

## STRUCTURAL CHANGES IN EMERGING SOVEREIGN DEBT AND IMPLICATIONS FOR FINANCIAL STABILITY

Several factors have contributed to the recent increased demand for emerging market (EM) sovereign debt. Cyclical developments such as the low mature market (MM) interest rates and favorable global liquidity conditions, as discussed in Chapter I, have led to a search for yield, including in the emerging market asset class. In the last five years, many EM countries have made impressive improvements in macroeconomic fundamentals and carried out structural reforms. Some have also benefited handsomely from rising commodity prices. In addition, many EM countries have improved their debt management capability. These factors have led to a sustained and significant upgrading of the EM sovereign debt class, about half of which is now investment grade. The low yields in MM assets coupled with improved quality and performance of EM assets have led to a significant increase of MM investor interest in EM assets. As discussed in earlier issues of the GFSR, relatively small changes in the asset allocation of large global investors can significantly affect EM funding costs. Several EMs have proactively taken advantage of this benign environment to lock in longer-term funding, improve debt structures, and develop local currency markets. Overall, emerging debt markets have been resilient to recent fluctuations in mature financial markets.

The potential reversal of the cyclical factors raises questions about the continued resilience of the emerging sovereign debt markets. First, the cyclical nature of global liquidity conditions and potential turning of the MM interest and credit cycles may leave many EM countries—particularly those with high debt-to-GDP levels—vulnerable to financial distress. Second, EM economic performance is not uniform across countries, and even

in countries with better macroeconomic performance, gains in taming inflation are more impressive than reduction in fiscal deficits and debt levels. Third, while generally positive, the growing investor involvement in EMs may still leave open the possibility of equally rapid exit following unexpected shocks.

This chapter analyzes the structural changes in EM sovereign debt composition and the broadening of the EM investor universe to gauge the extent of EM countries' resilience to adverse developments. While both global developments and EM economic performance are fundamentally important, our focus is on changes in EM debt structures. We address the following key questions:

- How has the EM sovereign debt composition changed in terms of interest rate structure, maturity, and local versus foreign currency mix? To what extent do these changes reflect improvements in EM debt management quality and capacity?
- How has the EM sovereign debt investor base changed, for example, with regard to the presence of long-term and strategic foreign investors, and diversification of local investor base?
- Does the evolution in EM countries parallel that in MM countries?
- Are these changes likely to persist and yield long-lasting benefits, or reverse quickly? In particular, to what extent are EM countries vulnerable if the low level of MM interest rates and ample global liquidity that originated the rally were to reverse, and to what extent would improvements in EM sovereign debt structure and investor base protect against such a reversal?

These questions are examined drawing upon surveys of EM countries, findings of recent visits to selected financial centers, existing literature, and publicly available data

**Table 3.1. Emerging Markets: Macroeconomic Fundamentals**  
(In percent)

	1996				2005				1996–2005
	Average	Minimum	Maximum	Standard deviation	Average	Minimum	Maximum	Standard deviation	Change in average
Current account/GDP	-1.8	-26.8	12.7	6.7	1.7	-16.9	15.9	6.9	3.5
Total (public + private) external debt/GDP	32.2	14.2	133.2	29.0	28.8	15.9	176.7	34.8	-3.4
Reserves/short-term debt	145.9	10.0	763.2	203.7	400.1	23.4	1,353.5	349.5	254.1
Fiscal balance/GDP	-3.1	-20.2	7.2	5.5	-2.4	-8.1	10.0	4.1	0.8
GDP growth	7.5	-8.0	12.2	4.0	5.2	—	9.0	2.3	-2.2
Inflation	23.5	0.2	123.0	31.2	5.9	1.8	16.6	4.3	-17.6

Source: International Monetary Fund, *World Economic Outlook*.

on sovereign debt. The chapter is organized as follows: the next section examines the improved economic fundamentals and debt management by EMs, improvements in EM sovereign debt structure, and the recent favorable changes in the external and domestic investor base for EM sovereign debt. The following section examines the remaining vulnerabilities of the current EM debt structure and the possibility of contagion. The last section offers conclusions and policy implications.

## Improvements in Emerging Market Sovereign Debt Structure and Investor Base

### Setting the Stage: Improved Fundamentals and Active Debt Management

Since the Asian crisis, there has been a significant improvement in the macroeconomic performance of many EM countries. Key features include more flexible exchange rate regimes, increased anti-inflationary credibility, stronger economic and fiscal performance, strong current account performance, and accumulation of foreign exchange reserves (Table 3.1).<sup>1</sup> These fundamental improve-

ments are accompanied by better and more timely data provision and, in some instances, simpler or lower taxation of foreign investors.<sup>2</sup> Collectively, these developments have improved credit ratings and compressed sovereign spreads, which, together with low global interest rates, have helped reduce debt and debt service burdens (Figure 3.1).<sup>3</sup> Against this background, private sector borrowing, including external debt issuance, picked up, most notably in emerging Europe (Figure 3.2). This chapter, however, focuses on EM sovereign debt and does not analyze vulnerabilities related to private external debt.

Capitalizing on these favorable trends, many EM sovereigns have improved their overall debt management operations and capacity. Improvements in the clarity of debt management objectives and strengthening of debt management capacity have also played a key role. Several EM countries have digested many of the lessons in good debt management practices from OECD countries (Box 3.1, p. 91). In recent years, many EMs have made major strides in improving the legal basis, organizational structure, and risk management capacity of their debt management offices (Box 3.2, p. 102). Generally, EM debt

<sup>1</sup>As shown in Table 3.1, there are significant variations across countries.

<sup>2</sup>Cady (2005) shows that enhanced and timely data provision reduces EM borrowing costs.

<sup>3</sup>Figure 3.1 is based on public debt figures for 25 EM countries. Public debt includes sovereign debt plus the liabilities of subsovereign governments and public sector entities.

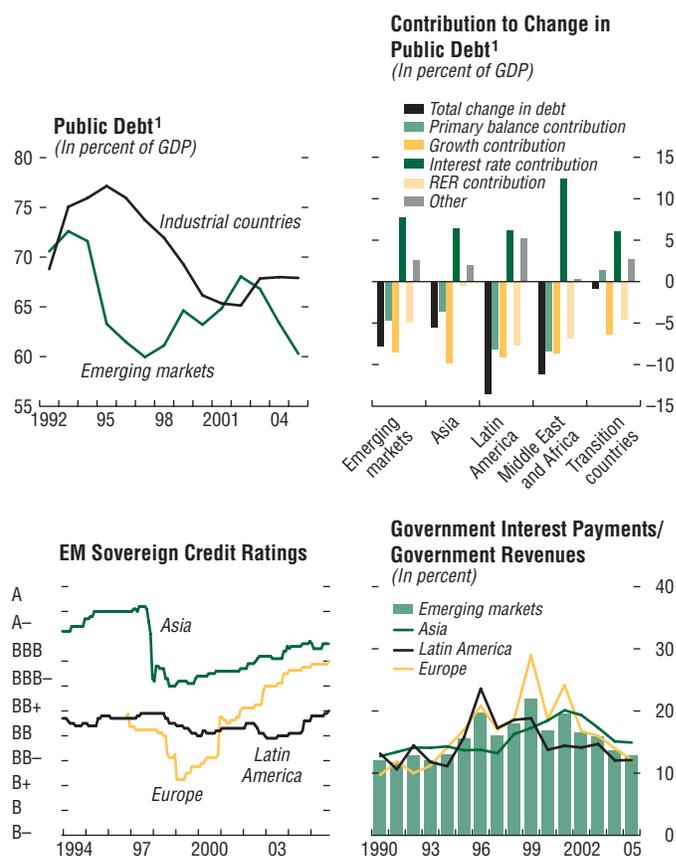
managers have focused on reducing the following key risks:

- *Exchange rate risk.* The possibility of a sharp increase in the local currency value of foreign currency debt obligations can be managed by reducing the share of foreign-currency-denominated debt.
- *Interest rate risk.* The possible rise in interest payments because of an increase in future interest rates either on new debt or on repricing of existing variable rate debt. This risk is reduced by increasing the share of fixed-rate debt, the average term to maturity, or duration of the debt stock.
- *Rollover risk.* The inability, or very high cost, of access to new funding can be managed by lengthening maturities and smoothing the repayment schedule.

Several recent liability management transactions testify to the increasing sophistication that some EM debt managers have in managing these risks and/or debt-servicing costs (Figure 3.3). Appendix Table 3.5 provides a sample listing of recent EM sovereign debt management transactions. It is worth pointing out some of the recent transactions that illustrate a variety of goals, techniques, and approaches to improve debt structures.

- Buybacks of international or foreign currency bonds are being carried out at a rapid pace by many sovereigns, mainly targeting Brady bonds and other instruments with high debt service costs. In early 2006, Brazil announced an ambitious plan (with a potential size of \$16–\$20 billion) to reduce short-term foreign currency debt, Brady bonds, and exchange-linked debt. Similar early retirement plans were announced by Colombia (\$2.8 billion of its external debt), Venezuela (all of its outstanding Brady bonds of about \$4.0 billion), and Turkey (about \$3.5 billion of its foreign-exchange-linked debt). The decline in Brady bonds, arising from previous restructurings, is especially seminal, with the outstanding amount declining from a peak of \$150 billion (face value) in August 1996 (some 80 percent of

Figure 3.1. EM Public Debt, Debt Service, and Credit Ratings

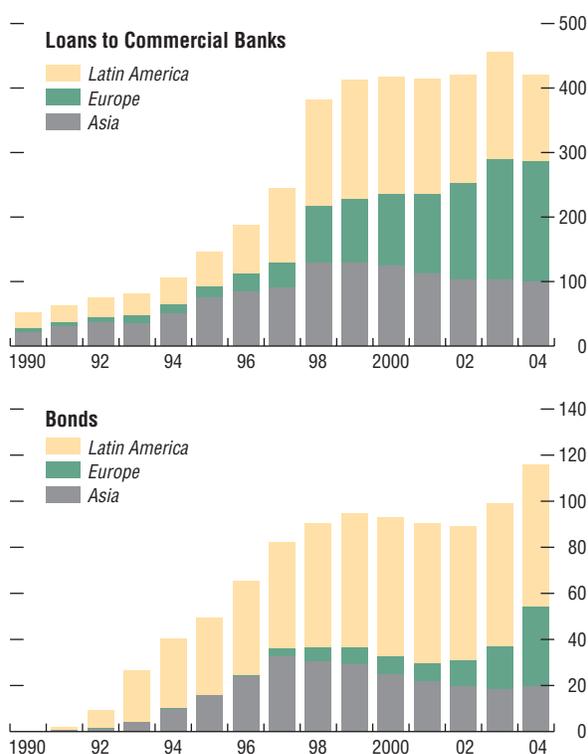


Sources: National authorities; Standard & Poor's; International Monetary Fund, *World Economic Outlook*; and IMF staff estimates.

<sup>1</sup>Unweighted averages; 2005 numbers are based on IMF staff projections.

**Figure 3.2. EM Private Sector Debt Held by Nonresidents**

(In billions of U.S. dollars)



Sources: Bank of England (2005); and World Bank.

all the bonds in the EMBI then) to a little over \$10 billion in April 2006, after the anticipated buybacks by Brazil and Venezuela.<sup>4</sup>

- In late 2005, Mexico issued exchange warrants allowing the holders to swap up to \$2.5 billion of dollar-denominated bonds for peso-denominated bonds (Box 3.3, p. 106).
- Colombia (2004, 2005) and Brazil (2005) issued local-currency-denominated global bonds. These transactions allowed the issuer to reduce the exchange rate risk, issue at longer maturities, smooth the debt repayment profile, and tap a larger foreign investor base.<sup>5</sup>
- The volume of EM prefinancing has risen exponentially since 2002. EM countries have used prefinancing to lock in current attractive rates, reduce interest rate and rollover risks, as well as improve the liquidity of new larger issues.

### Changes in EM Sovereign Debt Structures

This section presents the main changes in the sovereign debt structures of a sample of 18 investment- and subinvestment-grade EM countries, with sovereign debt levels ranging from 18 percent to 84 percent of GDP at end-2004 (Table 3.2).<sup>6</sup> The analysis is based on a

<sup>4</sup>The overall decline in external debt and improvements in its structure have improved the creditworthiness of these sovereigns and increased expectations in the market of imminent credit rating upgrades. After the announcement of Brazil’s buyback, Standard & Poor’s upgraded its credit rating from BB- to BB, two notches below investment grade, on the strength of the move.

<sup>5</sup>These bonds were issued at rates below those of domestic bonds of similar maturity (“jurisdiction spread”). The Brazilian bond (September 2005) was priced over 4 percentage points lower than the local fixed-rate bond with the longest maturity (January 2008); for the two Colombian placements, the yields were 11.875 percent and 10.75 percent, respectively, compared with 13.0 percent for a local bond of similar maturity.

<sup>6</sup>Sovereign debt refers to the total liabilities of the central government only—to both domestic and external creditors—and does not include the liabilities of

new database put together by Jeanne and Guscina (2006) as well as new issuance data from the Bank for International Settlements (BIS; for details, see Appendix II).

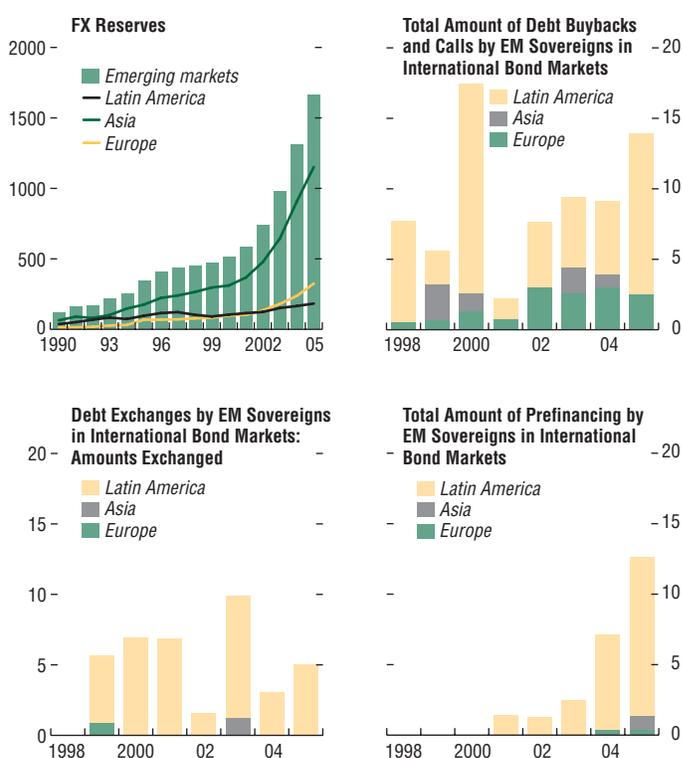
Although the sample of 18 EM countries covers the lion’s share of marketable debt, these countries are not fully representative of the EM universe. The sample countries account for close to 90 percent of the capitalization of the JPMorgan EM Global Bond Index (EMBIG) and are thus systemically important, and useful to focus on, in terms of changes in market debt structure and investor composition. However, they are not representative of the EM universe in terms of overall EM debt sustainability. Due to lack of data, several countries that experienced a deterioration in their debt levels were excluded from the analysis. Some of them (Argentina, Dominican Republic, and Uruguay) experienced severe crises involving large real exchange rate depreciations, economic contractions, and debt restructuring. Others have seen a rise in their debt and debt-to-GDP ratios primarily because of several years of seeing substantial budget deficits.<sup>7</sup>

The average sovereign debt-to-GDP ratio of the 18 EM countries in the sample has declined modestly from 44 percent of GDP in 2002 to 39 percent of GDP in 2004 although it is still higher than the pre-Asian crisis levels (27 percent of GDP in 1996; Figure 3.4). The average sovereign debt-to-GDP ratio of EMs compares favorably with the average of over 51 percent for the industrial country members of OECD. However, industrial countries in general have a higher capacity to service and

subsovereign governments and public sector entities. Sovereign marketable debt is defined as the portion of debt that is funded in bond markets. This chapter deals with debt structure and investor composition; therefore its focus is on sovereign, rather than on total public sector, debt.

<sup>7</sup>These countries include Belize, El Salvador, Jamaica, Lebanon, and Sri Lanka. In addition, Egypt experienced an increase in debt-to-GDP ratio due to a substantial real exchange rate depreciation.

**Figure 3.3. Reserves Accumulation and External Debt Management Operations**  
(In billions of U.S. dollars)



Sources: International Monetary Fund, *World Economic Outlook*; JPMorgan Chase & Co; Bloomberg L.P.; and IMF staff estimates.

