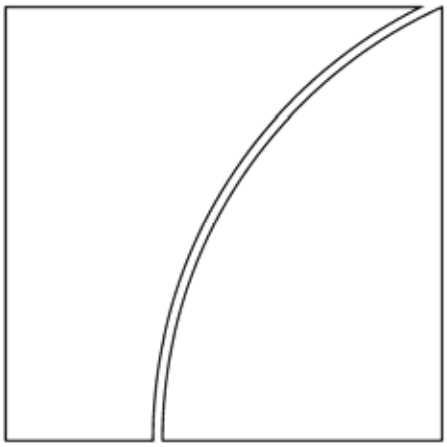
Committee on the Global Financial System



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Financial stability and local currency bond markets

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This Working Group was chaired by David Margolin of the Bank of Mexico.

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A. Introduction

Balance sheet weaknesses due to currency mismatches have played a key role in virtually every major financial crisis affecting the emerging market economies (EMEs) since the early 1980s. The denomination of debt in dollars (or other foreign currency) was either a main cause or at least a major aggravating factor. The many reasons for this are well known. A heavy dependence on foreign currency debt made countries more vulnerable to large currency depreciation. In many cases, devaluations were contractionary. At the same time, macroeconomic policies were often ill-placed to respond as government interest payments on foreign currency debt rose and monetary policy tended to focus on preventing overdepreciation of the exchange rate.

Matters were often made worse by the short duration of much foreign currency debt. Sharp increases in international interest rates, coming on top of currency depreciation, further increased debt servicing costs, worsening creditworthiness. Difficulties in rolling over maturing debt on sustainable terms were compounded. As many EMEs shared similar balance sheet vulnerabilities, crises could reach globally systemic dimensions.

Financial stability and bond markets

Local currency bond markets can help financial stability by reducing currency mismatches and lengthening the duration of debt. Such markets also help economic efficiency by generating market-determined interest rates that reflect the opportunity costs of funds at different maturities. In economies lacking well-developed local currency debt markets, long-term interest rates may not be competitively determined and thus may not reflect the true cost of funds. Banks will find it hard to price long-term lending, and borrowers will lack a market reference with which to judge borrowing costs. In many cases, long-term debt contracts in the local currency may simply not exist.

The absence of such markets can lead borrowers to take risky financing decisions that create balance sheet vulnerabilities, increasing the risk of default. For instance, issuing foreign currency debt to fund investments that yield local currency earnings leads to currency mismatches: exchange rate changes can therefore have significant effects on the balance sheet and the debt payments of the borrower, often compromising creditworthiness. Alternatively, using short-term local currency instruments to fund long-term projects entails interest rate and refinancing risks.

An ideal position is where assets and liabilities are matched. If a borrower financing the purchase of an asset yielding local currency earnings moves from long-term foreign currency debt to short-term local currency debt, forex risk is swapped for interest rate risk. On balance, however, forex risk has more often been the cause of crises than interest rate risk: exchange rate movements have usually been larger during crises than interest rate movements, and the monetary policy reactions to a negative shock (ie lower interest rates) are stabilising if the debt is in local currency but can be destabilising if the debt is in foreign currency.

A lack of long-term debt markets also leads to other risks:

- **Inadequate range of assets for local investors.** Local investors, such as pension funds and insurance companies, need assets that match long-term liabilities. When bonds are not available, such funds may invest in assets that are a poor match for their structure of liabilities, leading to interest rate and other risks.
- **Concentration of credit and maturity risks in the banking system.** Banks become the main source of long-term local currency financing. Concentrating maturity risk in the banking system is dangerous. The lack of markets may lead to

the mispricing of risk and, with opaque balance sheets, make it harder to monitor risks. Without the warning signals coming from markets, there can be excessive delay in correcting large exposures.

- **Increased vulnerabilities from capital inflows.** The flow of foreign capital into only short-term paper risks undermining monetary control and the stability of the local financial system.
- **More limited macroeconomic policy instruments.** Countries without deep local currency bond markets lack a non-inflationary domestic source of funds for the public sector that limits the vulnerabilities associated with monetary financing or external borrowing.
- **Inability to cope with financial distress.** In the event of financial distress, bond markets can disperse risks; the declining market value of debt spreads the losses over a wide ownership base. The compression of values expedites the realisation of losses and thus the restructuring process in the aftermath of a financial crisis.

In the light of these considerations, it is hardly surprising that local currency bonds have played a central role in financial market development. Such bonds have a long history in the major advanced economies. Indeed, government bonds were the primary instrument traded on the London and New York stock exchanges as far back as the 17th and 18th centuries (Library of Congress (2004), Michie (1999)).

The current situation

Over the past decade, therefore, the conscious nurturing of local currency debt markets became a major objective of financial policy in many countries, an orientation that was supported by the official international financial institutions. Better domestic macroeconomic policies played a big part in realising this objective. The global economic environment over the past years has also helped. The emergence of current account surpluses in many EMEs reduced the need for external issuance. Declining interest rates in major currencies prompted international investors to seek higher yields in emerging debt markets. In turn, the search for yield eased financing conditions along the maturity spectrum. This combination of domestic and international factors encouraged investors to purchase local securities and thus facilitated primary market issuance. Such favourable cyclical factors were reinforced by the secular process of integration between mature and emerging economies.

As a result, emerging economies' domestic bond markets have grown substantially. The outstanding stock now exceeds $4 trillion, compared with only $1 trillion in the mid 1990s (Graph A1). Equally important is the fact that the proportion of such bonds issued at market prices has increased.[1] Before the 1990s, bonds were often not issued at market rates, but rather were forced on local banks in amounts that reflected the size of the fiscal deficit.

