19, the peso
depreciated by 30 percent and continued to depreciate another 19 percent
during February.

2.   June 5, 1982. The Banco de Mexico announced that it would intervene
again, and will let the peso depreciate at 0.04 pesos/dollar per day.

3.   August 5, 1982. A two-tier exchange rate system was announced. A
preferential rate was to apply to service on public debt, interest on
private external debt, and "certain priority imports." The proceeds of
petroleum exports and foreign borrowing by the public sector were to be
converted through this market. All other transactions are to take place at
a freely floating rate. Commercial banks were required to surrender to the
Banco de Mexico their net foreign exchange holdings, including gold and
silver.

     August 13, 1982. All foreign currency deposits in Mexican banks were
made eligible for conversion at maturity into pesos at a rate of 69.5. The
foreign exchange market was closed temporarily.

     August 16, 1982. Commercial banks were authorized to open accounts in
foreign currencies for embassies, consulates, and international
organizations, and their foreign personnel.

     August 18, 1982. A Presidential Decree established that public sector
agencies (including enterprises) surrender their foreign exchange holdings
and their foreign currency time deposits at maturity. Petroleos Mexicanos
was allowed to open a special foreign currency account at the Banco de
Mexico for its deposits, and was permitted withdrawals for specified
payments. Private enterprises were required to register their foreign debt
obligations with the government. The decree authorized the sale of foreign
exchange at the dollar rate applicable to local deposits denominated in
foreign currency (69.5) for obligations payable abroad by local financial
entities and offset by foreign currency liabilities payable in Mexico by
other Mexican residents. This rate also applied to obligations in foreign
currency resulting from forward cover arrangements (reportos), loads with
fiduciary guarantees in local currency, and deposits held by embassies,
consulates, and international agencies located in Mexico and their
personnel. The rate also applied to payments of deposits in foreign

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1/ Numbers correspond to those shown in Chart 34.
2/ The information is collected from International Monetary Fund,
Exchange Arrangements and Exchange Restrictions, various issues.

currency made by foreign financial institutions in the Mexican banking system.

August 19, 1982. The foreign exchange market was reopened, and banks were authorized to transact foreign exchange at a free market rate.

September 1, 1982. Exchange controls were established by Presidential Decree, with supplementary rules issued by the Secretariat of Finance and Public Credit (SFPC) on September 14. All foreign exchange transactions were subject to control and exports and imports of foreign currency could take place only through the Banco de Mexico or its designated agents. Two exchange rates (ordinary and preferential) would be maintained; other special rates might be introduced later. Exports or imports of more than 5,000 pesos in foreign currency by individuals were prohibited, and exports of gold or silver required prior authorization. A foreign exchange budget was established to help establish priorities in the distribution of foreign exchange. Sales at the preferential rate were to apply principally to the foreign obligations of the public sector and domestic credit institutions, interest and principal on private sector obligations contracted before September 1 1982, and "specified imports." Unless otherwise authorized by the Banco de Mexico, all other exchange transactions were to be effected at the ordinary rate.

Mexican private banks were nationalized by Presidential Decree.

All capital transferred and held abroad prior to September 1, 1982 could be repatriated at the ordinary rate. Accounts opened in Mexican banks and loans granted by Mexican banks could not be denominated in foreign currency, with exceptions for foreign service and press correspondents, exporters, and tourist industries.

September 6, 1982. Two exchange rates were announced, a preferential rate (50) and an ordinary rate (70). Banco Internacional, SA is authorized by the Banco de Mexico as the only bank which may open accounts in foreign currency for the foreign service, international organizations operating in Mexico, and their foreign personnel.

September 14, 1982. Rules and regulations pertaining to the exchange arrangement were issued by SFPC.

September 20, 1982. The issuance of payments and other transactions in pesos abroad by Mexican credit institutions was prohibited.

4.   December 13, 1982. A decree established two foreign exchange markets, a controlled market and a free market. The decree envisioned that specified foreign obligations could be repaid through a special coverage exchange system with a fixed exchange rate plus a forward premium. The new arrangement would come into effect on December 20. The exchange rate in the controlled market was to be officially established and would apply to: (a) all merchandise export receipts, net of any required payment abroad by the