**Table 3.2. Sovereign Debt Indicators: Sample Description, End-2004<sup>1</sup>**

	Sovereign Debt (In percent of GDP)	External Debt to Official Creditors (In percent of GDP)	Share of Short-Term Debt (In percent of total domestic marketable debt)	Share of FX Debt (In percent of total marketable debt)	Weight in EMBIG (In percent)	Sovereign Rating (S&P)
<b>EM countries (18)</b>						
Chile	41	2	11	53	1.8	A
Korea	28	1	0	3	n.a.	A
China	18	2	2	2	2.5	A-
Malaysia	51	3	2	9	2.9	A-
Czech Republic	18	0	28	8	n.a.	A-
Hungary	57	0	20	27	0.5	A-
Thailand	28	3	26	9	0.2	BBB+
Poland	53	8	13	16	1.2	BBB+
South Africa	39	0	5	10	1.6	BBB+
Mexico	21	1	20	31	17.4	BBB
Russia	23	10	0	61	13.0	BBB
India	55	7	8	0	n.a.	BB+
Colombia	57	9	4	31	3.0	BB
Brazil	74	8	26	25	19.4	BB-
Turkey	83	11	13	29	7.5	BB-
Philippines	81	23	43	44	6.0	BB-
Indonesia	52	24	0	3	1.3	B+
Venezuela	32	2	9	57	6.3	B+
<b>Investment-grade countries</b>					<b>41</b>	
Mean	26	3	7	16	n.a.	
Median	28	2	11	10	n.a.	
<b>Subinvestment-grade countries</b>					<b>44</b>	
Mean	67	11	17	22	n.a.	
Median	57	9	9	29	n.a.	
<b>All countries</b>					<b>85</b>	
Mean	39	5	11	18	n.a.	
Median	46	3	10	20	n.a.	
<b>Latin America</b> (mean)	49	4	22	30	<b>48</b>	
<b>EM Asia</b> (mean)	32	5	5	5	<b>13</b>	
<b>EM Europe</b> (mean)	44	8	13	30	<b>22</b>	
<b>Mature markets</b>						
OECD industrial average <sup>2</sup>	51		16	6	n.a.	n/a
G-7 countries (average)	63		21	1	n.a.	n/a
Euro area (average)	58		10	1	n.a.	n/a
United States	35		36	0	n.a.	AAA
Japan	139		26	0	n.a.	AA-
Greece	119		1	n.a.	n.a.	A

Sources: OECD (2005); JPMorgan Chase & Co.; Jeanne and Guscina (2006); Bank for International Settlements-IMF-OECD-World Bank database; and International Monetary Fund, *World Economic Outlook*.

<sup>1</sup>External sovereign debt includes liabilities of the central government and the central bank; domestic sovereign debt refers to domestic debt securities issued by the central government and, in some cases, those issued by the central government and the central bank (for details, see Jeanne and Guscina, 2006). The GDP figures (at current prices, in U.S. dollars) are from the IMF's *World Economic Outlook* database.

<sup>2</sup>OECD industrial countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

sustain debt because of a stable investor base and established institutions and credibility.

The level and composition of EM sovereign debt vary significantly (Table 3.2). As of end-2004, the share of foreign currency debt in sovereign debt was 22 percent for the

subinvestment-grade EMs and 16 percent for the investment-grade EMs, compared with an average of 6 percent for the OECD industrial countries. For subinvestment-grade EMs, external debt owed to official creditors—Paris Club and international financial institutions

(IFIs)—accounts for about 11 percent of GDP, which is a legacy of their past balance of payment problems. The maturity structure of both the OECD countries and the 18 sample EM countries also varies widely. While the share of short-term debt is only 10 percent in the euro area, it is as high as 36 percent for the United States. In the EM sample, short-term debt is as low as 5 percent of total sovereign debt in emerging Asia, 13 percent for emerging Europe, and 22 percent for Latin America. The remainder of this section focuses on changes in EM sovereign debt structures in recent years.

### *External and Foreign Currency Debt*

The capital account crises during the 1990s have underscored the dangers of high external debt. The heavy reliance of EMs on external foreign currency debt was a serious vulnerability, especially because EM exchange rate depreciations were more frequent than appreciations.<sup>8</sup> Consequently, EM countries have sought to reduce exposure to foreign exchange risk—by repaying international bonds and increasing issuance of domestic currency debt. By end-2004, for the sample EMs, external debt declined to 10 percent of GDP after peaking at 16 percent in 1999 (Figure 3.4).

The recent strong current account performance and reserves accumulation have allowed some EMs to repay external debt. Along with the early repayment of the Paris Club debt, many EM sovereigns also chose to repay part of the debt owed to the IFIs. As a result, the

<sup>8</sup>Recent research argues that pervasive foreign currency contracting in international markets may be a response to the difficulties in enforcing contracts on sovereign borrowers. Also, “risky” debt structures that are heavily skewed toward foreign currency debt can be seen as the mechanisms for reducing “moral hazard” on the part of policymakers. See Jeanne (2000, 2004); Tirole (2002); and Chamon (2003). There is also an extensive literature on EM crises, exploring the links between foreign currency debt, exchange rate instability, and the likelihood of financial crises. See Bordo and Meissner (2005).

### **Box 3.1. Best Practices in Debt Management from OECD Countries**

Several “best practices” in debt management have emerged from OECD countries. These practices aim at low-cost funding subject to predefined and acceptable risk levels. In terms of debt composition, OECD industrial countries have reduced the proportion of foreign currency debt and increased the average term to maturity, while striving to increase fiscal and monetary policy credibility, and encourage the development and broadening of local institutional and retail investor base.<sup>1</sup> In particular, the proportion of foreign currency debt declined to 6 percent in 2003 from 17 percent in 1980 and the average term to maturity increased to 6.0 years from 4.6 years between 1990 and 2003.<sup>2</sup>

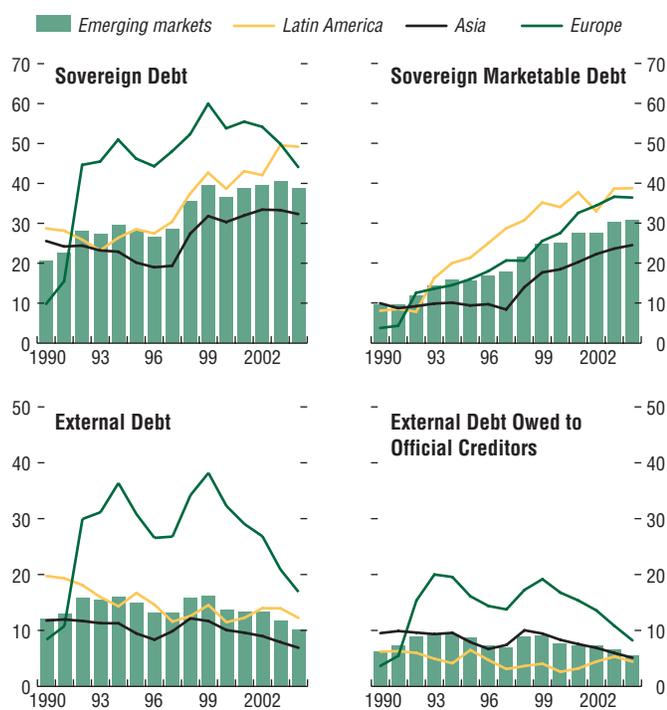
The improvements achieved in debt structures have been facilitated by the development of domestic primary and secondary debt markets. To promote efficient primary markets, issuers have held regular auctions; created a limited number of liquid benchmark issues; abolished privileged borrowings from public sector or regulated financial institutions; established transparent debt management frameworks; and created primary dealer networks. To promote efficient secondary markets, governments have facilitated repo market financing using public securities as collateral; reliable and efficient clearing and settlement systems; transparent and equitable regulatory and supervisory frameworks; market-making structures; liquid derivative markets; and good access by foreign investors. Most industrial countries also feature widespread use of nominal fixed-rate instruments and electronic trading. Some industrial countries have also undertaken initiatives to allow them to better identify their investor base, by identifying beneficial owners that hold investments in nominee accounts.

Note: The main authors of this box are Paul Ross and Bozena Radzewicz-Bak.

<sup>1</sup>See IMF and World Bank (2003); and Campanaro and Vittas (2004).

<sup>2</sup>OECD (2005).

**Figure 3.4. Structure and Dynamics of EM Sovereign and External Debt**  
(In percent of GDP)



Sources: International Monetary Fund, *World Economic Outlook*; Bank for International Settlements; Joint BIS-IMF-OECD-World Bank Statistics on External Debt; Jeanne and Guscina (2006); and IMF staff estimates.

average debt owed to official creditors fell from 8 percent of GDP to 4 percent during 2002–05, reducing the average foreign currency EM sovereign debt.

EM countries have been issuing more local currency bonds (Figure 3.5). The share of local-currency-denominated bonds in marketable sovereign debt of EMs in the sample rose by 9 percentage points between 1996 and 2004, to around 82 percent, reflecting, to a large extent, increased issuance in local currency and, to a lesser extent, nominal appreciation. This shift was particularly pronounced in Latin America and emerging Europe; in both regions the share of foreign currency debt (issued both domestically and abroad) fell from over 40 percent of the total *sovereign* debt stock to around 30 percent. The share of foreign currency debt in EM Asia has always been fairly low, at around 6 percent. The shift toward local currency debt reflects the growing willingness of foreign investors to accept local currency, the rapid growth of the domestic institutional investor base in EM countries, and a recent trend toward de-dollarization. Box 3.4, p. 107, provides an empirical analysis of the incentives and determinants of currency composition of domestic sovereign debt in EMs.

Many EMs have significantly reduced their reliance on foreign exchange debt since the late 1990s. The largest reduction in the share of foreign exchange debt (over 1996–2004) has occurred in Thailand (62 percentage points), Mexico (42 percentage points), Venezuela (22 percentage points), and Hungary (20 percentage points), as shown in Table 3.3. However, not all countries reduced their reliance on foreign exchange debt. Russia increased its share of foreign debt (by 42 percentage points) along with Chile (29 percentage points) and the Philippines (28 percentage points). In Russia, there has been a substantial reduction of overall foreign debt in 2005. In Chile and the Philippines, a higher share of foreign currency debt indicates limits on local currency debt mar-

kets as well as lower cost of borrowing in dollars at longer tenors.

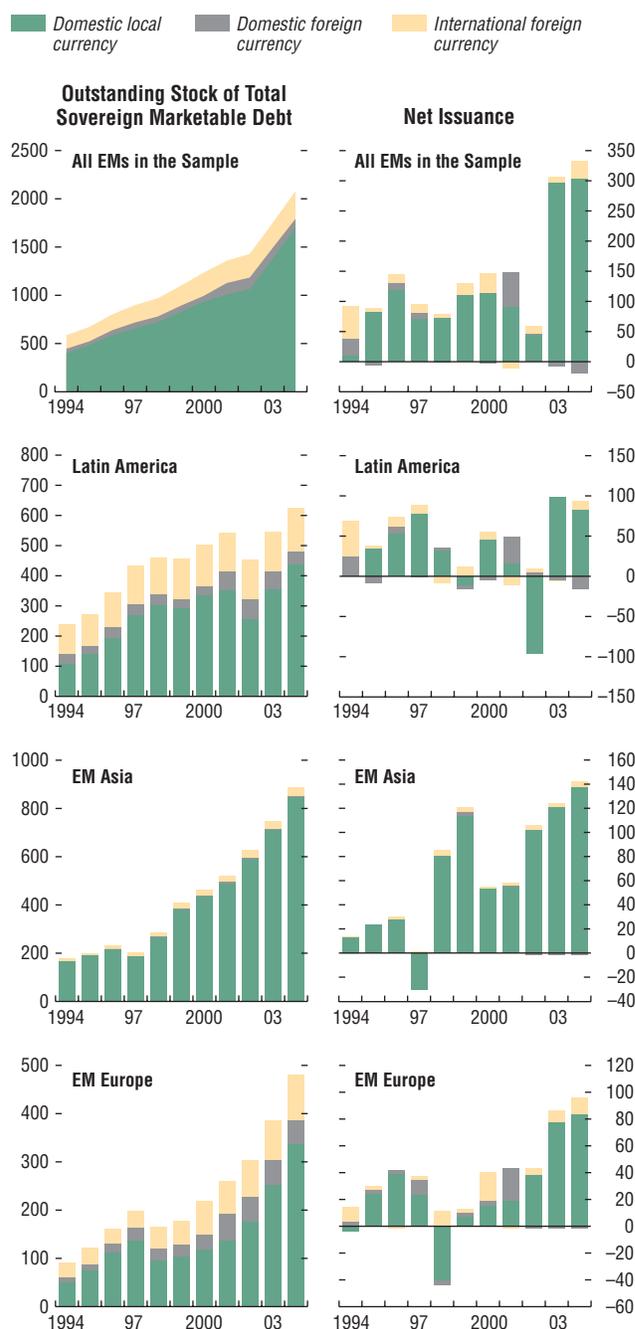
**Maturity, Indexation, and Rate Structure of EM Sovereign Debt**

The maturity of EM sovereign international debt issues has increased in recent years. While international issuance has typically been in the form of fixed-rate medium-term bonds, the average maturity of international issuance by the 18 EMs has increased further to 13 years in 2005 from about 8 years in 2001 (Figure 3.6).

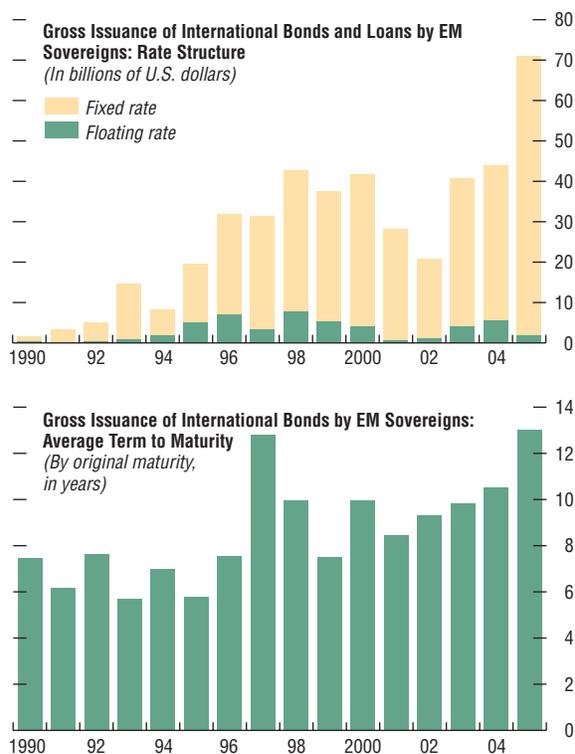
The maturity of domestic sovereign debt has also increased in recent years (Figure 3.7). The stock of medium- and long-term local currency bonds of EM sovereigns in the sample rose sharply between 1996 and 2004. Indeed, the proportion of short-term domestic sovereign debt has been close to zero in several Asian countries, such as India, Indonesia, and Malaysia. While the stock of short-term domestic debt of emerging European and Latin American countries has traditionally been higher, recent issuance has been dominated by medium- and long-term bonds. The largest reduction in short-term debt has been achieved in Russia (by 63 percentage points, eliminating short-term debt altogether), Turkey (53 percentage points), Poland (31 percentage points), the Czech Republic (28 percentage points), India (19 percentage points), and Mexico (18 percentage points), as shown in Table 3.3. Brazil, Chile, and the Philippines also achieved significant reduction in short-term debt. Thailand was the rare exception whose short-term debt increased significantly, by 26 percentage points, reflecting a shift from longer-term foreign exchange debt to shorter-term local currency funding.

The proportion of fixed-rate debt in domestic sovereign debt has increased as well. However, there are large variations across countries, with domestic sovereign debt being mainly fixed rate in EM Asia (with the exception of Indonesia) and mainly floating rate

**Figure 3.5. Currency Composition and Jurisdiction of Issuance of EM Sovereign Marketable Debt**  
(In billions of U.S. dollars)



Sources: Jeanne and Guscina (2006); Bank for International Settlements; and IMF staff estimates.

**Figure 3.6. Gross International Debt Securities Issuance by EM Sovereigns**


Source: Dealogic.

**Table 3.3. Sovereign Debt Structures of Individual EM Countries**

	FX Debt Share <sup>1</sup>		ST Debt Share <sup>2</sup>			
	1996	2004	1996	2004		
Brazil	34	25	↓	37	26	↓
Chile <sup>3</sup>	24	53	↑	22	11	↓
Colombia	30	31	↑	0	4	↑
Mexico	73	31	↓	38	20	↓
Venezuela	79	57	↓	8	9	↑
China	7	2	↓	12	2	↓
Korea	0	3	↑	4	0	↓
India	0	0	—	27	8	↓
Philippines	16	44	↑	54	43	↓
Malaysia	5	9	↑	6	2	↓
Thailand	71	9	↓	0	26	↑
Indonesia	22	3	↓	0	0	—
Czech Republic	7	8	↑	56	28	↓
Hungary	47	27	↓	28	20	↓
Poland	30	16	↓	45	13	↓
Russia	19	61	↑	63	0	↓
Turkey	37	29	↓	67	13	↓
South Africa	3	10	↑	5	5	—

Source: Jeanne and Guscina (2006).

<sup>1</sup>Foreign-currency-denominated debt (issued both domestically and abroad) in percent of total marketable debt.

<sup>2</sup>Short-term domestic debt in percent of total domestic marketable debt.