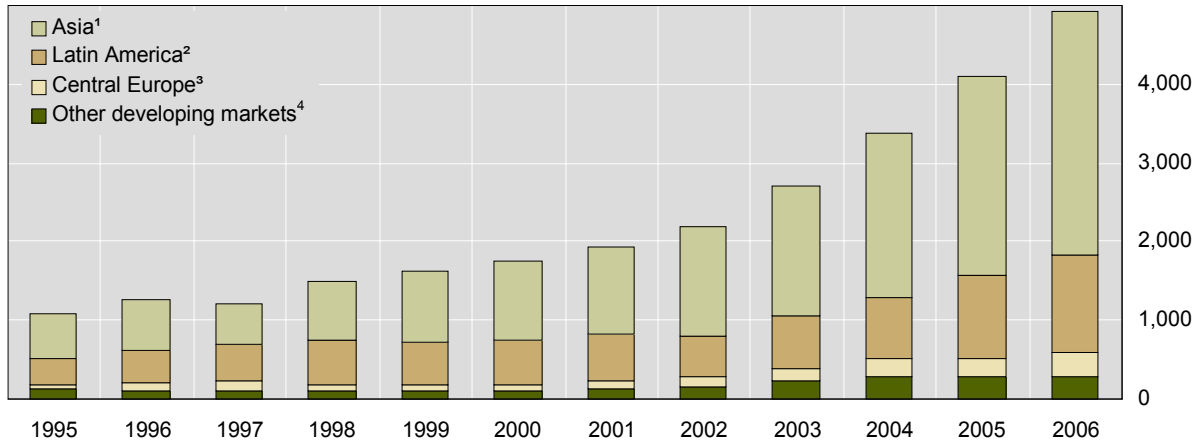
Emerging market local currency bonds have also attracted increasing interest from foreign investors. Portfolio managers worldwide seem to be putting an increasing proportion of their assets in emerging market securities, both equities and local currency bonds. Indirect exposures have also increased through (often offshore) derivatives markets and through lending to local banks that hold such paper directly.

[1] See Chapter C, pp 24–29.

Graph A1

Emerging market domestic debt securities outstanding, 1995–2006

In billions of US dollars



[1] China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan (China), and Thailand. [2] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [3] The Czech Republic, Hungary, Poland and Russia. [4] South Africa and Turkey.

Sources: National data; BIS.

New financial risks?

Although the development of new local currency bond markets should bring substantial benefits to both borrowers and investors, any new financial development may involve hidden risks. The very rapid growth of local currency bond markets is no exception. Some features of the financial systems in several EMEs are not well adapted to the development of local bond markets. The very rapid rise in foreign investment may also create risks in investor countries.

While countries are less likely to default on local currency than on foreign currency debt, defaults have still occurred. Russia, for instance, defaulted on domestic currency debt (GKOs) in August 1998. The scale of the repercussions of this event came as a surprise: while some dimensions of the risks were well known, information about many linkages was very limited. The shock waves reverberated around the global financial system. Russian banks suffered big losses on the holdings of GKOs. Non-resident investors were affected both directly and indirectly by claims on Russian banks. Information about all these exposures before the crisis was very limited. An earlier CGFS report on this crisis noted that "many of the most visible manifestations of market stresses occurred in markets not always directly followed by central banks. As long as financial institutions spread their activities into new markets and more risks become priced, central banks will have to continue to build up expertise to follow those developments" (CGFS (1999a)).

Summary of the Working Group's project

In this spirit, the mandate of the Working Group (reproduced in Annex 1) was to review the main features of newly developed local currency bond markets and analyse those aspects that could give rise to financial stability issues.

In order to develop an accurate picture of local currency bond markets, the Working Group circulated a questionnaire to about 30 central banks of the largest economies. This permitted the correction of some shortcomings in the data published in the BIS *International Financial Statistics,* which is the main international source of data on local currency bond markets. In

addition, it sought to provide internationally comparable data on the instrument structure of local currency bonds (in order to quantify exchange rate and interest rate exposures), the liquidity of such markets, the investor base, and the links with local banking systems.

Many of the central banks which took part in this survey reported that it took some effort to put together information (often publicly available) in a form that gave a reliable picture of potential vulnerabilities in their own country. Bringing together the data from individual central banks presented additional difficulties. This lack of good, comparable data on local currency bond markets, which stands in sharp contrast to the quality of data on international bonds, has been a matter of concern for some time.[2] Appendix 1 provides a fuller report of this statistical work. This statistical work was complemented with discussions held with central banks not represented on the CGFS and with private sector participants at workshops in Mexico City, Tokyo and Basel.

The rest of the Report is organised as follows. Chapter B examines some important linkages between economic policies (including macroeconomic policies, microeconomic reforms and debt management policies) and the evolution of local currency debt markets. Also examined are the Asian Bond Fund and the role of the official international financial institutions (IFIs).

Chapter C summarises the main elements of local currency bond markets in EMEs, with particular emphasis on the salient differences vis-à-vis more developed markets. One finding is that domestic currency debt has grown relative to foreign currency debt in EMEs during the past three years as total bond debt as a proportion of GDP has fallen. Second, a significant fall in sovereign international issuance in the past few years has been associated with a rise in corporate or financial institution issuance. A third finding is that the structure of EME domestic bond debt has become safer: the share of straight fixed-rate debt has risen (but is still lower than that seen in industrial countries) while that of debt indexed to the short-term interest rates or the exchange rate has fallen. Issuance in international markets of debt securities denominated in EME currencies has increased in recent years but still remains small: this trend is also examined in this chapter.

How the rise of local currency debt has changed the exchange rate and interest rate exposures of major borrowers is discussed in Chapter D. Several standard measures are reviewed. In addition, data from the survey are used to construct comprehensive measures of currency mismatch. On almost every measure, exchange rate exposures have declined. Some countries have achieved a radical improvement in the space of only a few years. While inadequate data preclude a precise measure of interest rate exposures, there is no evidence that interest rate exposures have risen in the EMEs generally. These conclusions are supported by stress tests which examine the evolution of various public debt/GDP ratios under various stress scenarios.

Large and increasing investments in illiquid markets could create significant financial stability risks at times of stress. Chapter E therefore examines the evidence of improved liquidity as issuance has expanded. In many countries, liquidity has improved and the markets in countries with better fundamentals have proved to be more resilient in recent periods of global financial market volatility than many had feared. Nevertheless, significant impediments to the development of liquidity are identified in this chapter. In many countries, local currency debt and interest rate derivatives markets are still in the early stages of development. This may mean that large capital inflows (often facilitated by earlier reforms) can lead to larger

[2] The Financial Stability Forum, for instance, drew attention to serious statistical shortcomings in 2000 (FSF (2000)).

changes in financial asset prices than in deeper markets.[3] It can also be more difficult to hedge interest rate exposures.