Chart 34. Mexico: Real Effective Exchange Rate, Jan. 1979–Jan. 1995
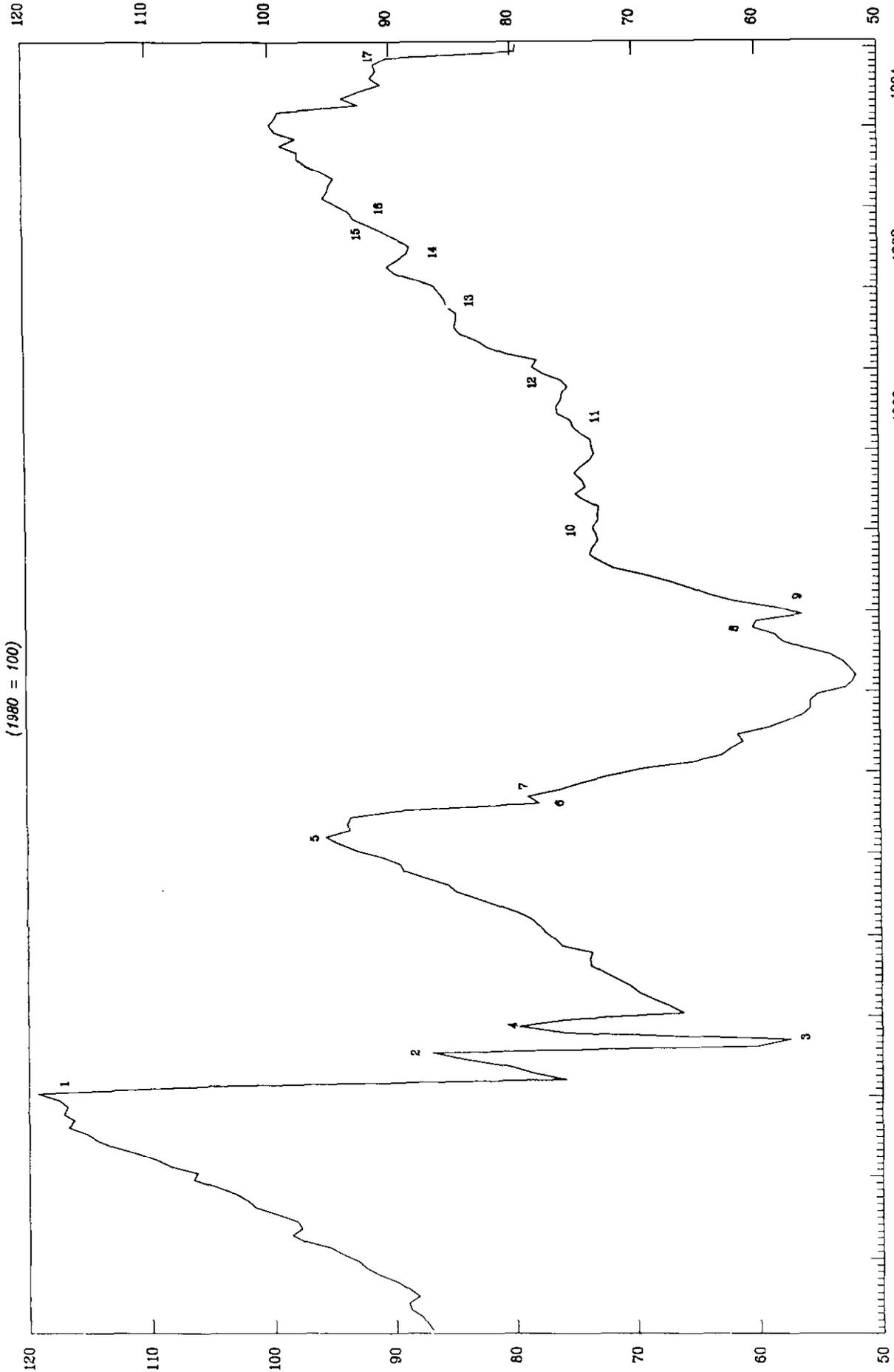
(1980 = 100)

December 14, 1987. The exchange rate in the controlled market was depreciated by 18 percent, reducing the spread between the controlled and free rates to about 1.5 percent.

9.   March 1, 1988. The Government undertook to fix the exchange rate for the dollar for a period of three months, within the context of the anti-inflation pact. The period of the fixed rate was subsequently extended through the end of the year.

10.   January 1, 1989. Daily preannounced amounts of depreciation against the dollar were initiated.

11.   May 28, 1990. The preannounced rate of depreciation was set at 0.80 per dollar per day.

12.   November 12, 1990. The rate of depreciation was changed to 0.40 per dollar per day.

13.   November 11, 1991. The controlled exchange rate market was eliminated.

14.   June 22, 1992. The Government announced that the new peso, equivalent to 1,000 former pesos, would be introduced January 1, 1993.

15.   October 21, 1992. The daily depreciation of the selling intervention point was changed to 0.40.

16.   January 1, 1993. New peso introduced (equal to 1,000 old pesos).

17.   December 20, 1994. Upper band devalued by 15 percent.

December 22, 1994. Fixed regime abandoned for a floating regime.

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