<sup>3</sup>Includes debt issued by the central bank.

in Latin America. Another notable development was the increased issuance of inflation-indexed bonds, used by some EMs with a history of hyperinflation and/or volatile inflation rates as a means of extending maturity of local currency debt. The stock of inflation-indexed bonds issued by EM sovereigns in the sample almost tripled between 1996 and 2004, on the back of increased issuance of these instruments by Brazil, Colombia, and Turkey.<sup>9</sup>

The shift away from short-term or variable-rate domestic sovereign debt was facilitated by improved macroeconomic fundamentals and debt management. Recent research shows that “domestic original sin” (the inability of a sovereign to borrow in its local currency at long tenors and a fixed rate) is closely related to high inflation, high debt-service-to-GDP ratio,

<sup>9</sup>In Turkey, the CPI-indexed bonds were issued to recapitalize banks after the 2001 crisis and are held by the Central Bank of Turkey.

and narrow investor base.<sup>10</sup> The recent increased monetary stability, the need to smooth the debt repayment profile, and the growing demand by local institutional investors for longer-dated local currency bonds have all played an important role. Nonetheless, EMs that suffered from the original sin problem in the past (Latin America and Europe) still have a significantly lower average maturity of local currency fixed-rate debt compared with those that did not (Asia) (Figure 3.8).

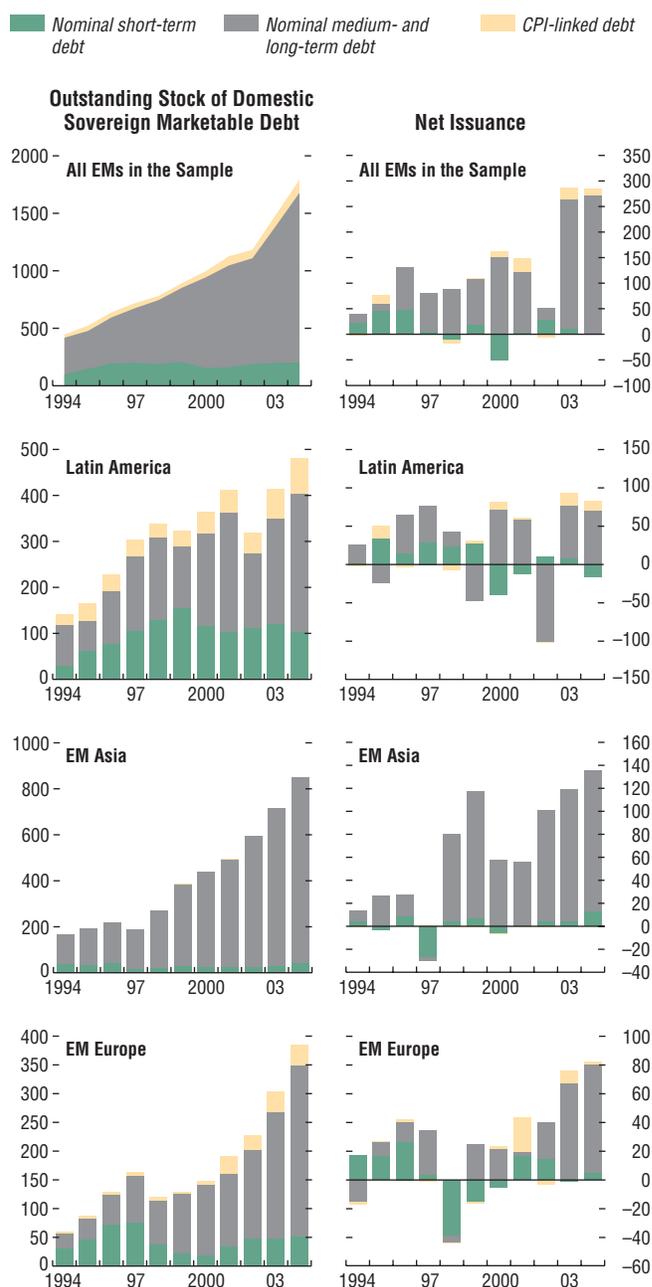
### Changes in EM Investor Base

The investor base in EM sovereign debt is becoming increasingly diverse. Despite difficulties in quantifying trends, several important ones are discernible. First, foreign investors are increasing their exposure to domestic currency, and domestically issued, debt. Second, the share of longer-term investors seems to be growing among both foreign and domestic investors. This section describes these phenomena, within the data limitations, and explains some of the developments facilitating these changes.

It is difficult to obtain complete data on the composition of investors in sovereign bonds. Unlike bilateral, multilateral, or bank loans, neither issuers nor other data gatherers publish comprehensive decompositions of commercial investors in EM sovereign debt. Some sovereigns have needed and compiled such information sporadically, for example, in the contexts of voluntary debt swaps or distressed debt restructurings, but the full composition of commercial investors in EM debt is rarely known. The problem is particularly severe for external debt. While more information is available on the composition of investors in domestic bonds, not all EM sovereigns routinely track such information. A survey of 18 EM countries was carried out to obtain the composition of

**Figure 3.7. Maturity Structure and Indexation of Domestic Sovereign Marketable Debt**

(By original maturity, in billions of U.S. dollars)

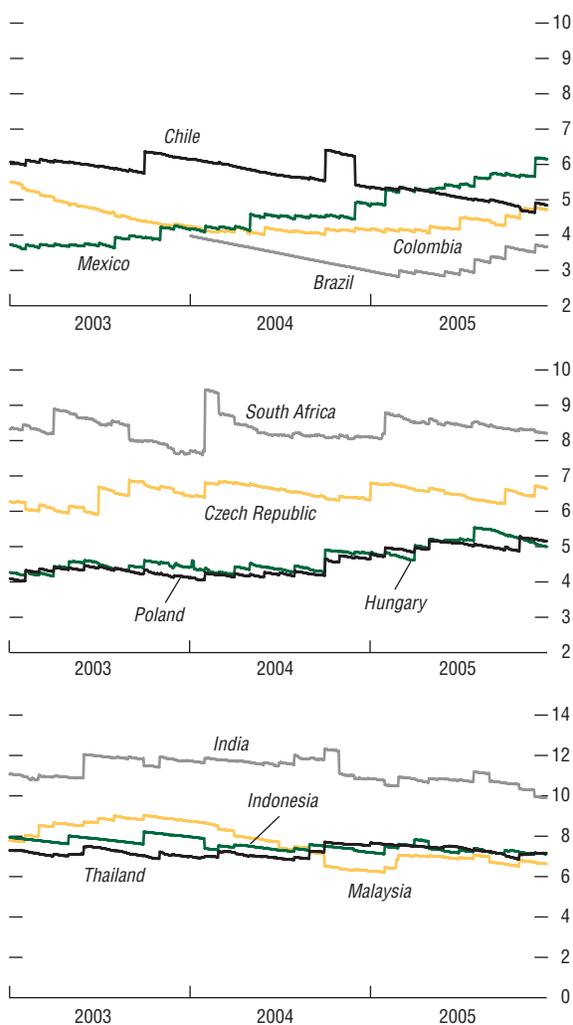


Sources: Jeanne and Guscina (2006); Bank for International Settlements; and IMF staff estimates.

<sup>10</sup>See Mehl and Reynaud (2005).

**Figure 3.8. Average Remaining Maturity of Local Currency Fixed-Rate Marketable Debt of Selected EM Sovereigns**

(In years, GBI-EM local currency bond indices)



Source: JPMorgan Chase & Co.

investors in domestic and externally issued debt (see Appendix II for details). Only a handful of countries could provide detailed information on investor composition. Most information received was for 2004–05, with fewer responses received for earlier years. The analysis and conclusions in this section are thus limited by these data difficulties and should be interpreted with caution.

Despite data limitations and significant remaining differences, the composition of investors in EM sovereign debt seems to be moving closer to that of MM debt. As MM capital markets have developed, the role and importance of institutional investors (pension funds, bond funds, and insurance companies) in them has generally increased, particularly at the long end of the maturity spectrum. At the same time, lower liquidity requirements for banks and the development of money market funds have reduced the role of banks as investors in government paper. Given the high credit ratings of MM sovereigns and the need for global diversification of MM institutional investors, most MMs have a significant and loyal foreign investor base (often institutional investors). Most MMs also have well-developed programs to attract retail investors who have substantial personal savings, and who dedicate increasing portions of their wealth to risk-free investments as they age and retire. However, there are also significant differences among various MM countries. For example, banks are still the dominant investors in Japanese government securities, whereas institutional investors are more prominent in the United States and Greece (Figure 3.9).<sup>11</sup> Nonresidents account for the lion's share of U.S. government bonds, reflecting the reserve currency

<sup>11</sup>The United States, Japan, and Greece were selected to illustrate the variation in the composition of sovereign debt investors in MMs. The United States and Japan were chosen as two countries with large financial markets, while Greece was chosen as a member of the euro area and as an industrial country that has more recently diversified its investor base.

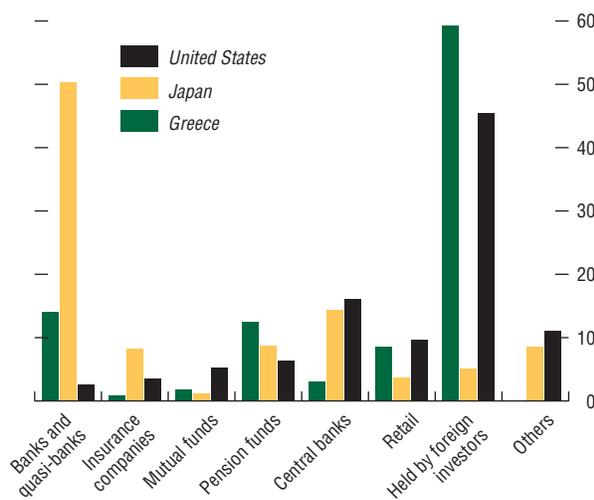
status of the U.S. dollar as well as the paucity of domestic savings. In Greece, the large share of foreign investors may reflect the relative ease of access and attractiveness to EU investors. In EMs, although banks continue to be the principal holders of sovereign domestic debt, the shares of retail and institutional investors are increasing (Figure 3.10).

**Foreign Investors**

*Foreign investors in international foreign currency issues.* The strong interest of MM investors in EM sovereign debt reflects the recently improved risk-return profile of these assets. Over the past five years, the EMBIG index has returned higher risk-adjusted returns than many competing investments (Figure 3.11). The absolute return has averaged 12.5 percent per year, and the index is now more diversified, with 33 countries compared with 15 in 1993. The average credit quality of the included debt has improved and index volatility and correlations of returns have declined (see next section). The relatively low correlations between EM sovereign debt and other asset classes make the former more attractive within a global investment portfolio.

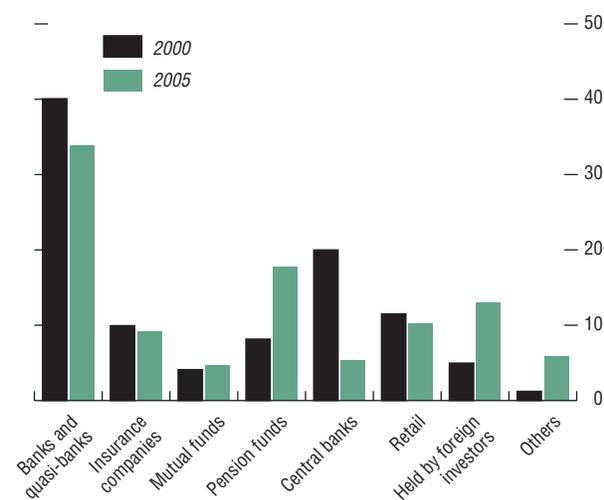
EM investor base is shifting from highly active short-term traders toward more strategic and buy-and-hold investors. Institutional investors in EM bonds consist of dedicated strategic investors, crossover investors, and EM mutual funds and hedge funds. The year 2005 saw an important expansion of MM strategic investors (with a pure or dedicated allocation, such as pension funds, insurers, corporations, and trusts) in EM external debt with total inflows reaching around \$14 billion in 2005, about 40 percent higher than the \$10 billion in each 2003 and 2004 (Figure 3.12). EM bond mutual funds have always had an important but volatile presence in the EM sovereign debt. These flows were strong in 2005 (\$10.2 billion versus \$3.2 billion in 2004), but they depend on retail investors, who are more likely to rotate out of EMs in the event of a

**Figure 3.9. Composition of Investors in Domestic Debt of Selected Mature Markets<sup>1</sup>**



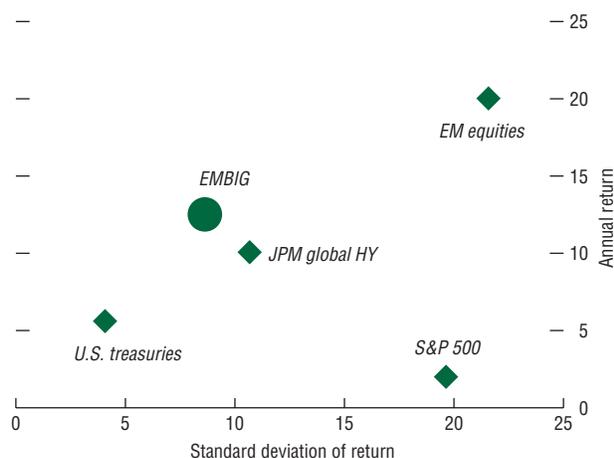
Sources: National authorities; and IMF staff estimates.  
<sup>1</sup>For Japan and the United States, data are as of end-third quarter 2005; for Greece, as of end-second quarter 2005.

**Figure 3.10. EM Investor Holdings of Domestic Central Government Debt (In percent)**



Sources: National authorities; and IMF staff estimates.

**Figure 3.11. Risk-Return by Asset Class, 2001–05**  
(In percent)



Sources: JP Morgan Chase & Co.; and Bloomberg.

rise in MM interest rates. Crossover investors, hedge funds, and other trading accounts have no commitment to EM bonds and are the most volatile flows in EM sovereign debt. While data on absolute investment values of different types of investors in EM external debt are not available, market sources indicate that hedge funds are now largely out of foreign currency externally issued debt.<sup>12</sup>

Given their objectives and governance structure, the growing presence of MM strategic investors may lend greater stability to the EM sovereign asset class. Strategic investors, particularly pension funds and insurance companies, often have explicit liabilities, and they aim to match the duration of their assets and liabilities and meet a *long-term* return benchmark, rather than outperform their peers in the short term (as is the case for mutual funds) or maximize total returns with a wide tolerance of risk (as is often the case for hedge funds). Strategic investors tend to have a more deliberate asset allocation strategy, and require formal approval by trustees or other similar governing bodies. They also tend to employ external money managers, for EM bonds and other assets, and thus are committed to a certain investment strategy for defined periods.<sup>13</sup> The increased presence of such investors could lower volatility for EM sovereign debt. For instance, two large global insurance companies provided much stability to Hungary's bond markets during November 2003, despite a sell-off by hedge funds. Many of the global insurers are now beginning to invest in EMs in which they sell insurance products. Furthermore, the increasing participation of dedicated funds seems to lower EM spreads.<sup>14</sup>

<sup>12</sup>However, it is unclear the extent to which these funds maintain a synthetic position in EM foreign currency debt, for example, from having sold credit default swaps.

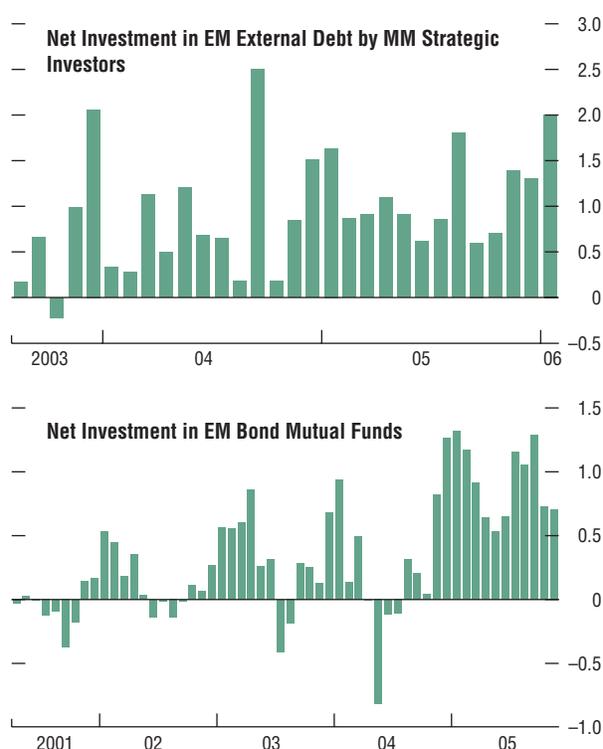
<sup>13</sup>See IMF (2004a, Chapter III; and 2004b, Chapter IV).

<sup>14</sup>A recent study by Goldman Sachs (2005) shows that each percentage point increase in the share of EM dedicated bond fund inflows in total EM debt flows improves EM spreads on average by 29 basis points.

The EM investor base is also diversifying geographically as well as through inclusion of official investors. Inflows from Asia and the Middle East have been strong and are likely to grow as Asian investors continue to search for yield, and Middle Eastern and other oil-exporting investors recycle a portion of their petrodollar surpluses into EM assets. Market sources also indicate that central banks in MMs have begun to allocate—from a virtually zero base—a small portion of their reserves to EM debt. More importantly, EM central banks, with their own vastly expanded reserve base, are also beginning to invest in EM sovereign debt. Given the size of such reserves, even a small allocation to EM debt could constitute an important class of new foreign investors. Official initiatives, such as the Asian Bond Funds,<sup>15</sup> coupled with likely continued upgrading of EMs to investment grades, are likely to foster these tendencies. While this represents a welcome diversification of the EM investor base, as of now these investors are not a major source of funding.