Issuance in the EMEs is dominated by the government or covered by government guarantees (Chapter F). This has not led to higher **net** debt ratios for the public sector, because of sizeable accumulation of foreign exchange reserve assets. This evolution has had a major impact on the balance sheets of governments and of banks, and such large reserves could create distortions in the financial system. While a corporate bond market is of less importance for financial stability than government debt markets, a widening of debt market issuance may well require reforms that would themselves make local financial systems healthier. The dispersal of risk outside the banking system via securitisation is still very limited. The development of mortgage-backed and asset-backed securities markets is nonetheless an objective of policy in several countries, and this seems likely to exert a growing influence on fixed income markets in EMEs in the future.

One factor that may have limited the usefulness of local currency debt issuance is the narrowness of the domestic investor base (Chapter G). In many countries, the domestic banks have become the dominant buyers of local currency bonds, which is quite unlike the situation that prevails nowadays in the main industrial countries. One important reason for this is that the accumulation of substantial foreign exchange reserves has led to the greatly increased issuance of short-term debt securities, notably by the central bank. Banks hold almost all of this sterilisation-related debt. But banks also hold substantial amounts of long-dated paper: supervisors therefore need to ensure that banks can manage the interest rate exposures that arise. The local non-bank institutional investor base is not always very well developed.

Foreign investor interest has increased substantially in the past five years and is likely to grow still further in the years ahead. Chapter H examines how non-residents invest in these markets, noting in particular their dependence on offshore derivative instruments. This reliance on derivatives exposures has several implications for monitoring and financial stability.

The final chapter (Chapter I) summarises the main findings of this Report. There is no doubt that the currency mismatch problem has been greatly reduced. In some instances, however, the maturity of domestic bonds needs to be lengthened to make debt structures more conducive to financial stability. Three important policy challenges that remain are: to improve market liquidity of these new markets; to encourage greater private-sector issuance; and to spread the risks of bond investment more widely.

[3] Thailand, confronted with this dilemma, opted for capital controls in December 2006.

B. The role of policies

Economic policies have played a major role in helping or hindering the development of local currency bond markets. Macroeconomic policies which fail to control inflation have often undermined bond markets. Regulatory restrictions have also impeded market development as have short-sighted government debt issuance policies. At the same time, certain policy approaches have been followed to nurture bond market development. One initiative that has attracted broad attention is the Asian Bond Fund. Various proposals have been made to encourage the official international financial institutions to issue bonds in EME currencies rather than in dollars. This chapter concludes with a brief overview of such policies.[4]

Macroeconomic policies, inflation and bond markets

Today's emerging markets have a much shorter history of tradable bonds than the major industrial countries. Nevertheless, local bond markets are not new even in developing countries: long-term, fixed-rate local currency bonds were traded as long as a century ago.

Within the major Asian and Latin American markets over the past 50 years, there has been a very wide range of experience across countries. A prototypical history is that in the 1950s and 1960s the central government and a very limited number of public agencies and large corporations issued local currency bonds with maturities of five to 10 years and fixed-coupon payments. These bonds were typically held to maturity by banks, insurance companies and wealthy individuals, so secondary market trading was limited.

In the 1970s and 1980s, however, fiscal deficits and inflationary pressures restricted demand for these bonds at interest rates governments were willing to pay. Governments in EMEs responded by: (a) mandating the purchase of government bonds at regulated interest rates by banks and other institutions; (b) developing inflation-indexed or floating-rate bonds; (c) increasing the issuance of short-term bonds; (d) borrowing in foreign currencies; and (e) creating more money. In many cases, the issuance of long-term, nominal fixed-rate local currency bonds disappeared.

In the 1980s and 1990s, inflation was the major factor driving down the share of long-term, fixed-rate local currency debt (Goldfajn (1998)), Jeanne and Guscina (2006)). Burger and Warnock (2003, 2004), for instance, find that foreign purchases of local currency bonds in emerging markets are negatively correlated with past inflation performance. This finding is supported by Ciarlone et al (2006), who find evidence that low volatility of inflation and low levels of public debt foster the demand for local currency bonds.

But the abandonment of long-term local currency debt markets was not an inevitable consequence of higher inflation, however. During the inflationary period of the late 1970s, for instance, most industrial countries continued to issue long-dated debt with high nominal coupons. In some cases, the market signal sent by the steep rise in nominal long-term rates during that period often served to create a constituency that could exert meaningful political pressure against inflation. This "constituency creating" effect was particularly powerful when mortgage rates were driven by the market rate on government bonds (Sokoler 2002). In addition, financing government deficits at long maturities meant that central bank action to

[4] The more technical aspects of policies to develop liquidity are considered in Chapter E.

raise short-term interest rates was not inhibited by a significant impact on budget deficits.[5] But such effects, while important, were not necessarily decisive, and many countries had significant long-term, fixed-rate local currency bond markets before experiencing episodes of high inflation.

Over the past decade, however, macroeconomic mismanagement in the EMEs has been corrected to a significant degree. One important key reform throughout the EMEs has been the progressive reduction of automatic central bank financing of government deficits. Until recently, governments in several countries typically issued bonds required to finance government deficits at artificially low interest rates; commercial banks had to hold much of their portfolio in government bonds; and the central bank absorbed any excess supply. This has changed. By way of example, Box B1 outlines the progressive end to monetary financing in India in just over a decade.

Box B1

The end of monetary financing in India

Prior to the 1990s, India's debt market was insignificant, consisting predominantly of government securities and characterised by the automatic monetisation of government deficits and administered interest rates. Banks were required to hold 25% of their portfolio in government debt, and they charged high interest rates in an effort to cross-subsidise the low interest earned on government securities.

This setup has changed progressively over the past 15 years as a result of the following:

- Introduction of market-determined interest rates in 1992 through the auction of government securities.
- Abolition of automatic monetisation in 1994, with the adoption of ways and means advances (that is, bridge finance to meet day-to-day liquidity shortfalls) for the government in 1997.
- Permission for government securities to be traded on stock exchanges and non-bank participants to undertake repurchase agreement operations in government securities in 2003.
- Increase in the amount that foreign investors are allowed to invest.