*Foreign investors in local currency domestic markets.* There seems to be a secular trend toward a higher allocation to local currency instruments within the international investors' portfolios. While foreign investors still provide only a small share of total domestic financing, the survey data suggest that the share of foreign creditors in domestically issued debt has nearly doubled from around 6 percent to 12 percent over 2000–05 (Figure 3.13). The bulk of the increase has taken place in the last two years and, apart from the EU convergence cases (Hungary and Poland in particular), this investment reflects growing interest in

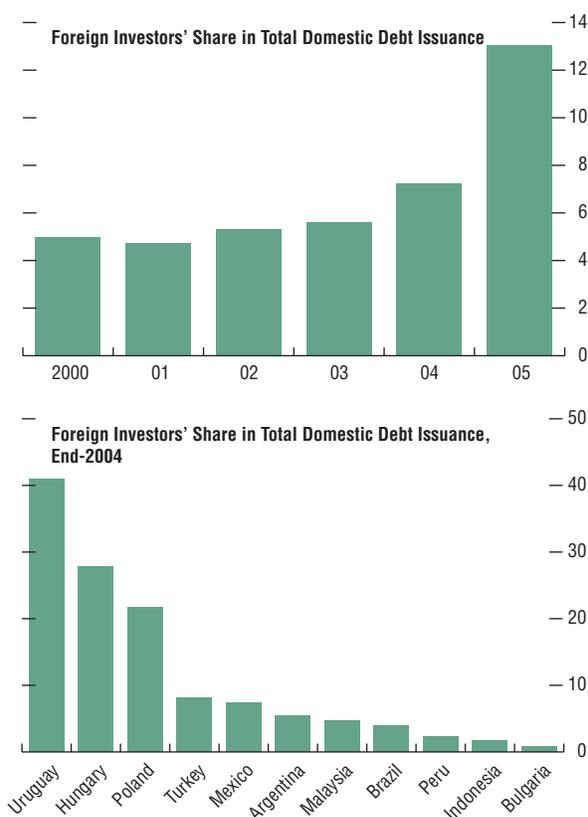
**Figure 3.12. Investment Flows in EM Debt**  
(In billions of U.S. dollars)



Source: JPMorgan Chase & Co.

<sup>15</sup>Asian Bond Fund I and II are official initiatives of the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) to make catalytic investment in dollar and local currency debt issued by East Asian sovereigns. The initiatives intend to promote development of regional and country-specific benchmark debt indices, liquidity and improved trading of benchmark instruments, and greater regional and global investor interest.

**Figure 3.13. EM Domestic Debt: Shares Held by Foreign Investors**  
(In percent of total)



Source: IMF staff calculations based on data from country authorities.

the higher real domestic currency rates available in Brazil, Mexico, Turkey, and Uruguay, and a general market conviction that inflation and interest rates in these countries will decline (Figure 3.14).

Positioning, trading, new investment flows, and issuance in EM local currency debt remains quite strong. Market sources indicate that there is a relatively limited supply of liquid local instruments relative to investor interest. Figure 3.15 shows the share of international investors in EM local currency bonds to total EM sovereign bonds. According to one survey, of the \$210 billion managed by a sample of international institutional investors, \$57 billion (27 percent) was dedicated to local currency assets. Surveys of investor attitudes suggest significant overweighting of local currency instruments relative to recent historical average.<sup>16</sup> EM local currency debt trading has been rising rapidly and is likely to exceed that of foreign currency debt in 2006. Finally, thanks to substantial prefunding of external debt needs, as well as active asset-liability management operations, *net* local debt issuance (\$59 billion in 2006) is likely to exceed *gross* external debt (\$37 billion) by a wide margin. All these factors suggest a significant increase in foreign investor participation in domestic instruments.

Recently, there has been a significant growth in hedge fund investment, the bulk of which is now in EM local currency assets. Assets under management (AUM) of hedge funds identified as pursuing an EM strategy have grown by \$64 billion over the last five years.<sup>17</sup> However, coverage is incomplete as different data providers produce very differ-

<sup>16</sup>A recent survey by JPMorgan indicated that MM investors in EM debt are moving toward a roughly 30 percent allocation to local currency instruments, and to reach that share, new money is allocated 50:50 to local and external markets.

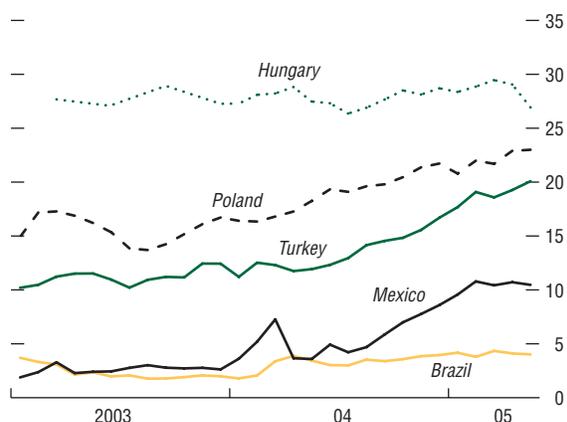
<sup>17</sup>These data are from the Center for International Securities and Derivatives Markets (CISDM). They cover almost 2,000 hedge funds, of which 172 are identified as pursuing EM strategies.

ent estimates of AUM and hedge funds are not required to disclose this information. While the data relate to funds investing in all types of EM assets, not just EM sovereign debt, market sources indicate that sovereign debt has benefited from the rising AUM. Besides specialist EM funds, those funds pursuing a global macrostrategy are also reported to have increased investment in EM debt. Hedge fund investment in EM sovereign debt is reportedly almost entirely in local currency instruments, and they are particularly aggressive in investing in somewhat exotic markets.

While the growing share and diversification of foreign investors and their interest in local currency debt are generally welcome news for EMs, they also underscore the need to maintain good policies. A sovereign's ability to maintain debt service in local currency far exceeds that in foreign currency. The increasing participation of foreign investors in local currency and domestic debt markets is useful to extend the local currency yield curve, and increase the depth and competitiveness of local markets. However, foreign investors may react more to adverse political or economic developments than domestic investors.<sup>18</sup> On the one hand, an exit by foreign investors may trigger exchange rate and interest rate volatility, which, if substantial, could have potentially negative effects on the domestic financial system, fiscal accounts, and economic activity in general. On the other hand, because foreign investors only account for a small part of the overall domestic debt issues, a change in their position is more likely to be accommodated by net flows between foreign and domestic investors. Thus, continued efforts to develop and diversify the local investor base are very important.

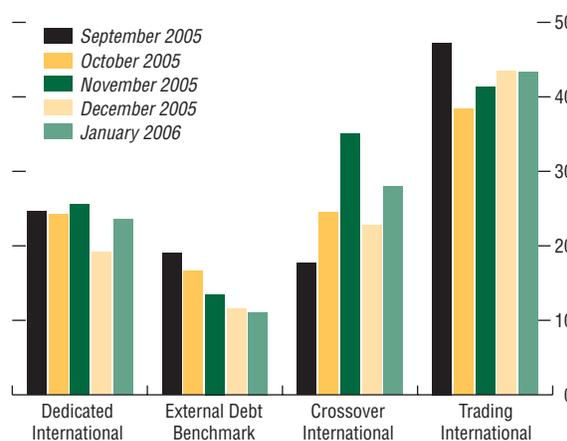
*Foreign investors in local currency issues in global markets.* MM investors have also shown interest in global or international EM sover-

**Figure 3.14. Share of Nonresident Holdings of Government Local Currency Bonds**  
(In percent)



Sources: National authorities; and IMF staff estimates.

**Figure 3.15. Allocation of International Investors in EM Bonds to Local Currencies**  
(In percent)



Source: JPMorgan Chase & Co.

<sup>18</sup>However, in several recent crisis episodes, the domestic investors started the run on sovereign debt.

### Box 3.2. Developments in Debt and Risk Management Capacity in Emerging Markets

Recent changes in EM debt portfolio structures are accompanied by, and often the result of, significant improvements in public debt management, and reflect increasing adoption of the best practices outlined in the IMF and World Bank's *Guidelines for Public Debt Management* (2003). This box briefly discusses initiatives to improve debt management in a sample of EMs.

Several countries have clarified and formalized debt management objectives. For example, the debt management objective of Brazil is to "minimize long-term financing costs, ensuring the maintenance of prudent risk levels."<sup>1</sup> Often these objectives and associated monitoring arrangements are codified in legislation. Further, several countries have announced formal debt management strategies, including Brazil, the Czech Republic, Hungary, Indonesia, Poland, and Mexico. Annual financing plans and regular debt management reports are produced by several additional countries, including Turkey.

Some EM countries have consolidated responsibilities of several debt management functions or institutions to improve debt management and increase accountability. For example, recently a debt management office was formally created in Uruguay, within the Ministry of Finance. In Brazil, the State Treasury has acquired consolidated responsibilities for domestic and external debt as well as front, back, and middle offices. The semiautonomous Hungarian Government Debt Management Agency has since 1996 been given full responsibility, first, for domestic debt management, and, second, for external management. It became an independent corporation (wholly owned by the government) in 2001. Establishing an explicit middle-office function has strengthened the focus on risk management and encouraged building up the requisite analytical capabilities in several EMs.

With clearer debt management strategies and improved organization, EM debt offices are

improving their communications with the market. Many countries now hold regular auctions and have regular issuance calendars. More broadly, they are becoming more sophisticated and transparent in how they operationalize those objectives. Several EM debt offices have made major strides in improving the transparency and quality of information provided to investors (e.g., Brazil and Mexico) and also implemented sophisticated investor relation programs.

The strengthening of debt management and greater availability of market financing instruments have led to an increased focus on risk management. Debt managers choose debt structures that are more resilient to macroeconomic and financial shocks. Determining the ideal composition of a debt portfolio is a challenging task and requires, as a starting point, identifying cost-risk preferences of the government, which are difficult to identify, with perhaps the best approximation captured by an agreed "benchmark" portfolio that defines the preferred maturity, currency, and re-fixing profile.

As an initial step, many countries conduct stress tests on their existing debt portfolios. They assess the effect of a change in interest and exchange rates on debt service costs, given the existing debt portfolio to identify the budget impact and vulnerabilities of the debt structure. In some cases, the analysis is augmented by considering how various potential financing strategies would affect these metrics, given a set of budgetary projections (Mexico and Brazil) to help decide a preferred financing strategy. Debt managers also use these metrics to monitor and evaluate ex post changes in risk levels.

Further, debt managers are seeking to augment a deterministic approach with a stochastic simulation framework (Brazil, Mexico, Hungary, and the Czech Republic). This stochastic approach uses target variables such as debt service cost, the cost to the budget, or nominal cash flow to rank prospective financing strategies and their related debt portfolios based on the likelihood that the target variable (e.g., nominal debt

Note: The main author of this box is Allison Holland.

<sup>1</sup>Tesouro Nacional (2005).

service costs) lies below a certain level. This approach is akin to the VaR approach used by asset managers. While the stochastic approach has many advantages over the deterministic approach, significant analytical challenges need to be met. Even the most tractable approach (“cost-at-risk”) needs calibration of the interest and exchange rates in economies where the yield curve is evolving, in both shape and level. Extending these models to a more comprehensive set of variables increases the modeling complexity significantly, limiting the use of this approach and the degree of confidence in its outputs.

These approaches do not cover all risks. An additional risk is rollover risk, that is, the risk that the debt manager may not be able to finance obligations as they fall due. It is often mitigated by setting a target on the average term to maturity, duration, or the proportion of debt that needs to be refinanced in the year ahead (Hungary and Brazil). Such targets also influence the choice of preferred debt composition. Many countries have prefinanced future maturi-

ties precisely to eliminate rollover risk, among other objectives.

Effective risk management also needs supporting infrastructure and market development. Debt recording, IT systems, and analytical skills need upgrading, yet some debt managers in EMs face resource constraints. Another constraint is posed by the market environment. As markets develop, the set of financing instruments available to debt managers expands to include those with more desirable risk properties, such as long-term fixed-rate domestic currency bonds. Thus debt managers have incentives to encourage the development of the debt markets and to improve their functioning (Poland, Mexico, and Brazil).

While debt and risk management capacity has generally improved in some EMs, it has some way to go in many other EM countries. Sustainable improvements in the depth of the market, supporting infrastructure, coupled with continued improvements in fiscal and monetary policies, will be required before debt managers can fully achieve the desired risk profiles.

eign debt issues in local currencies. Foreign investors are attracted to these issues (e.g., by Uruguay in 2003–04, Colombia in 2004–05, and Brazil in 2005) because of the higher real yields relative to foreign currency issues (particularly in Brazilian and Colombian paper). Moreover, the global bond structure is also preferred by foreign investors for reasons of familiar and more efficient global bond logistics (including the bond contract, use of New York or English governing law, taxation, distribution, clearing and settlement through Euroclear, and so on). Some issues also avoid convertibility risks by paying coupon or principal in dollars at current market exchange rates. For issuers, particularly those with as yet underdeveloped local institutional investors, these issues offer the opportunity to place a large benchmark issue in local currency with longer maturities with

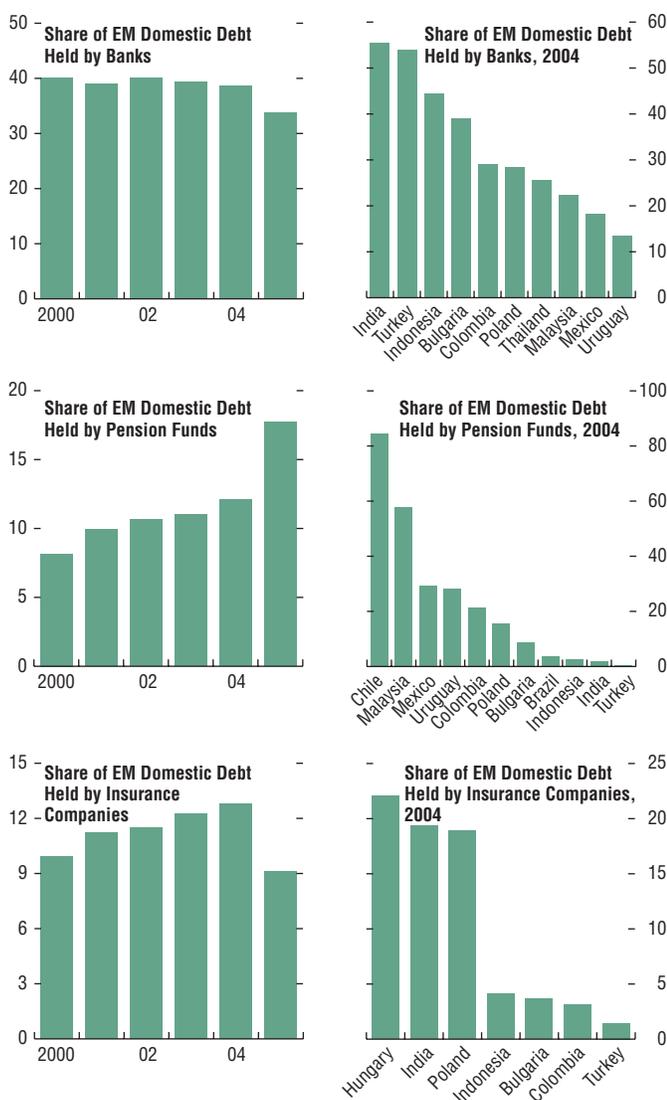
the help of long-term foreign institutional investors.

### *Domestic Investors*

An analysis of the past five years suggests several important changes in the domestic investor base for EM sovereign debt (Figure 3.16).

Banks constitute the largest domestic investors in EM sovereign debt. Banks provided slightly above a third of all domestic financing to EM sovereigns in 2004. Although the banks’ share has remained high, it has fallen gradually with the institutional investors’ share rising rapidly (as described below). Bulgaria, Turkey, India, and Indonesia depend largely on bank financing. However, even in these countries, this share has been falling. The substantial holdings of sovereign debt by banks have important implications in terms of the sound-

**Figure 3.16. Holders of EM Domestic Debt**  
(In percent of total)



ness of the banking system, as well as in terms of introducing any changes in risk-weighting of sovereign debt by regulators.

There is a steady increase in the shares of pension funds across EMs. Pension funds now appear to be the second largest investor class in domestically issued debt, accounting for 20 percent of EMs that reported their share. Pension funds account for about 85 percent of domestic sovereign debt in Chile, about 60 percent in Malaysia, and more than 25 percent of the domestic government funding in Mexico, Uruguay, and Colombia.

The share of pension funds in EM public debt is likely to expand in the years ahead as enabling reforms take place. Such reforms under consideration (e.g., in India and Brazil) could increase the investment of pension funds, because of both the long accumulation periods in many EMs and the high share of public debt in their investment portfolio during the initial years. Of the 10 countries for which data were available, pension funds invested 40 percent or more of their assets in government securities. As pension funds are particularly keen investors in longer-maturity paper and tend to be buy-and-hold investors, their increasing presence is conducive to lengthening the domestic maturity spectrum.<sup>19</sup>

Insurance companies are becoming increasingly important investors in EM sovereign debt. The share of insurers in reporting EMs has risen to around 13 percent by 2004. Life insurers dominate general insurers in terms of overall investments, and the share of life insurance products in personal wealth portfolios in EMs is likely to grow as incomes rise from levels well below those of MMs. Nonetheless, insurers already hold about a fifth of public debt in Hungary, India, and

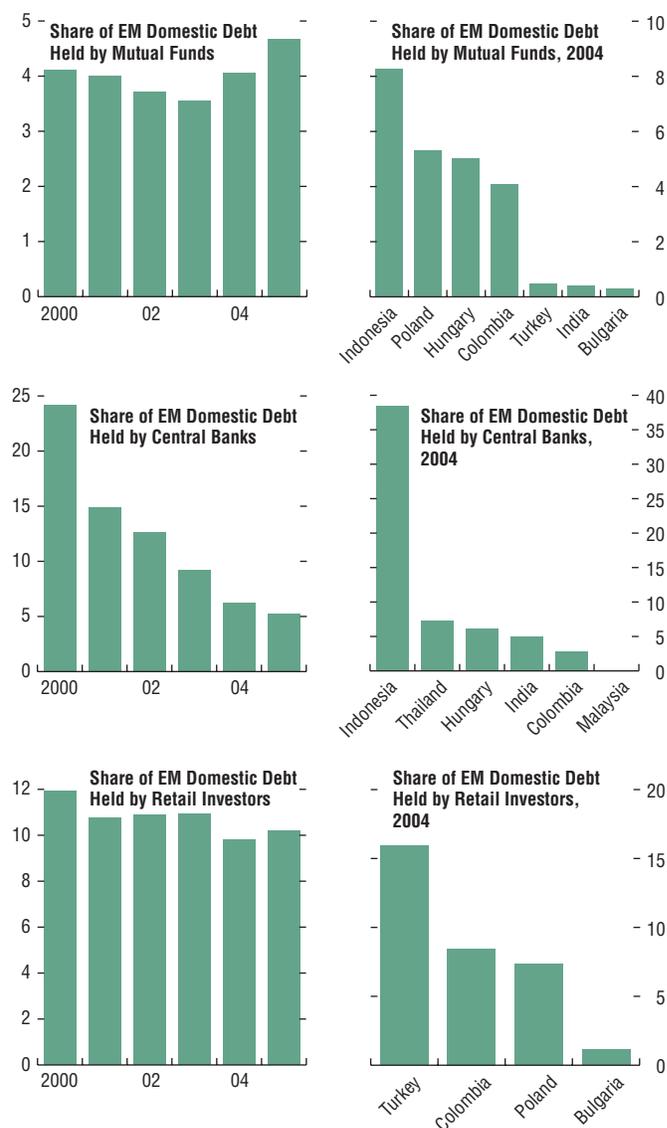
<sup>19</sup>However, at times regulations requiring pension funds to guarantee a return within a small band of an industry average or some target rate could result in a more short-term orientation. Furthermore, the buy-and-hold behavior of such investors may reduce liquidity in local markets.

Poland. As with pension funds, insurers typically invest in longer-dated public securities and tend to be buy-and-hold investors, providing considerable ballast to public debt. The growth in private and defined contribution pension plans also bodes well for the growth of insurance sector assets, and its share in public debt, as retirees convert their accumulated pension balances into annuities.

While growing rapidly, mutual funds are still very marginal players in EM domestic sovereign debt. The share of mutual funds nearly tripled in reporting EMs over 2000–04, but still remained small at under 4 percent in 2004. Barring a few exceptions such as Brazil, Korea, and South Africa, mutual funds have still to come of age in EMs. Mutual funds in EMs are likely to grow from these low levels with rising incomes and with falling deposit interest rates, leading to their greater acceptance by traditional bank depositors. Mutual funds are also likely to be important in increasing market discipline on sovereign issuers, as they are likely to be less constrained by regulations than banks, insurers, or pension funds.<sup>20</sup>

Central banks are no longer important investors in their own domestic sovereign debt. The share of central banks in reporting countries has declined steadily and is now close to 6 percent, except in Indonesia where the substantial holding of government paper by the central bank reflects the legacy of bank interventions during the Asian crisis. These developments reflect greater fiscal and monetary policy discipline in EMs, greater independence of central banks, more specific controls on central bank financing of the government, and increasing reliance by the sovereign on market funding. It could also reflect EM central banks' efforts to sterilize the large

Figure 3.16 (concluded)



Source: IMF staff estimates based on data from country authorities.

<sup>20</sup>Liquidity regulations applying to banks and investment guidelines applicable to pension funds and insurers often compel investment in government securities.

### Box 3.3. Mexican Warrants

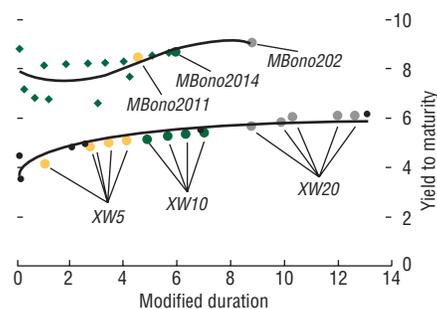
In November 2005, Mexico sold exchange warrants that permit investors to swap up to \$2.5 billion of dollar-denominated debt (UMS) for peso-denominated debt (MBonos) in late 2006. This operation, the first of its kind by an EM sovereign issuer, is part of Mexico's efforts since the 1994 Tequila crisis to reduce its foreign currency debt and develop the domestic debt market. The warrants will be "in the money" at the expiration date if the prices of the foreign currency debt increase less, or decline more, than those of the domestic debt. Since the differential between Mexican and U.S. interest rates is expected to continue to narrow, the derivative has attracted many investors to the deal. If exercised, the warrants would raise the average duration of domestic debt and lower Mexico's foreign exchange exposure, while raising the overall cost of debt.

Three series of warrants were issued with the peso-denominated debt to be awarded in the exchange maturing in 2011, 2014, and 2024, respectively. The exchange ratio is the ratio of forward prices of the two securities on the day of issue. As the dollar amount of peso-denominated bonds per warrant is determined at issue, the currency risk in the exchange is borne entirely by the issuer. At the expiration date, if the warrants are in the money, the exchange of foreign for domestic debt will increase the duration of outstanding domestic debt because the bonds offered in the exchange belong to the outer end of the domestic yield curve (see the figure). However, the actual increase in the face value of peso-denominated debt will depend on the level of the U.S. dollar to Mexican peso exchange rate on the expiration date.

In terms of Mexico's U.S. dollar yield curve, it is likely that the effect of the operation will be to promote the specific benchmark issues, which were not included in the exchange, and, in all likelihood, a reduction in the total number of U.S. dollar bond series outstanding. The result

Note: The main authors of this box are Brian Bell and Luisa Zanforlin.

#### Mexico: U.S. Dollar and Mexican Peso Bond Yield to Maturity Curves by Warrants



Sources: Bloomberg L.P.; and IMF staff estimates.

should be an improvement in the liquidity of the secondary market in U.S. dollar bonds.

What are the advantages for Mexico in using exchange warrants rather than proceeding with a straight bond exchange offer? It seems likely that the warrants will have attracted some external investors who would be more wary of investing in a jittery local debt market, particularly given that 2006 will be an election year. In addition, issuing warrants that could be in the money at the expiration date may allow the issuer to exchange higher volumes than through a straight exchange.

Offsetting these advantages, to some extent, is the foreign currency risk borne by the sovereign, since the peso value of debt required to honor the warrants will be determined on the exercise date, if warrants are in the money. Effectively, if the peso depreciates against the dollar during the life of the warrant, and the warrant was still worth exercising, the warrant holders will receive securities with a higher peso face value. Also, the increase in the face value of domestic debt would be higher than if the exchange took place on the warrant issue date. Conversely, if the peso appreciated over the lifetime of the warrant, and the warrant was still in the money, the peso value of new debt would be lower.

### Box 3.4. Cross-Country Differences in the Currency Composition of Domestic Sovereign Debt

This box summarizes findings from an empirical analysis of the determinants of the currency structure of local government debt in emerging markets. The analysis is focused on the following question: How do countries' macroeconomic and institutional characteristics, including the exchange rate regime, affect the currency composition of domestic sovereign debt? The empirical evidence is based on Tobit estimates on a pooled sample of 23 emerging market countries between 1990 and 2004, based on data compiled by Jeanne and Guscina (2006).

The empirical analysis is anchored in a stylized, two-period general equilibrium model. In the model, dollarization of sovereign debt arises as a result of optimal hedging decisions by risk-averse lenders and borrowers in an environment with price risk (exchange rate and domestic price shocks) and macroeconomic risk (nonfinancial income shocks).

The empirical evidence suggests that a relatively large share of foreign-currency-denominated debt may result from investors' attempt to protect themselves from uncertainty in an environment of high and variable inflation, relative to the volatility of the exchange rate. Results suggest that, faced with relatively high domestic price uncertainty, households will find it optimal to allocate a (possibly large) fraction of their total savings to foreign currency domestic bonds to help smooth their income across states of nature. On the other hand, sovereign issuers may need to dollarize some of their debt because either investors refuse to accept local currency debt or demand very high local currency real interest rates.

In countries where the nominal exchange rate is countercyclical (i.e., recessions are associated with sharp depreciations of domestic cur-

rency), dollar assets provide additional consumption-insurance to domestic investors (holders of sovereign bonds). For sovereigns issuing dollar debt, however, the opposite is true: the cost of servicing dollar debt (in local currency terms) increases at a time when their ability to pay is lower. Empirical estimates indicate that, other things being equal, countries where the nominal exchange rate is countercyclical display *higher* levels of dollarization of debt. This suggests that *demand* considerations may be a key driver in the dollarization of sovereign debt in equilibrium.

The results also suggest that the fraction of bonds issued in foreign currency is significantly and negatively correlated with the absolute size of the overall domestic debt outstanding. As the issuers' local markets expand, issuers tend to favor own currency liabilities over the foreign currency alternative.

Summing up, the evidence indicates that lack of monetary stability—as proxied by the relative variance of inflation and the real exchange rate—has a significant impact on dollarization of sovereign debt. In this sense, dollarization of domestic debt appears to be at least in part the rational response of agents to a lack of monetary policy credibility.

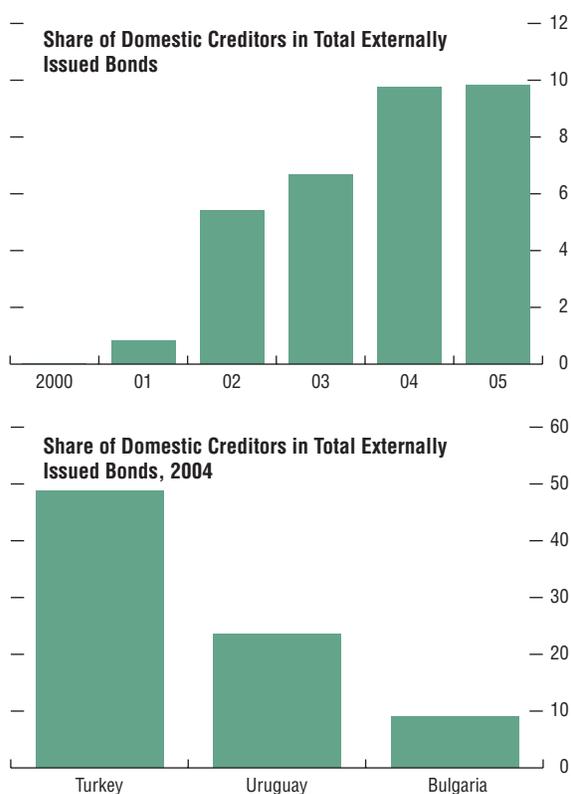
These preliminary findings have several implications. A combination of flexible exchange rates and inflation targeting would minimize dollarization incentives. More generally, a clear commitment to stable macroeconomic policies facilitates the issuance of domestic currency bonds. Our results are also in line with the evidence that past debt de-dollarization processes have been driven by a deepening of the domestic markets,<sup>1</sup> and that the dollarization ratio of government bonds is negatively related with the size of domestic financial markets.<sup>2</sup>

Note: The main authors of this box are Anna Ilyina and Herman Kamil.

<sup>1</sup>Bordo, Meissner, and Redish (2005).

<sup>2</sup>Claessens, Klingebiel, and Schmukler (2003); and Eichengreen, Hausmann, and Panizza (2005).

**Figure 3.17. Holdings of External Debt by Residents of Issuing Country**  
(In percent)



Source: IMF staff calculations based on data from country authorities.

foreign exchange (FX) reserves accumulation by issuing their own securities.

The share of domestic retail investors has grown rapidly in some countries while declining in others. Over 2000–04, the share of retail investors in total domestic debt remained around 11–12 percent. However, this masks the wide variation across EMs. Turkey has a sizable share of domestic debt held by retail investors, but the share has also declined from over 20 percent in 2002–03 to under 18 percent in 2004, and further to 14.4 percent by October 2005, reflecting an increasing shift to foreign investors. Several EM countries have still to implement an adequate retail distribution program. While actual data are not available, Brazil, Mexico, and the Philippines are among the countries with good retail distribution.

Finally, the share of *domestic* investors in *externally* issued debt has grown in tandem with the share of foreign investors in domestically issued debt. Over 2002–04, this share has more than doubled: from 5 percent to 11 percent (Figure 3.17). Domestic investors in emerging Europe and Latin America are particularly important holders of externally issued debt. This may partly reflect the demand for foreign currency assets by local investors as protection against domestic political and economic vulnerabilities or the need for local institutions to match the currencies of assets and liabilities in dollarized economies (e.g., Turkey and Uruguay).

To summarize, EM sovereign issuers are experiencing a widening of their investor base. The most important recent trends signify a growing participation of foreign strategic investors in external debt, a significant increase in foreign investors' willingness to take local currency debt, and an expansion of the domestic institutional investor base coupled with less reliance on bank financing. As described in Box 3.5, these changes are also being supported by a variety of technical factors—such as development of credit derivatives; development of new EM sover-

### Box 3.5. Technical Factors Contributing to Widening Investor Base

Several recent technical developments are facilitating MM investors' positions in EM sovereign assets. These include development of new credit derivative instruments, introduction of new sovereign debt indices, development of new EM currency indices, and growing depth and liquidity of EM exchange markets.

EM credit derivative markets, primarily those for sovereign credit default swaps (CDSs), already have an impact on sovereign debt markets. Precise data on the size of over-the-counter EM credit derivative markets are not available, but estimates range between \$300 and \$500 billion of outstanding notional contracts. Major participants include banks, investment managers (including mutual funds, pension funds, and insurance companies), and hedge funds. CDS markets have developed rapidly since the late 1990s, benefiting in particular from a certain degree of contract standardization (ISDA contract documentation and standardized contract sizes). The EM segment is essentially composed of a sovereign single-name and state-owned company (e.g., oil company) CDS. Market liquidity and CDS curves are relatively well developed for Brazil, Colombia, Mexico, Russia, Turkey, and Venezuela, with maturities up to 10 years, although 5-year CDSs are the most traded. In certain cases, CDS markets are increasingly used as the *primary* source of price discovery and risk gauge of market sentiment for a given sovereign entity. EM credit derivative indices have also been developing rapidly in recent years (e.g., iTraxx), thanks to the growing number and diversity of EM references. The development of EM collateralized debt obligation (CDO) markets has been constrained by several obstacles, including the limited number of references and the lack of liquidity of underlying markets. However, recent transactions illustrate how financial innovation may nevertheless lead to further development of this market (see Chapter II).

Looking ahead, these markets are likely to have significant implications for global financial stability and the EM asset class. Credit default swaps already help diffuse sovereign risks to a wider class of investors, which may improve market deepening and maturation, and systemic resilience. For example, the consequences of the Enron and Argentina defaults for the financial system were much less severe than that of the Russia default, where risks were more concentrated. At the same time, however, growing CDS markets also contribute to blur the ultimate allocation of EM credit, and may introduce greater leverage and increased market volatility. For example, they may increase the risks of cash market squeezes in cases of credit events where the CDS market has acquired a size largely superior to that of the underlying market. (For example, in Mexico, the CDS market is now estimated to be about 10 times bigger than the underlying market.) The use of derivatives may also make the dynamics of crises more unpredictable by accelerating capital outflows, amplifying volatility, and, in some cases, increasing the correlation between asset and currency markets. In many past crisis episodes, such a negative impact was either due to the immaturity of local derivative markets or to weak prudential supervision, which allowed some financial institutions to build up excessive leveraged positions before the onset of a crisis. The lack of liquidity and narrow investor base on some of these markets may in particular be a source of additional volatility, although the further development of EM credit derivative markets should help expand the range of instruments needed to meet various risk profile needs, and potentially attract a more diverse and stable investor base.

Local currency indices in EM debt provide a valuable benchmark for a wide variety of investors. The Asian Bond Fund II initiative, launched in March 2005, sought to develop local currency benchmark bond indices for seven Southeast Asian currencies. In June 2005, JPMorgan undertook a more comprehensive initiative, introducing a new family of indices

Source: JPMorgan Chase & Co.

Note: The main authors of this box are Nicolas Blancher and Hemant Shah.