Enacted in 2003, the Fiscal Responsibility and Budget Management (FRBM) Act prohibited the central bank from subscribing to the primary issuance of government securities beginning in April 2006. Coupled with rising interest rates, this heralded further reforms in 2006 that enhanced liquidity (see Chapter E). Further measures being contemplated include the removal of the minimum requirement for bank investment in government debt.

The Working Group found strong evidence that better macroeconomic developments in recent years (including lower inflation with stronger monetary policy frameworks, floating exchange rates, and reduced fiscal deficits) have supported the development of local currency bond markets.

According to the latest IMF *World Economic Outlook*, every major region experienced **inflation** in single digits in 2006, with the exception of sub-Saharan Africa. In a significant number of EMEs, the disinflation process has been associated with the introduction of

[5] This is consistent with the historical study of Bordo et al (2002) on how Australia, Canada, New Zealand and South Africa (as well as the United States) were able to issue long-dated local currency debt: "The common movements across [these countries] include sound fiscal institutions, credibility of monetary regimes, financial development".

explicit inflation targeting regimes. By the second half of 2005, the IMF had identified 13 inflation targeting EMEs spread across the globe,[6] and other countries, such as Turkey, have introduced inflation targeting since then. At the same time, the EMEs have built up large **external surpluses**. The breadth of the strengthening of the external positions of EMEs over the last decade is exceptional, but the world environment was also exceptionally favourable. A final factor increasing the resilience of EMEs vis-à-vis financial crises and raising their attractiveness as a destination for investment has been a broad-based movement towards greater **exchange rate flexibility**. An IMF analysis of de facto currency regimes shows that 14 of the 20 biggest EMEs (as measured by their 2006 purchasing power parity GDP) moved towards greater exchange rate flexibility during 1992–2003.[7] At the end of 2003, EMEs with a freely floating exchange rate represented 40% of all EMEs, from virtually zero in the early 1990s. Intermediate regimes made up another 40%.

A study by Mehl and Reynaud (2005) has shed interesting light on the composition of government debt in emerging economies. Defining as risky debt all debt that is not long-term and fixed-rate debt, they explore how various macroeconomic and other factors determine the riskiness of the composition of local debt. Box B2 contains a summary of their findings. An analysis by Ciarlone et al (2006) of the demand-side determinants of local currency issuance supports this conclusion. The authors find that local currency issuance decreases with a rise in inflation volatility and public debt/GDP ratios and increases with the depth of the financial system and the quality of institutions.

Better macroeconomic fundamentals have contributed to a steady decline in long-term interest rates in many countries. Nevertheless, participants at the workshops held during 2006 suspected that the continued high level of foreign investor interest in local currency bonds even as yields were bid down also in part reflected unusually favourable global cyclical conditions.[8]

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[6] Including important EMEs such as Korea, Mexico, Poland and South Africa. See IMF *World Economic Outlook* (2005).

[7] IMF (2005).

[8] Several participants warned that the low levels of implied volatility that have been priced in recent years by markets may have caused mechanistic risk management rules, such as VaR-based exposure limits, to give investors overly reassuring signals about the riskiness of their portfolios. This is discussed further in Chapter H.

Box B2

The empirical determinants of riskiness in the composition of local debt

To shed light on the riskiness of local debt composition in emerging economies, Mehl and Reynaud (2005) have collected data on the structure of central government debt, broken down by maturity, currency and coupon type, from national sources and calculated a synthetic measure of debt riskiness for a sample of more than 30 countries since the mid-1990s.

Academic literature suggests that the main determinants of the riskiness of local debt composition include fiscal policy, monetary credibility, debt management considerations (the slope of the yield curve, notably) and the breadth of the investor base. Mehl and Reynaud (2005) estimate the marginal effects of these determinants. Their main results are summarised in the table below.

1. Soundness of macroeconomic policies

A heavy debt burden makes local debt composition riskier. According to the authors' estimates, an increase of 1 percentage point in the debt service/GDP ratio, a proxy for the debt burden, is associated with a rise in debt composition riskiness of about 1.9 percentage points. When the debt burden becomes too heavy, the default risk premium becomes too large for governments to issue long-term debt (Drudi and Giordano (2000)).

High inflation also tends to make local debt composition riskier. The estimates indicate that an acceleration in inflation by 1 percentage point translates into a rise in the riskiness of local debt composition of about 0.8 percentage points. This suggests that progress towards price stability is instrumental in alleviating creditor fears that domestic debt could be inflated away.

2. Debt management (slope of the yield curve)

Traditionally, the slope of the yield curve can affect debt maturity as it is one of the determinants of the trade-off between cost and risk of issuance (IMF and World Bank (2003)). In this respect, a yield curve that is steeper by 100 basis points is found to be associated with a reduction in the riskiness of local debt composition of about 20 basis points. One possible interpretation of this result is that an upward-sloping yield curve encourages market participants to invest at the long end of the maturity spectrum, where yields are higher.

3. Breadth of the investor base

A wider local base of institutional investors (eg as a result of pension system and capital market reforms) contributes to the deepening of domestic debt security markets (Claessens et al (2003)). The introduction of a fully funded pension system is of particular relevance in this respect, as pension funds have an interest in debt securities carrying low default risk and denominated in domestic currency. A widening by 1 percentage point of the investor base, as proxied by the private savings/GDP ratio, is associated with a decrease of around 0.8 percentage points in the riskiness of local debt composition.

The elasticity of domestic debt composition riskiness to various determinants

Variable	Proxy	Elasticity of domestic debt composition riskiness
Level of the debt burden	Debt service to GDP	1.9 percentage points
Monetary credibility	GDP deflator growth	0.8 percentage points
Slope of the yield curve	5-year T-bond yield minus 3-month T-bill rate	–0.2 percentage points
Size of the investor base	Private savings to GDP	–0.8 percentage points

Source: Mehl and Reynaud (2005).