**Box 3.5 (concluded)**

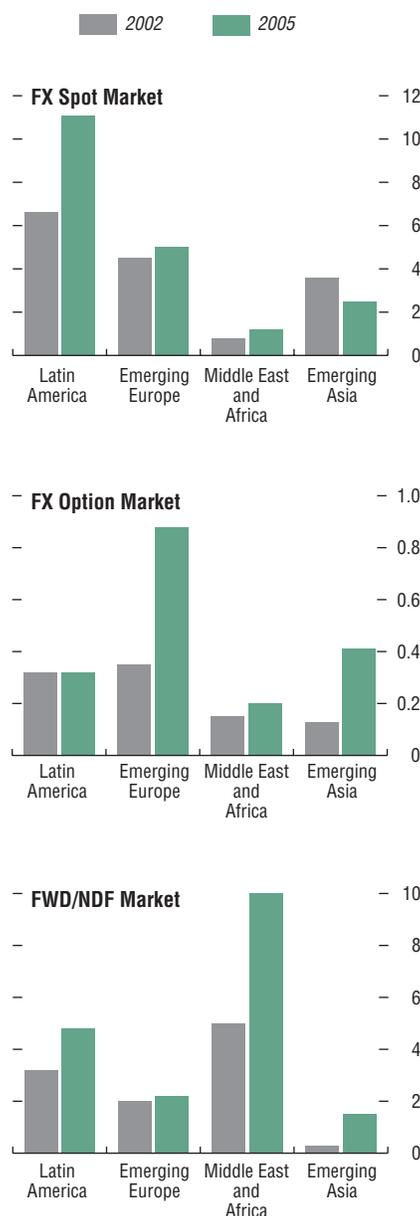
called Government Bond Index-EM (GBI-EM), which allows investors to tailor a benchmark appropriate for their purposes from one or all of these markets. Further refinements, such as a diversified index, and purification (by exclusion of high-income countries such as Hong Kong SAR and Singapore) are expected in 2006. The presence of such a benchmark for EM local currency debt greatly facilitates investment by institutional investors by providing a comprehensive index against which their performance can be assessed.

Benchmark indices and tradable contracts are also being introduced for EM currencies. In November 2005, the Latin America Currency Index (LACI) was launched by JPMorgan and Bloomberg. The launching of the index is a direct consequence of investors taking on more exposure, in particular currency risk in local currency instruments in Latin America. The LACI provides a low-cost tradable basket to hedge against movements in currencies across the region, without the need for implementing multiple trades across markets with different trading hours, instruments, and conventions. Although the rates component of the GBI-EM is attractive to investors, the currency component can be expensive to hedge in local currency instruments where the cost of carry can be very high (particularly, for example, in Brazil). Under these circumstances, the LACI can be used to hedge away much of the currency risk at a relatively low cost. The index and contracts would be particularly useful to funds focused on Latin America.

The spot and derivative markets in EM currencies and interest rate swaps are growing rapidly (see the figure). Following the Asian crisis, there has been a major move toward either floating rate regimes or formal fixity. Since 1996, 20 EMs have adopted a flexible exchange rate regime or increased flexibility of the nominally flexible regime, while 7 emerging European countries have adopted the euro. Moreover, derivative markets in major EM domestic currencies have increased substantially in terms of trading volumes and maturity of contracts available.

**Changes in FX Market Liquidity, 2002–05**

(Proxied by average daily volumes)



Source: JPMorgan Chase & Co.  
Note: FWD = forwards; NDF = nondeliverable forwards.

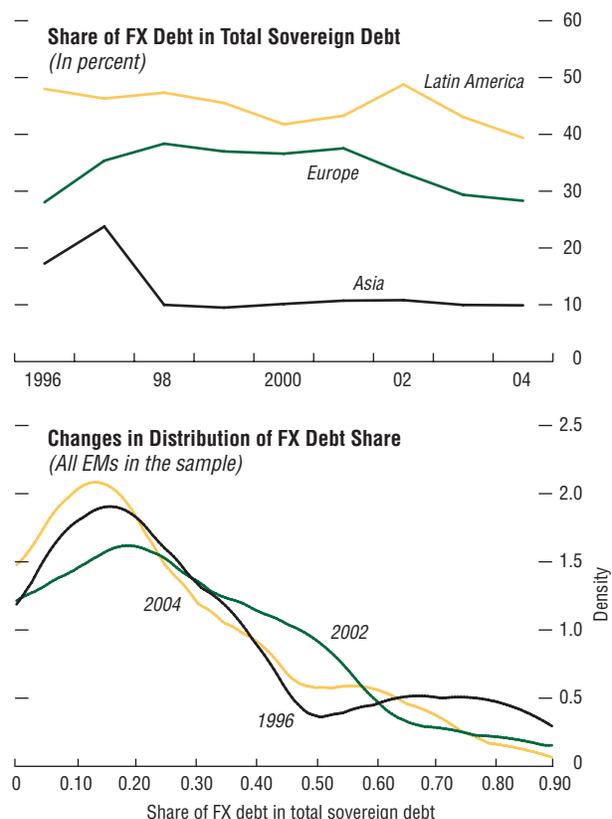
eign risk and currency indices; growth of the corresponding derivative markets; and improvements in domestic trading, payment, and settlement systems—that improve the ability of foreign and domestic investors alike to manage and hedge their EM sovereign risk exposures. Such growing diversification of the local currency investor base bodes well for reducing exchange rate–induced shocks, longer-term financing, and improved functioning of domestic debt markets. Undoubtedly, the current widening of investor base is also partly induced by a cyclical search for yield and lower risk aversion, and is thus reversible. The challenge for EM issuers is to make such widening more permanent by maintaining the recent improvement in macroeconomic performance and by better debt management.

### EM Sovereign Debt Structures, Financial Vulnerabilities, and Contagion

This section examines the question of whether the recent changes in EM sovereign debt structures and investor base have reduced EM vulnerability to global financial shocks. Such shocks would manifest themselves in increased volatility of both exchange rates and interest rates (domestic and external), in difficulty in accessing capital markets for new financing or roll over of existing debt, and in transmission of shocks from one EM to other EMs (contagion). Therefore, this section analyzes the question of whether the resilience of EM debt to interest rate, exchange rate, and rollover and contagion risks has been enhanced by the changes in debt structure and investor composition.

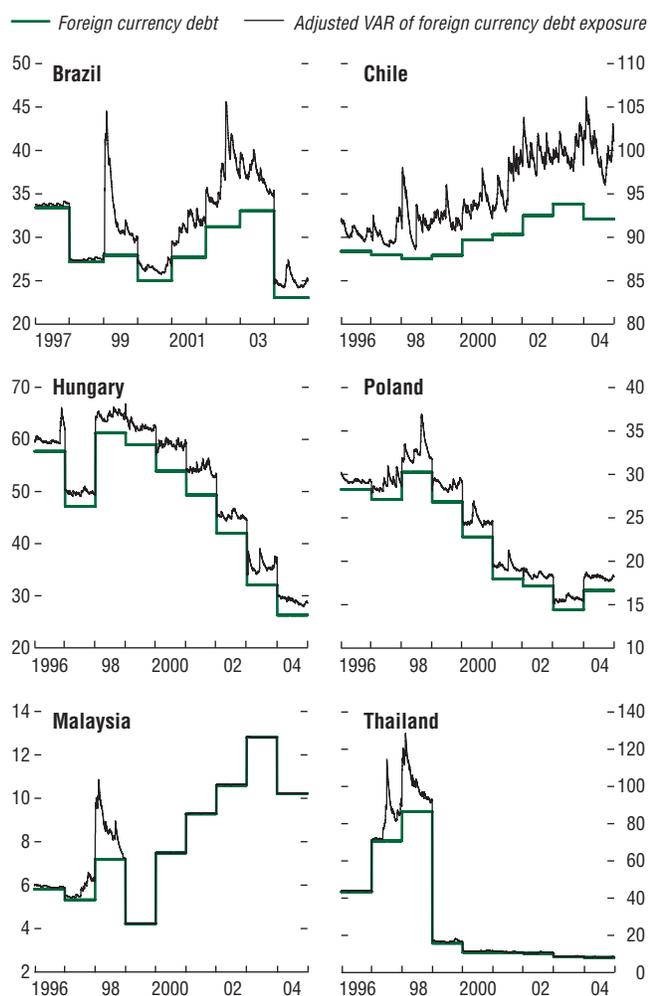
An observed change in sovereign debt structure is typically an outcome of debt management decisions, reflecting the fiscal objectives and risk preferences of the sovereign, quality of debt management, and external constraints. Therefore, the impact of changes in sovereign debt structure can be rigorously

**Figure 3.18. Share of Foreign Currency Debt in Total Sovereign Marketable Debt**



Sources: Jeanne and Guscina (2006) database; Bank for International Settlements; and IMF staff estimates.

**Figure 3.19. Foreign Exchange Risk Exposures of Selected EM Sovereigns**  
(In percent of total debt)



Sources: Jeanne and Guscina (2006); Bank for International Settlements; national authorities; and IMF staff estimates. For Brazil and Chile, the data were received directly from the national authorities.

assessed only within a model that reflects such country-specific objectives, decisions, and constraints, together with assumptions about the outcomes of future stochastic variables. Recent work in risk management has developed such stochastic modeling of the joint dynamics of macroeconomic variables (GDP, primary fiscal balance, and public debt) and financial variables (interest, exchange, and inflation rates).<sup>21</sup> However, such an assessment for the 18 countries in the sample goes beyond the scope of this chapter. Instead, the rest of this section examines the resilience of EM sovereign debt using the key indicators associated with interest rate, exchange rate, and debt rollover rate risks.

### Exchange Rate Risk

Figure 3.18 shows the reduced reliance of EM on foreign currency debt as discussed in the previous section. In order to capture the exchange rate volatility effect, the VaR measures of foreign currency exposures were computed for selected EMs (Figure 3.19), together with the standard foreign currency debt ratios.<sup>22</sup> The VaR measures are declining for most of the sample, because of the falling share of foreign currency debt in total and generally lower foreign exchange volatility (with a few exceptions, such as Chile and Malaysia, where the share of foreign-exchange-denominated debt has risen, and in the case of Malaysia from a very low base).

<sup>21</sup>See, for example, Bolder (2002, 2003); Garcia and Rigobon (2004); and Hostland and Karam (2005).

<sup>22</sup>The VaR-adjusted value of foreign currency debt is computed by adding to the foreign currency debt position a potential change in the local currency value of foreign debt due to adverse exchange rate movements over a three-month period at the 95 percent confidence level. The variances used in computation are obtained using 66-day rolling window and exponential smoothing. The VaR-adjusted value of foreign currency debt is presented in percent of total debt.

**Table 3.4. EM Prefinancing of 2006 External Debt**  
(In millions of U.S. dollars)

	Planned	Actual	Remaining
Brazil	4,500	3,479	1,021
Colombia	2,000	2,000	0
Mexico	3,100	3,100	0
Panama	640	250	390
Venezuela	3,000	4,215	-1,215
Asia	8,750	1,150	7,600
Emerging Europe	20,800	1,076	19,724
Latin America	14,465	13,604	861
Middle East and Africa	9,000	0	9,000
Total	53,015	15,830	37,185

Source: JPMorgan Chase & Co. (2006).

### Interest Rate and Debt Rollover Risks

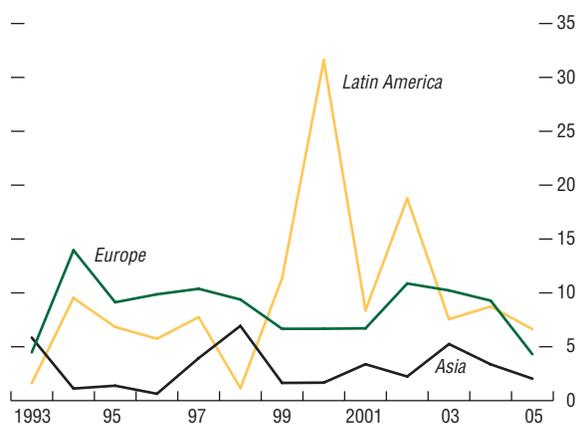
#### External Debt

The bulk of the EM sovereign debt issued in international markets is in the form of fixed-rate bonds. Most countries have moderate repayment burdens in 2006. On average, international bonds maturing within one year represented less than 10 percent of total EM sovereign debt and an even smaller fraction of net international reserves as of September 2005 (Figure 3.20). Moreover, most Latin American EMs have already prefinanced their 2006 external borrowings (Table 3.4).

#### Domestic Debt

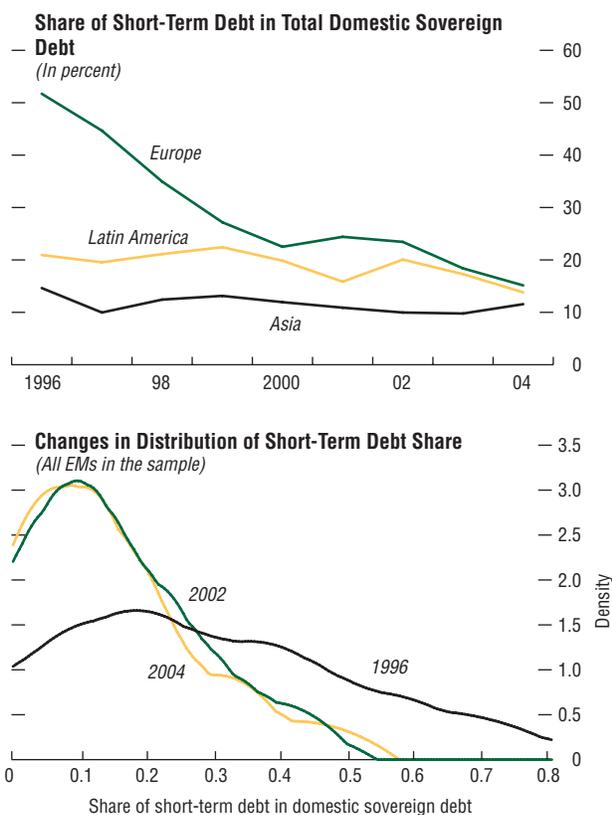
Based on the original maturity of outstanding debt, the reliance on short-term local currency debt was reduced significantly across EMs during 1996–2004, contributing to the decline in rollover risk (Figure 3.21). By the end of 2004, the average short-term debt shares in all three EM regions were reduced to around 10–15 percent from 15–50 percent in 1996 (Figure 3.21). Correspondingly, there was also a decline in the average share of debt maturing in less than one year, with the exception of Brazil in 2004–05 (Figure 3.22). It is also corroborated by the increase in duration of EMBIG country indices, notably for Hungary, Poland, Mexico, and Colombia (shown for selected EMs in Figure 3.23). A key factor underlying this trend was the

**Figure 3.20. External Sovereign Market Debt Maturing in Less Than One Year**  
(In percent of FX reserves)



Sources: Bank for International Settlements; International Monetary Fund, *World Economic Outlook*; and IMF staff estimates.

**Figure 3.21. Short-Term Domestic Sovereign Marketable Debt**  
(By original maturity)



Sources: Jeanne and Guscina (2006); Bank for International Settlements; and IMF staff estimates.

increase in the share of five-year benchmark domestic bonds by several emerging European countries and a decline in the share of treasury bills in budgetary financing.

The increased reliance on the less risky forms of debt may serve as an insurance against bad states of the world. Box 3.6, p. 120, illustrates the effect of changing the maturity of the local currency debt and the share of foreign currency debt on EM sovereign credit risk, using a stylized contingent-claims model. The analysis suggests that under reasonable assumptions, lower foreign currency debt and longer maturity of local currency debt can reduce the rollover and default risks in bad states of the world. Although such a strategy may be associated with higher debt service costs in the short-run, it may pay off in the longer term, as it reduces the likelihood of financial distress.<sup>23</sup>

### Contagion Risk

Contagion is broadly defined as the transmission of unanticipated local financial and economic shocks from one country or market to other(s). There are two main transmission channels for such shocks—*international trade* and *financial integration*. Trade links can cause such transmissions through the impact of currency devaluations associated with a crisis on the relative price of exports (competitiveness effect) and the domestic demand for imports (income effect), and they were an important factor in the 1994–95 Mexican peso crisis, the 1997 Asian crisis, and the 1999 Brazilian crisis.<sup>24</sup> In this section, we do not focus on such *fundamental* spillover but on *financial* contagion, which typically arises through com-

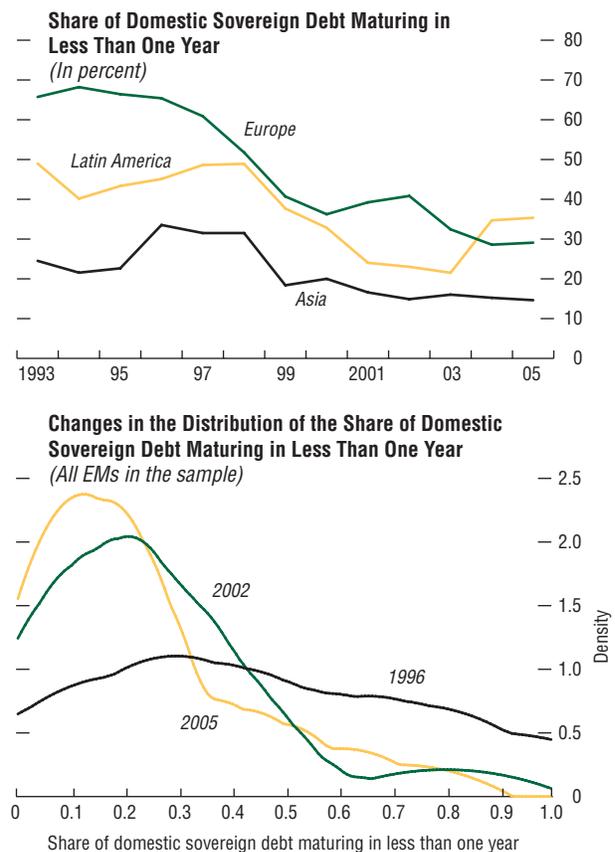
<sup>23</sup>The extent to which the shift toward local currency debt financing may help improve debt sustainability and sovereign credit quality depends, among other things, on the level of domestic interest rates vis-à-vis foreign interest rates.

<sup>24</sup>Eichengreen and Rose (1999); Glick and Rose (1999); and Forbes (2001 and 2004).

mon creditor linkages within EM.<sup>25</sup> Under this type of contagion, a shock in one EM country affects the balance sheet of international investors, inducing a rebalancing of their overall risk position, especially by investors with high leverage or margin call requirements, including possibly by shedding risk of other EM countries. Other transmission mechanisms could include increases in risk aversion by investors following a shock, herding behavior (in which investors derive market information from the behavior of other investors and follow the market), and evaluation and compensation arrangements for money managers with reference to market indices (which may lead investors to follow the behavior of the market as a whole).

There is some tentative evidence pointing toward reduced contagion. During past crises in EMs, the correlation of returns has risen dramatically as declines in bond prices have propagated across countries. Didier, Mauro, and Schmukler (2006) show that the average six-month correlation coefficient of daily returns was lower in 2000–05 than in 1994–99 (Figure 3.24). There are a number of common factors that affect correlations among EMs, such as changes in MM “riskless” rates, across-the-board changes in EM credit quality, investors’ risk appetite, or volatility of the asset class. Bunda, Hamann, and Lall (forthcoming) control for some of these common factors and show a sharper decline in adjusted correlations. The widening gap between adjusted and unadjusted average correlations over the last two years indicates that the comovement of EM returns during this period appears to be less specific to particular EMs and driven more by external events. The results indicate that the so-called pure contagion continues to track close to the lows seen in 2003 (Figure 3.25). This is corroborated by studies explaining EM spreads

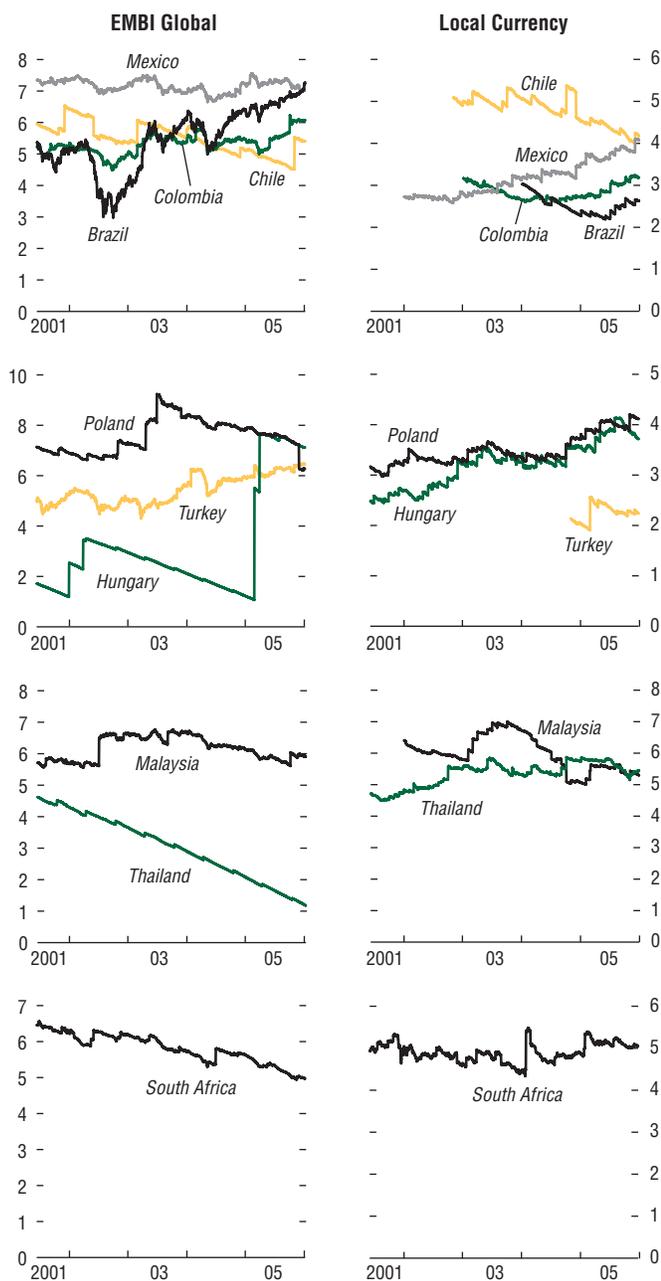
**Figure 3.22. Domestic Sovereign Debt Maturing in Less Than One Year**



Sources: Bank for International Settlements; and IMF staff estimates.

<sup>25</sup>Kaminsky, Lyons, and Schmukler (2004); and Broner, Gelos, and Reinhart (2004).

**Figure 3.23. Modified Duration of the EMBIG and GBI-EM Indexes of Selected EM Countries (In years)**



Source: JPMorgan Chase & Co.

(see also Chapter I, Box 1.5, which concludes that EMBIG spreads are well anchored in fundamentals).

The decline in contagion could reflect changes in investor behavior. Investor research of EM debt and economic performance as well as financial and economic data provided by EMs have increased significantly since the Asian crisis. These improvements are likely to facilitate more investor discrimination between countries, reduce surprises, and thus result in less herding behavior by investors. Going forward, the increased foreign investment into local currency markets may also help reduce financial contagion. As investors move into local currency debt, the volatility of their returns could fall, and they may have less need to sell off EM bonds across the board following shocks affecting a particular country.<sup>26</sup>

Finally, there is also some evidence of reduced concentration of common creditors in EMs. A recent Bank of England study shows that the geographical concentration of lenders—an important factor in Asian crisis—is reducing.<sup>27</sup> The study shows that EM creditors were fairly diversified as of end-2003. While there was still some concentration among bank creditors (e.g., the U.S., European, and Spanish banks were, respectively, the most prominent lenders to EMs in Asia, Europe, and Latin America), bond investors were more geographically diversified. Also, creditor concentrations differ in bond markets and bank loan markets. For instance, while Spain dominated as a bank lender in Latin America, the United States dominated Latin American bond markets (Figure 3.26).

<sup>26</sup>Dodd and Spiegel (2005) show that the average correlation coefficient of dollar returns across local currency instruments from 1993 to 2004, as proxied by the return on JPMorgan’s ELM+ index (Emerging Local Markets Index Plus) corrected for exchange rate movements is 0.120, compared with a correlation of returns across EM dollar bonds (as proxied by the EMBI+) of 0.445 over the same time period.

<sup>27</sup>De Alessi Gracio, Hoggarth, and Yang (2005).

To summarize, the evidence in favor of lower contagion is more suggestive than conclusive. While both investor and issuer behavior hint at lower contagion, so far there is insufficient evidence to rule out financial contagion. Some EMs, particularly those with high vulnerabilities, may well be tested by a large and unanticipated financial or economic shock. This underscores the need for sound macroeconomic policies and continued structural reforms, as well as moving toward debt structures more robust to contagion risks.

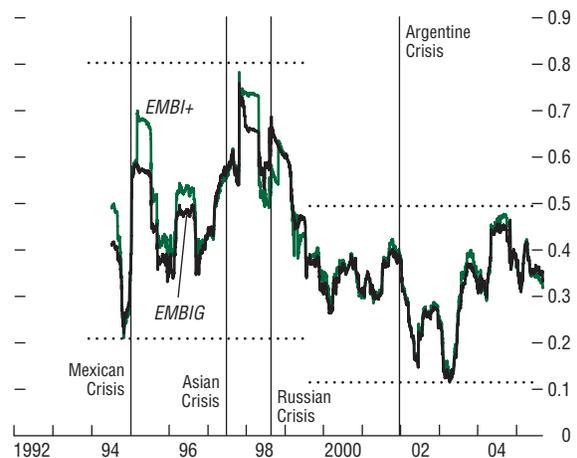
### Conclusions and Policy Implications

The recent improvements in EM debt management and diversification of the investor base have been facilitated by a benign global environment that led to a virtuous cycle of low global interest rates, improved fiscal performance, higher creditworthiness, and lower spreads.<sup>28</sup> On balance, *as long as MM interest rates and global liquidity conditions tighten gradually*, the positive developments in EM economic performance and debt management are likely to persist and provide increasing buffer against such moderate deterioration of external financing conditions. Overall, the vulnerability of major emerging sovereign debt markets to external risks is continuing to decline and appears to be lower than in previous periods of low spreads and low volatility. This assessment is based on the following factors:

- for most EM countries, fiscal positions are stronger than in the past, implying lower net borrowing requirements;
- as a group, and including most of the systemically important countries, the current account is in surplus and substantial reserves have been built up in recent years, reducing the need for external borrowing and providing a cushion should financial conditions worsen;

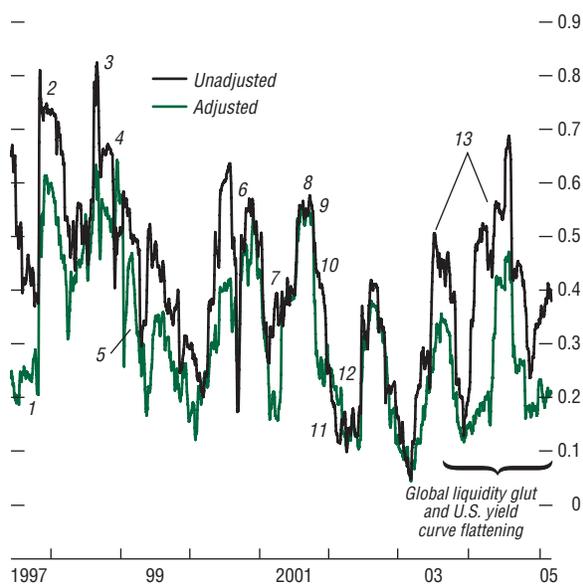
<sup>28</sup>See Hauner and Kumar (2005).

**Figure 3.24. Six-Month Correlations of Daily Returns for EM Bonds**



Source: Didier, Mauro, and Schmukler (2006).

**Figure 3.25. Adjusted and Unadjusted Correlations of EM Returns**



Source: Bunda, Hamann, and Lall (forthcoming).

<sup>1</sup>Thai baht devaluation, July 1997.

<sup>2</sup>Hong Kong stock market collapse, October 1997.

<sup>3</sup>Russian crisis, July–September 1998.

<sup>4</sup>LTCM collapse, September 1998.

<sup>5</sup>Brazilian devaluation, January 1999.

<sup>6</sup>U.S. high-yield sell-off, October 2000.

<sup>7</sup>Turkey devaluation, February 2001.

<sup>8</sup>September 11, 2001.

<sup>9</sup>Argentina debt exchange, October 2001.

<sup>10</sup>Enron collapse, October–December 2001.

<sup>11</sup>Argentina default, December 2001–January 2002.

<sup>12</sup>U.S. high-yield crisis and EM sell-off, June 2002.

<sup>13</sup>U.S. long-term interest rate spike, June–September 2003; March–June 2004.

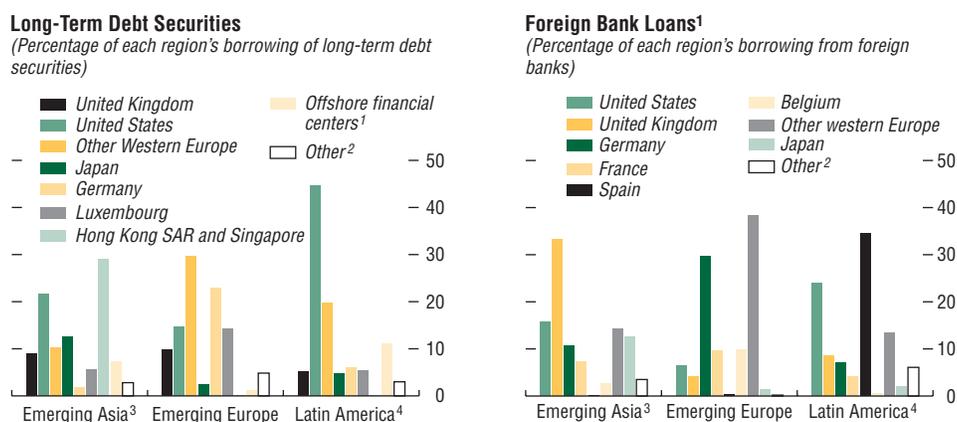
- the investor base is wider than in the past, with continuing inflows from long-term asset managers, providing an extra degree of stability in a more volatile environment; and
- active debt management operations—including buybacks, exchanges, and slowly extending yield curves for local debt—are succeeding in reducing governments’ foreign exchange rate risks and rollover risks.

These factors are particularly prominent in the systemically important EM countries and it is plausible that contagion from adverse shocks affecting individual countries will likely be lower than in previous episodes of market instability. Furthermore, developments in credit derivative markets should help diffuse sovereign risks to a wider class of investors, which may improve market deepening and maturation, and systemic resilience (as discussed in detail in Chapter II). At the same time, however, the lack of liquidity and narrow investor base in some of these markets may, in particular, be sources of additional volatility.

Nonetheless, vulnerabilities appear higher for a number of emerging market countries, especially those with some combination of weaker fiscal positions, relatively high debt and debt service burdens, large current account deficits, and heavy dependence on continued high prices of a few key commodities. In addition, the growing involvement of foreign investors in local debt markets raises vulnerability concerns in countries with relatively weak domestic financial systems, particularly in some of the low-income countries that are now seeing considerable foreign investment in local debt.

Thus, EM countries need to build on the recent successes and mitigate remaining vulnerabilities. Sound macroeconomic policies, especially prudent fiscal policies and flexible exchange rates, are essential to reduce vulnerabilities. At the same time, the recent evidence clearly points to active debt management as playing a significant role in reducing vulnerabilities. A wider group of countries

**Figure 3.26. Geographical Distribution of EM Creditors, End-2003**



Sources: IMF, *Coordinated Portfolio Investment Survey*; and Bank of England staff calculations.

<sup>1</sup>Offshore financial centers consist of Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Guernsey, Isle of Man, Jersey, Lebanon, Macao SAR, Mauritius, Netherlands Antilles, Panama, and Vanuatu.

<sup>2</sup>Other consists of Australia, Canada, Iceland, New Zealand, Cyprus, Malta, and borrowing from other EM countries.

<sup>3</sup>Includes Hong Kong SAR, Singapore, and the Pacific Islands.

<sup>4</sup>Includes the Caribbean.

Sources: Bank for International Settlements; and Bank of England staff calculations.

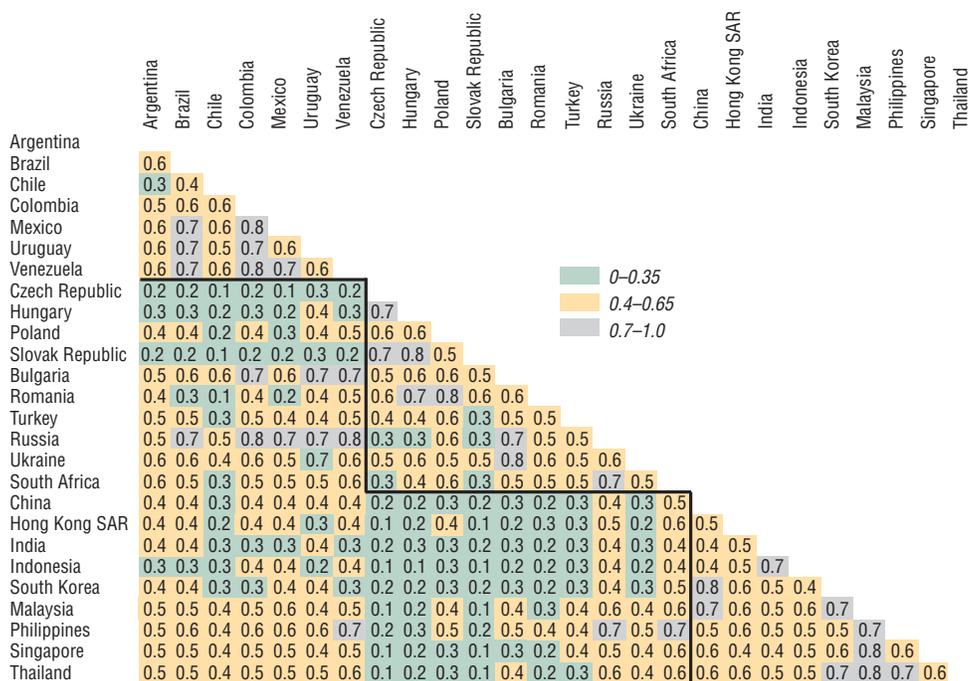
<sup>1</sup>Foreign claims, immediate borrower basis.