Microeconomic policies

In addition to macroeconomic mismanagement, other more microeconomic factors hindered the development of deep debt markets in many countries. First, the absence of a broad and diversified base of investors limited the demand for bonds. Until the late 1990s, institutional investment played a limited role in most countries (Chile was a notable exception). As a result, the stock of assets managed by institutional investors was much smaller in emerging markets than in the industrial world (as a share of GDP). Even where institutional investment was developed, restrictions on asset holdings, particularly on lower-rated or private sector securities, constrained market development. In more recent years, however, the creation of pension funds has fostered a structural demand for local currency instruments.

Second, various policies or regulatory restrictions impeded the development of liquidity in secondary markets. Some policies have created excessive volatility in short-term money markets, exacerbating the liquidity risks for securities holders. In some countries, interest rate controls, accounting rules and investment regulations have inhibited active trading by investors, as have transaction and withholding taxes. Moreover, market liquidity has been constrained by the lack of proper infrastructure for secondary market trading in government bonds, including a system of primary dealers obligated to provide two-way quotes and the availability of repurchase agreements and derivatives.

Finally, many countries have lacked an adequate infrastructure for the development of private sector debt. Constraining factors have included: the absence of a long-term government benchmark for pricing corporate liabilities; weak legal systems and insufficient protection of property rights; lax accounting standards; poor corporate governance; and inadequate transparency. In addition, the limited penetration of credit rating agencies has constrained the analysis of corporate credit risk.

These issues are reviewed in later chapters, which assess how far these shortcomings have been corrected.

Government debt issuance policies

Government decisions about the currency denomination of the government's own debt have had a major impact on the development of local currency debt markets. In the past, such debt issuance strategies were **opportunistic**, paying scant attention to the possible implications for financial stability (or to the medium-term fiscal consequences). Foreign currency debt was often preferred just because the face coupon payment was lower than that on local currency debt: this had the effect of holding down reported current government spending.

In recent years, however, governments have taken a more **principles based approach** to the management of debt. This involved avoiding issuance policies that undermined macroeconomic control.[9] A more deliberate focus on balance sheets was developed, leading to efforts to quantify risk exposures.[10]

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[9] A key issue is the issuance of short-dated paper by public sector bodies. For many years, the Deutsche Bundesbank had reservations, on monetary policy grounds, concerning the issuance of such securities. Their concern was that large-scale issuance of short-dated paper by the government could undermine the central bank's ability to influence short-term interest rates in the pursuit of monetary policy objectives. See Deutsche Bundesbank (1997).

[10] Häusler (2007) reviews progress over the past decade in developing local securities markets. New Zealand pioneered an explicit balance sheet approach: under this framework, government debt management is related to an overall government balance sheet and physical as well as financial assets (Anderson (1999)). There are

One good illustration of this is Mexico's public debt strategy (Mexico Federal Government (2006)). A large and increasing number of countries have followed similar approaches.[11] This strategy sought to finance the public deficit in the local markets, to favour the issuance of long-term fixed-rate securities, and to decrease gradually the issuance of variable-rate instruments. The strategy set annual targets for net external debt reduction, sought to widen and diversify the investor base for local debt, and replaced new international bonds with peso denominated instruments issued in Mexico.

The implementation of this strategy had two elements. First, a series of operations were carried out to develop a long-term yield curve in pesos. Securities issuance extended the yield curve from between three and five years in 2000 to 10 years in 2001, 20 years in 2003 and 30 years in 2006. The development and depth of the yield curve established a reference for long-term financing in pesos, increasing the menu of financing possibilities for the private sector.

Second, steps were taken to strengthen the demand for public securities, improve the infrastructure, reform the regulatory regime applicable to institutional investors, and promote the local market among foreign investors. As a result, foreign holdings of peso debt with maturity greater than one year grew from 7.7% in 2000 to 15.5% in 2006.

The so-called Strategic Guidelines for Public Debt Management – which defined indicators of risks, including variables that affect the financing cost of debt, mainly the interest and exchange rates – were issued by the government. The main risk indicators are summarised in Box B3. The regular publication of such indicators would seem conducive to building market confidence in a government's financing programme.

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several reasons why this approach suggests that most government borrowing should be denominated in local currency. One is that the value of most public sector assets is insensitive to exchange rate movements. Another is that governments collect taxes in local currency (and often exempt exports from taxation). See BIS (2000) and Wheeler (2003) for reviews of debt management principles.

[11] Acevedo et al (2006) (available on the website of this Report) develop a methodology which adjusts for valuation effects of exchange rate changes in order to quantify governments' proactive policies to shift the composition of public debt towards local currency denomination. They find that deliberate policies, not just currency appreciation, have been the dominant factor behind the recent improvements in debt dynamics in six EME countries.

Box B3

Market and refinancing risk indicators: the case of Mexico

In its review of the 2007 Annual Financing Programme, the Public Debt Office of Mexico reported on five main risk indicators:

1. **Share of external debt.** Net external debt of the federal government as a proportion of GDP fell from 8.4% at the end of 2000 to an estimated 4.9% at the end of 2006. As a proportion of net total debt of the federal government, net external debt fell from almost 45% to almost 23%.

2. **Average duration of debt.** The average duration of the debt portfolio increased from 1.5 years at the end of 2000 to 4.3 years at the end of 2006. The duration of market debt, including internal and external debt, rose from 2.3 years at the end of 2000 to 3.0 years at the end of 2006.

3. **Share of fixed-rate debt.** The proportion of government securities with a fixed-rate and a maturity of one year or more stood at 49.8% of the total portfolio at the end of 2006, more than three times larger than that registered at the end of 2000 (14.5%).

4. **Amortisation profile.** At the end of 2000, 56% of maturities were concentrated in the following year and 25% of debt matured in three years or more; at the end of 2006, 33% of maturities were concentrated in the following year, and 55% of debt matured in three years or more.

5. **Cost-at-risk (CaR).** The probability of a sudden deterioration in the fiscal stance due to unfavourable changes in financial variables diminished considerably between 2000 and 2006. The CaR as a ratio of expected costs diminished from 1.47 in 2000 to 1.11 in 2006 in the case of an interest rate shock and from 1.04 to 1.02 in the case of an exchange rate shock. As a result of recent public debt management, the sensitivity of the financing cost of federal government debt to either higher interest or higher exchange rates in 2006 was therefore approximately a third of what it had been in 2000.