<sup>2</sup>Australia, Brazil, Canada, Chile, and Mexico.

<sup>3</sup>Includes Hong Kong SAR, Singapore, and the Pacific Islands.

<sup>4</sup>Latin America includes the Caribbean.

**Relative Common Creditor Index for EM Long-Term Debt Securities<sup>1</sup>**



Source: Bank of England (2005).

<sup>1</sup>Creditor countries consist of Australia, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States; and Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Guernsey, Isle of Man, Jersey, Lebanon, Macao SAR, Mauritius, Netherlands Antilles, Panama, Vanuatu, Hong Kong SAR, and Singapore.

**Box 3.6. Impact of Changes in Sovereign Debt Structure on Sovereign Credit Risk**

The contingent claims approach (CCA) is a framework that adapts the widely used finance and risk management tools to construct a market-to-market balance sheet for the sovereign, and to derive a set of credit risk indicators. The ability of a sovereign to pay is determined by its level of assets compared with its level of contractual liabilities (i.e., distress barrier). The variability of sovereign assets relative to the distress barrier can be used to measure credit risk (see first figure). Sovereign assets can be viewed as a portfolio composed of foreign currency reserves and other items, including the present value of the primary fiscal surplus, whose expected value in foreign currency terms at future time  $T$  is affected by the level and volatility of the forward exchange rate. Thus, by using forward-looking market prices, along with balance sheet information, the CCA approach can produce quantifiable risk indicators—such as distance to distress, default probabilities, and credit spreads.<sup>1</sup>

This box illustrates how the approach can be used to measure the benefit of extending maturity and reducing foreign currency exposure. The analysis suggests that reducing the share of foreign currency debt and stretching out the maturity of local currency debt is a lower-risk strategy when there is uncertainty about future states of the world. Although such a strategy may be associated with higher debt service costs in the short run, it may be less costly in the longer term because it reduces the likelihood of financial distress.

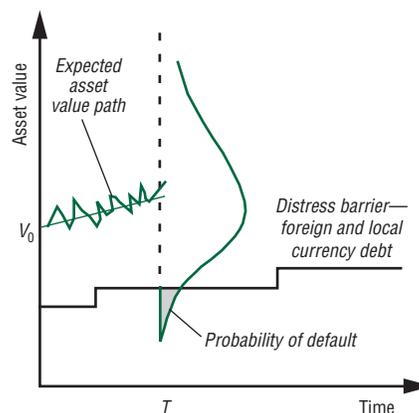
**Model Assumptions**

An EM sovereign can face two possible states of the world: a good state ( $G$ ) and a bad state ( $B$ ). In the good state, macroeconomic conditions are benign and the sovereign balance sheet is healthy. In the bad state, the exchange rate is more depreciated and more volatile, and the sovereign balance sheet is less healthy with lower

Note: The main authors of this box are Dale Gray, Anna Ilyina, and Cheng Hoon Lim.

<sup>1</sup>See Gapen and others, 2005.

**Distribution of Sovereign Asset Value at  $T$**



assets and higher volatility. An EM sovereign can find itself in a bad state of the world because of external factors (terms-of-trade shocks, and increased volatility of global equity prices or global interest rates) or because of domestic factors (fiscal overruns or political uncertainty). The relationship between the level and volatility of the forward exchange rate is calibrated using data from several EMs. The associated sovereign asset value and its volatility for a stylized EM sovereign are shown in the first table below.

Also, the distress barrier is denominated in foreign currency terms and includes both foreign and local currency debt, with their total book value remaining constant. Thus, when the exchange rate depreciates in the bad state of the

**Asset Value and Volatility in Different States of the World**

	Good State	Bad State
Forward exchange rate (local currency per U.S. dollar)	2	3
Volatility of forward exchange rate (in percent)	46	68
Sovereign asset value (in billions of U.S. dollars)	275	208
Volatility of sovereign asset (in percent)	35	45

Source: IMF staff estimates.

**Example Spreads for Different Debt Structures**  
(In basis points)

	Good State	Bad State
<b>High share of foreign currency debt, low share of local currency debt</b>		
Maturity structure A—short-term 75 percent, medium-term 25 percent, long-term 0 percent	250	1,050
Maturity structure B—short-term 50 percent, medium-term 37.5 percent, long-term 12.5 percent	220	980
Maturity structure C—short-term 25 percent, medium-term 50 percent, long-term 25 percent	190	925
<b>Low share of foreign currency debt, high share of local currency debt</b>		
Maturity structure A—short-term 75 percent, medium-term 25 percent, long-term 0 percent	500	950
Maturity structure B—short-term 50 percent, medium-term 37.5 percent, long-term 12.5 percent	370	790
Maturity structure C—short-term 25 percent, medium-term 50 percent, long-term 25 percent	250	640

Source: IMF staff estimates.

world, the distress barrier declines, with a larger decline occurring when there is a higher proportion of local currency debt. The distress barrier also becomes smaller when the maturity of the local currency debt is extended. The maturity of the foreign currency debt is assumed to be relatively long and stays unchanged.

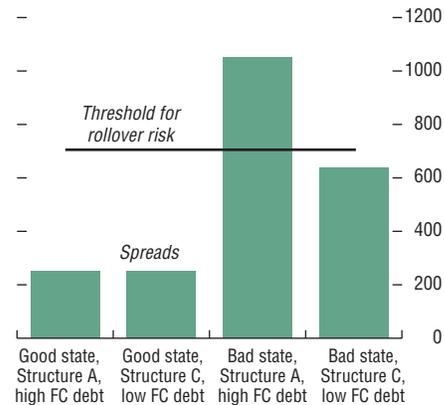
**Extending Maturity and Reducing Foreign Currency Exposure of Sovereign Debt**

The second table above shows the impact on the level of spreads when the maturity of local currency debt is extended for a given state of the world and a given share of foreign currency debt in total debt (high versus low share of foreign currency debt). Since the distress barrier includes foreign and local currency debt, the spreads shown in the second table reflect the credit risk on both types of debt.

The following are the key conclusions:

- Given uncertainty in the future state of the world, holding a lower share of foreign currency debt and a relatively long maturity of

**Spreads for Different Debt Structures and States of the World**  
(In basis points)



Source: IMF staff estimates.  
Note: FC = foreign currency.

local currency debt keep spreads lower (640 basis points versus 925 basis points or higher) in the event of a “bad” state of the world.

- For any given maturity structure of local currency debt, the sovereign credit spread widens by a larger margin in the bad state of the world when there is a higher share of foreign currency debt.
- The extension of maturity of local currency debt yields benefits (in terms of the credit spread compression), but these benefits are smaller when there is a high share of foreign currency debt.
- Risky debt structures, with a high share of foreign currency debt and short-term local currency debt, can significantly increase the vulnerability of the EM sovereign to rollover risk in a bad state of the world. Based on historical evidence, EM sovereigns tend to experience debt rollover problems when sovereign credit spread widens above 700 basis points (see second figure).
- The increased reliance on the less risky forms of debt may serve as an insurance against a bad state of the world.

could consider types of operations that include using reserves above prudential requirements to buy back external debt, market-based exchanges of foreign currency debt for local currency debt, and gradual lengthening of the yield curves. A number of countries could benefit from improved investor relation programs and enhanced data transparency. Finally, low-income countries that are just beginning to attract significant interest from foreign investors will need to consider how best—through avoiding overborrowing and developing debt management programs—to protect their balance of payments and financial sectors against perhaps swift changes in investor sentiment.

Substantial improvements remain to be made in developing local capital markets in major EM countries to help attenuate vulnerabilities and broaden the investor base. Several EM countries (including China, India, and Turkey) have to undertake substantial enabling reforms to stimulate pension and mutual funds that could invest in long-term public debt and provide stronger cushions against potential capital outflows. The strong presence of local institutional investors adds liquidity and depth in local currency markets, and is often a precondition for foreign investors to increase exposure to these markets. Many EMs have a long way to go in developing interest rate and currency derivative markets, lengthening the maturity of contracts available therein, or removing restrictions on foreign participation. Substantial improvements are still needed in trading and settlement processes; valuation of securities; adoption of standards for securities lending and repurchase market; equal tax treatment of different players; enabling legislation, improved regulation, and supervision of institutional investors and securities markets; and

regional cooperation in developing common listing and trading standards.

Efforts to improve debt management need to continue. As amply demonstrated in several countries (Brazil, Colombia, and Mexico), other EM countries can benefit considerably by strengthening their overall debt management function. In particular, EM issuers need to focus on more than just financing current cash flow needs; they also need to proactively structure their debt to minimize costs subject to risk constraints that determine currency composition, maturity profile, interest rates, and ensure adequate size and liquidity for key benchmark issues. The recent success of many EMs in using liability management operations to reduce the original sin problem, lengthen maturities, reduce debt-servicing costs and foreign exchange risks, and improve liquidity in benchmark issues are worthy of consideration by others. Efforts to develop specific investor segments, such as domestic retail investors or foreign long-term investors, and keeping investors informed through adequate investor relation programs are equally important.

There is a remaining need for substantial institutional strengthening of the public debt management function. The key areas for improvement include independence and legal authority, flexibility in debt management operations, and institutional capacity of front- and middle-office management, particularly in the smaller countries.<sup>29</sup> Also, many EM countries, particularly those with large foreign debt issuance, need to develop a better knowledge of their investor base. The generally poor tracking of investor base by the authorities—particularly of foreign investors—coupled with the growing dispersion of EM risk in the capital markets, may increase the uncertainty associated with investor behavior in sovereign debt markets during stressful times.

<sup>29</sup>For instance, many EM legislatures restrict the debt managers' authority to engage in buybacks or other types of liability management operations, prefunding, or terms of issuance. The IMF assists its members in strengthening debt management through policy discussions and technical assistance.

## Appendix I. Selected Operations by EM Sovereigns

### Table 3.5. Selected External Liability Management Operations by EM Sovereigns, 2003–05

Type of Operation	Description	Impact on Sovereign Debt
Prepayment of nonmarketable debt to private creditors	Poland (2005)—prepayment of the Paris Club debt (€5.3 billion), financed by the issuance of U.S. dollars and euro-denominated global bonds.	Reduction of U.S. dollar debt.
	Russia (2005)—prepayment of the Paris Club debt (US\$15 billion), financed by Oil Stabilization Fund.	Reduction of debt level; reduction of U.S. dollar debt.
Brady bond exchanges, calls, and buybacks	Brazil (July 2003)—Par and Discount Brady bonds were exchanged for global bonds maturing in 2011 and 2024; principal value exchanged = US\$1.3 billion.	Collateral released = US\$490million.
	Mexico (April/June 2003)—Brady Par Bonds were prepaid via call options.	Collateral released = US\$2.6 billion; debt reduction = US\$3.1 billion; reduction of U.S. dollar debt.
	Venezuela (July 2003)—DCB and FLIRB bonds were exchanged for domestic FX-denominated bonds; principal value exchanged = US\$1.5 billion.	Collateral released; extension of maturity.
	Venezuela (October 2004)—DCB and FLIRB bonds were exchanged for global bonds maturing in 2014; principal value exchanged = US\$750 million.	Collateral released.
Global bond exchanges, calls, and buybacks	Mexico (April 2004)—global bond exchange; principal value exchanged = US\$3 billion.	Extension of maturity; improved liquidity.
	Mexico (November 2005)—global bonds maturing between 2007 and 2033 were bought back using FX reserves.	Debt reduction = US\$1.4 billion; smoothing of amortizations; reduction of U.S. dollar debt.
	Colombia (June–September 2005)—US\$600 million of global bonds were exchanged for peso bonds; US\$1.1 billion of global bonds were bought back, financed mainly by the reopening of 2024 global bond issue.	Extension of maturity; reduction of U.S. dollar debt.
	Brazil (July 2005)—US\$4.5 billion of C-Bonds with embedded call option were swapped into longer-dated A-bonds.	Extension of maturity; smoothing of amortizations.
Warrants	Mexico (November 2005)—sold warrants allowing swap of up to US\$2.5 billion of U.S. dollar-denominated bonds (with maturities between 2007 and 2033) in 2006 for peso-denominated bonds (due in 2011, 2014, and 2024).	Reduction of U.S. dollar debt (if warrants are exercised).
Local-currency-denominated global bond issuance	Colombia (November 2004)—issued US\$325 million of peso-denominated global bonds payable in U.S. dollars (at current exchange rate) maturing in 2010; same issue was reopened in January 2005 for additional US\$25 million.	Proceeds were used for general budgetary purposes, including refinancing, repurchase, or retirement of U.S. dollar debt.
	Colombia (February 2005)—issued US\$320 million of 10-year peso-denominated bonds payable in U.S. dollars.	
	Brazil (September 2005)—issued US\$1.479 billion of 10-year real-denominated bonds payable in U.S. dollars.	Prefunding for 2006. Longer maturity in reals.
Prefinancing for the subsequent budgetary year(s)	Brazil (2003)—US\$1.5 billion of seven-year global bonds.	Prefinancing for 2004.
	Mexico (2003)—US\$1 billion of 11-year global bonds.	Prefinancing for 2004.
	Philippines (2003)—US\$550 million reopening of 2014 global bond; US\$550 million reopening of 2025 global bond.	Prefinancing for 2004; liquidity improvement.
	Brazil (2004)—US\$1 billion of 15-year global bonds; US\$500 million of 10-year global bonds; €200 million of 8-year euro bonds.	Prefinancing for 2005.
	Colombia (2004)—US\$500 million of 10-year global bonds; US\$375 million of 5-year global bonds.	Prefinancing for 2005.
	Mexico (2004)—US\$1.5 billion of 30-year global bonds; US\$975 million of 15-year euro-denominated bonds;	Prefinancing for 2005; extending the euro curve.

**Table 3.5 (concluded)**

Type of Operation	Description	Impact on Sovereign Debt
	US\$500 million reopening of 2009 global bond.	
	Philippines (2004)—US\$250 million reopening of 2025 bond.	Prefinancing for 2005; liquidity improvement.
	Turkey (2004)—US\$238 million reopening of 2015 bond.	Prefinancing for 2005.
	Venezuela (2004)—US\$790 million of 10-year global bonds; US\$500 million reopening of 2034 bond.	Prefinancing for 2005.
	Brazil (2005)—US\$1 billion reopening of 2025 bond; US\$500 million reopening of 2015 bond; US\$500 million reopening of 2034 bond.	Prefinancing for 2006.
	Colombia (2005)—US\$500 million reopening of 2014 bond.	Prefinancing for 2006.
	Indonesia (2005)—US\$100 million of 30-year global bonds and US\$900 million of 10-year global bonds.	Prefinancing for 2006; extending the dollar curve.
	Mexico (2005)—US\$1.975 billion reopening of 2015 issue; US\$921 million of 10-year euro-denominated bonds.	Prefinancing for 2006–07; liquidity in euro segment.
	Philippines (2005)—US\$150 million of 11-year global bonds.	Prefinancing for 2005.
	Venezuela (2005)—US\$1.215 billion of 20-year global bonds; US\$1.5 billion of 10-year global bonds; and US\$1.5 billion of 15-year global bonds.	Prefinancing for 2005; extending the dollar curve.

## Appendix II. Description of Data

This appendix provides a summary of data analyzed in the section on EM debt structures and investor composition.

### Debt Structure

Figure 3.1 uses a sample of the following larger 25 EM countries that were covered in the September 2005 issue of the *World Economic Outlook*:

- *Middle East and Africa*: Côte d'Ivoire, Lebanon, Morocco, Nigeria, and South Africa.
- *Asia*: China, India, Indonesia, Korea, Malaysia, Pakistan, and Philippines.
- *Eastern Europe*: Bulgaria, Hungary, Poland, and Turkey.
- *Latin America*: Argentina, Brazil, Chile, Costa Rica, Ecuador, Mexico, Peru, Uruguay, and Venezuela.

Figures 3.2–3.6, 3.17, 3.19, and 3.20 generally cover 1996–2004 and include a sample of 18 EM countries, based on a new database put together by Jeanne and Guscina (2006), for which more detailed information on maturity

and currency composition was available. These countries covered approximately 90 percent of the market capitalization of JPMorgan's EMBIG as of end-2004. The country coverage is as follows:

- *Africa*: South Africa.
- *Asia*: China, India, Indonesia, Korea, Malaysia, Philippines, and Thailand.
- *Eastern Europe*: Czech Republic, Hungary, Poland, Russia, and Turkey.
- *Latin America*: Brazil, Chile, Colombia, Mexico, and Venezuela.

### EM Investor Composition

This section uses data on investor composition collected specifically from country authorities and complemented with data from their websites. Due to restricted data availability, the sample size varies by year and variable. Aggregate domestic debt data were obtained from 18 EMs and external debt data from 13 EMs. Detailed data on holdings of specific investor classes were available only for a small subsample in both cases. The country coverage is as follows:

- *Africa*: South Africa.

- *Asia*: India, Indonesia, Korea, Malaysia, Philippines, and Thailand.
- *Eastern Europe*: Bulgaria, Czech Republic, Hungary, Poland, Turkey, and Ukraine.
- *Latin America*: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay.

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