One challenge in the implementation of an underlying strategy is determining how to follow such guidelines in ways that take account of prevailing conditions. The issuance of debt exchange warrants in Mexico provides an illustration of one possible technique.[12] These warrants gave the holders the right to exchange foreign currency denominated bonds (UMS) for long-tem peso bonds (bonos), representing an exchange of $2.5 billion. This helped to develop the local currency bond market endogenously, increasing the amount of bonos outstanding only if conditions were favourable in the bono market. Because the exchange for local debt was limited to long-term securities, it avoided the problem of the government having to reduce the duration of its internal debt. In addition, the impact of the large increase was minimised as the greater supply of bonos was gradually incorporated into the market. The warrants gave the holders of UMS bonds downside protection on switching into local debt instruments. This was especially important in an election year, thus explaining why all expiry dates bridged the July presidential elections. Finally, the operation posed no exchange rate risk for the warrant holders, as amounts to be tendered and received were denominated in US dollars up to the exercise date.

[12] For a thorough analysis of Mexico's debt warrants, see, inter alia: JPMorgan Chase (2005); Deutsche Bank (2005) and CSFB (2006).

Asian Bond Fund and other initiatives

Because foreign investors are often deterred from investing in comparatively small local currency markets by country-specific institutional arrangements, steps have been taken by several international groupings to simplify or harmonise local arrangements. One particular initiative that has attracted widespread interest has been the Asian Bond Fund initiative of the Executives' Meeting of East Asia Pacific (EMEAP) Central Banks. The second fund (ABF2) has invested $2 billion in local currency denominated sovereign and quasi sovereign bonds (see Box B4). At one level, this initiative serves to facilitate the investment of the reserves of Asian central banks in **Asian** financial assets. But the project has much greater ambitions. Noting that the aim would be to promote the development of index bond funds in the regional markets, the EMEAP press statement put emphasis on "[enhancing] the domestic as well as regional bond infrastructure". The statement further underlines that ABF2 is being "designed in such a way that it will facilitate investment by other public and private sector investors". ABF2 comprising a Pan Asian Bond Index Fund (PAIF) and eight single-market funds have been created to accept investment from non-central-bank investors who want to have a well-diversified exposure to bond markets in Asia. A key complementary part of this project will be efforts to "improve the market structure by identifying and minimising the legal regulatory and tax hurdles in [bond] markets". The creation of a tradable index is an important element for further development.[13]

Two related initiatives are also worth mentioning. The first is the ADB $10 billion regional multicurrency bond platform that links the domestic capital markets of Singapore and Hong Kong, China, Malaysia and Thailand.[14] The second is the creation of the Asia Securities Industry and Financial Markets Association.

These initiatives do appear to have helped reform certain domestic institutional arrangements – the very diversity of which tended to segment local securities markets unnecessarily. Some markets became accessible to foreign investors for the first time. The Asian Bond Funds have attracted steady investor interest outside Asia.

[13] The Asian Bond Fund initiatives have attracted considerable attention outside Asia. A good overview of the debate is Battellino (2005), which draws the wider lessons from this initiative and squarely addresses three criticisms that have been made.

[14] The Asian Development Bank (ADB) has also supported the work of harmonisation. See the explanatory work of Ismail Dalla and others at the ADB on the areas where some form of harmonisation might be needed (Dalla (2003)).

Box B4

Asian Bond Fund 2

In June 2005, the EMEAP central bank group, which comprises the central banks and monetary authorities of Australia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand, established the Asian Bond Fund 2 (ABF2) with $2 billion to invest in local currency denominated sovereign and quasi sovereign bonds in eight Asian markets (viz China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand). ABF2 provides a low-cost, efficient instrument for broadening investor participation in regional and domestic Asian bond markets, identifying the impediments to bond market developments in Asia, and catalysing regulatory and tax reforms and improvements in market infrastructure.

The key accomplishments of ABF2 to date have been to accelerate tax reforms, enhance regulatory frameworks, further liberalise capital control measures, improve market infrastructure by creating a regional custodian network, harmonise legal documentation for investment funds in the region, and introduce a set of credible, representative and transparent benchmarks.

Policymakers in Asia are well aware of the obstacles to foreign participation and have taken steps to improve the situation. In setting up ABF2, for example, Asian central banks have worked to reduce at least some of these impediments. In particular, PAIF (the biggest component of ABF2) is the first foreign institutional investor to participate in the Chinese interbank bond market.

The contribution of international financial institutions (IFIs)

IFIs have long sought to contribute to the development of domestic bond markets in emerging market and developing countries. One potential way to do this is the issuance of local currency bonds by IFIs themselves. IFIs have been issuing local currency bonds in emerging market countries since the 1970s.[15] And in many cases they have been the first, or among the first, foreign entities to issue local currency bonds in the domestic and international markets. In 2005, for example, the ADB was the first to issue a local currency bond in the domestic markets of Thailand, China (together with the International Finance Corporation (IFC)) and the Philippines. That same year, the IFC issued the first dirham bond in the Moroccan market, and the European Bank for Reconstruction and Development (EBRD) launched the first rouble bond in the Russian market. In 2006, the World Bank issued the first leu bond in the Romanian market. (For a summary and an assessment of the potential impact of IFIs' local currency bonds on domestic capital market development, see Box B5.)

The Working Group's discussion on the impact of IFIs' local currency bonds on domestic capital market development with those directly involved in such issuance and other market participants suggested two main points. The first was that a prime objective of the IFIs in issuing in emerging market currencies was usually to take advantage of cost-effective funding.[16] Several reasons were advanced for this: one key element is that the IFI AAA rating allows them to arbitrage returns in various markets, including the swap markets. Given the

[15] The ADB and the World Bank (IBRD) in 1970 launched the so-called samurai bond in then still-emerging Japan.

[16] In 2005, the ADB, World Bank, EBRD, European Investment Bank (EIB), Islamic Development Bank (IDB) and IFC raised up to a third of new borrowings through issues in emerging market currencies. However, in terms of volumes, issuance in emerging market currencies was concentrated on the South African rand. Issuance in South African rand was also primarily, if not exclusively, in the form of eurobonds. The concentration on the South African rand suggests that cost-effectiveness was the primary objective of IFIs' local currency bond issues.

comparatively small number of IFI local currency bond issues that are launched for the purpose of domestic capital market development, these issues' impact on local currency bond market development can only be selective.

The second point was that IFIs may in these selected cases effectively contribute to opening the market for foreign issuers, particularly through the associated provision of technical assistance. However, successful international integration of the domestic capital markets will follow only if the IFIs' efforts are fully integrated with the local government's macroeconomic and financial market policies. Given the considerable demands of issuing a startup local currency bond (above all in domestic markets), the IFIs have a useful role to play in providing technical assistance (covering borrowing strategies, choice of instruments etc) and in the compilation and dissemination of relevant data.[17]

[17] For instance, the ADB has developed a website providing comprehensive and standardised information on local currency bond markets in Asia (www.asianbondsonline.com).

Box B5

The IFIs and local currency bonds

IFI issuance of local currency bonds may have several attractions with regard to developing local currency bond markets. These issues are reviewed in Wolff-Hamacher (2006), available on this Report's website. The main conclusions are as follows:

- The IFIs in many cases provided considerable technical assistance to help **develop the legal and regulatory framework** for foreign issues when they launched the first local currency bond in a particular local market and thus opened the market for other foreign issuers.
- Some IFIs also involved the domestic financial sector in the issuing process, thereby **transferring financial know-how**. By following best-practice standards (eg in terms of documentation), the IFIs also provided domestic issuers with an example. However, the capacity of IFI local currency bonds to serve as a liquid benchmark for domestic (in particular, corporate) issuers depends on the number and volume of issues (including the reopening of issues) and may also be somewhat limited by the higher credit ratings of IFIs than domestic issuers.
- A "**signal effect**" might serve to attract other foreign issuers and investors. However, so far, no study has systematically analysed the development of the foreign issues markets or of foreign investor participation after a startup IFI issue. Whether or not the market for local currency issues develops after such an issue and whether the demand of foreign investors increases will depend on the market's attractiveness, which is determined largely by the decisions and actions of the local government. In particular, the government needs to maintain macroeconomic conditions and financial market policies (including the legal and regulatory framework and the market infrastructure) that are conducive to the integration of the domestic capital and long-term bond markets with international markets.
- There is some evidence that the IFIs can help to **extend the local yield curve**. Nevertheless, a durable impact again depends largely on the local government's actions: governments need to be willing and able to take over from the IFIs and issue bonds with longer maturities. In addition, government action to develop the base of domestic institutional investors may create a virtuous circle of increased demand and supply for medium-to long-term debt.[1]
- There have also been instances where IFIs' local currency bond issuance activities have contributed to the **development of derivatives and swap markets**, but the evidence so far is mostly anecdotal.[2]
- Finally, individual local currency bond issues (especially those issued as "traditional" foreign bonds or as global bonds) have often been placed with domestic (in particular, institutional) investors. Thus IFI local currency bonds have provided **domestic investors with an opportunity to diversify their portfolio**. Although this contributes to financial market stability, the overall effect again depends largely on the number and volume of IFI issues.

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[1] In the context of its inaugural rouble bond in 2005 and the establishment of a new money market index in the Russian market (the MosPrime), the EBRD emphasised that in some cases developing the short end of the market may be as important as developing the long end.

[2] IFIs could of course also contribute to derivatives and swap market development by providing technical assistance independent of local currency bond issues.

C. The shift from foreign to local currency debt

This chapter outlines the main elements of the shift from foreign currency to local currency denominated debt. A major factor is that domestic bond issuance has increased relative to international issuance. An additional new development has been the increased international issuance of bonds denominated in EME currencies, rather than in the major international currencies. The structure of domestic debt issuance has also changed, with the share of foreign-currency denominated debt declining.

A second aspect concerns the sustainability of debt structures in the light of these developments. After rising substantially in the mid-1990s (in large part as a consequence of crises), the ratio of total debt securities (international plus domestic) outstanding to GDP has been falling in the EME countries. Better fiscal policies and an unusually favourable global environment in the past few years have contributed to this trend. A final section examines the impact of changes in currency composition on debt sustainability.

Table C1

Financial system assets

As a percentage of assets

	1995			2005		
	Bank assets	**Equities**	**Bonds**	**Bank assets**	**Equities**	**Bonds**
Latin America	40	26	34	29	30	40
Asia, larger economies	57	19	24	49	25	26
Other Asia	46	43	11	39	33	28
Central Europe	52	12	37	37	25	39
Total EMEs	**46**	**30**	**25**	**40**	**32**	**28**
Industrial countries	**30**	**27**	**43**	**25**	**32**	**44**
Of which:						
Germany	56	10	34	45	14	41
United Kingdom	38	38	23	38	32	30
As a percentage of GDP						
Total EMEs	55	36	30	77	61	53
Industrial countries	82	75	120	95	119	166

Note: Deposit money banks' assets refer to the claims on the private sector, non-financial public enterprises and central and local governments (lines 22a, 22b, 22c and 22d of the IMF's International Financial Statistics). Bonds include domestic and international debt securities from the BIS database. Refer to Annex Table 1 (as a percentage of GDP) for the countries covered in each regional group. Total EMEs also include Israel, Russia, South Africa and Turkey.

Sources: Datastream; IMF; Standard & Poor's; World Bank; BIS.

Bonds in the financial system

Table C1 presents financial assets by broad asset class in selected markets, the assets of banks, equity market capitalisation, and the outstanding stock of bonds. Bond markets in many EMEs have a share of total financial intermediation which is somewhat smaller than in the industrial countries. In 2005, bond markets accounted for 28% of total financial assets in

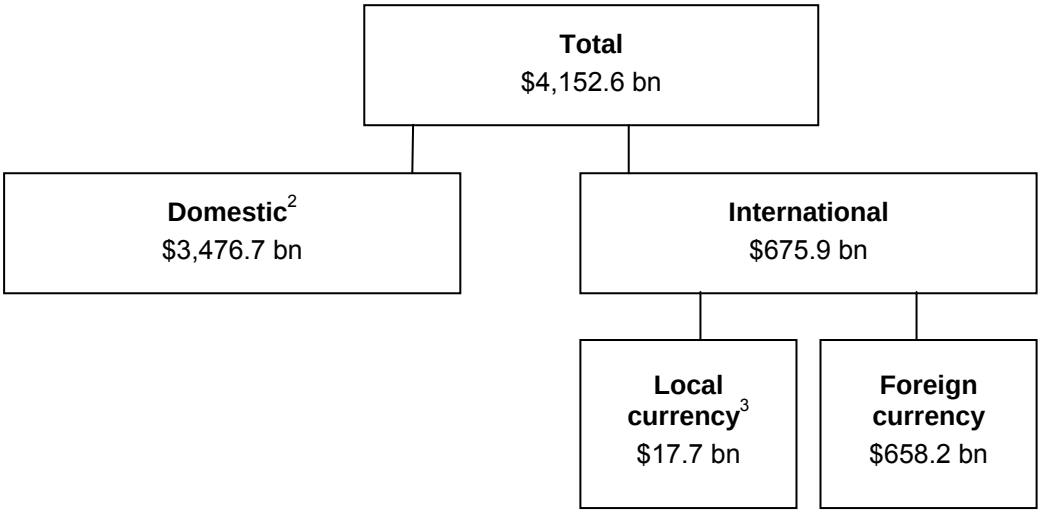
the emerging market economies, somewhat higher than in 1995. The share of bank assets has fallen. This shift is evident in all regions.

BIS statistics on bonds outstanding

The starting point for the analysis of the structure of bond issuance by EMEs is the bond database reported in BIS's quarterly statistics. The main elements of these statistics are laid out in Table C2. At end-2006, outstanding EMEs bonds issued in major international markets

Table C2

BIS *Quarterly* statistics on bonds and notes outstanding issued by residents of EMEs (at end 2006)[1]



[1] Based on 23 major EME countries used in this Report. [2] No currency breakdown is available for domestic bonds published in the BIS *Quarterly*. No data are available for Israel or Saudi Arabia. [3] This is issuance by residents in their own currency. The total outstanding issued in currencies of 23 EMEs by non-resident issuers worldwide as at end-2006 was $76.7 billion. Adding the $7.8 billion for the currencies of other EMEs gives the total of $102.1 billion shown in Table C4.

Sources: Dealogic; Euroclear; ICMA; National authorities; Thomson Financial Securities Data; BIS.

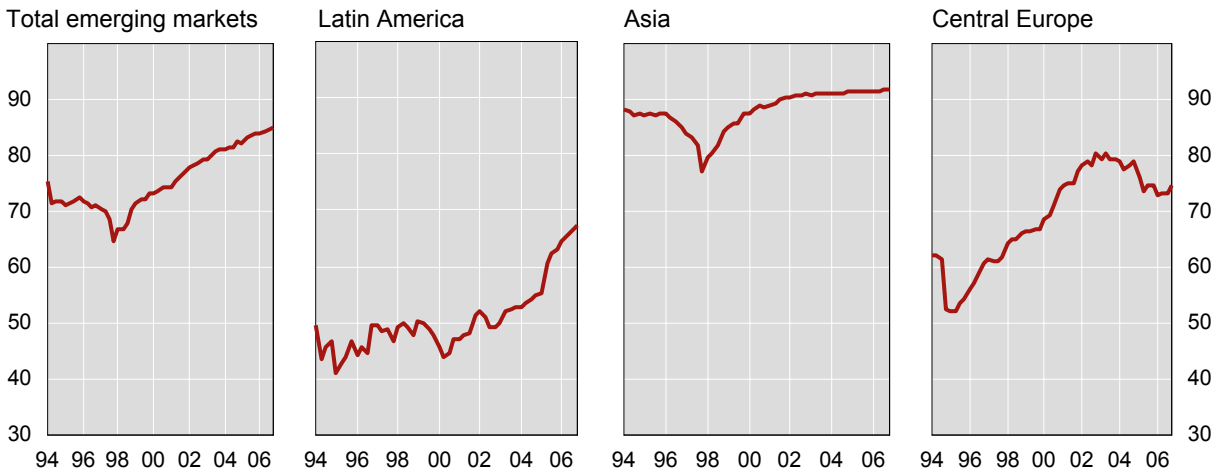
(ie international bonds) amounted to $676 billion.[18] About $18 billion of such bonds were issued in the currency of the EME issuer. The outstanding of EME bonds issued in their local markets (ie domestic bonds) amounted to $3,477 billion. Data on the currency of denomination of such bonds are not collected by the BIS, but almost all bonds are denominated in local currency. On the assumption that domestic bonds are denominated local currency, local currency bonds outstanding amounted to $3,494 billion and foreign currency bonds outstanding to $658 billion. Although the lack of currency detail on domestic bonds is a shortcoming, these data nevertheless shed much interesting light on recent developments.

[18] The term "bonds" refers to bonds and notes with a maturity greater than one year. BIS also collects data on short-dated money market instruments: in this Report, the conventions used in the tables and graphs is that debt securities = bonds and notes + money market instruments.

Graph C1

Domestic bonds and notes

Outstanding amounts, as a percentage of total



Sources: National data; BIS.

Developments in the share of domestic bonds in total bonds outstanding are summarised in Graph C1. There is considerable cross-country variation in this ratio. In 1995, domestic bonds amounted to 87.5% of total outstanding debt securities issued by the larger economies in Asia; Chile, Malaysia and South Africa also had ratios well above 80%. At the other end of the spectrum, domestic bonds accounted for less than 50% of total bonds outstanding in several countries: Argentina, Hungary, Indonesia, Mexico, Turkey and Venezuela. Over the past decade, however, the share of domestic bonds has risen substantially across the developing world, particularly in those areas where the share in 1995 was rather low.

There has been a substantial change in the scale and pattern of net international issuance in recent years. In the 1990s (and indeed earlier), the issuance of international bonds by emerging market economies was substantial and dominated by Latin American entities. In the period 1995–99, issuance averaged about $42 billion annually, about half of which was borrowing by Latin American entities. This has now changed: Brazil, Chile, Mexico and Venezuela all made net repayments of international bonds in 2005–06. Net international issuance by EMEs outside Latin America, on the other hand, rose from around $20 billion a year in the period 1995–99 to over $45 billion a year in both 2005 and 2006.

Graph C2 (upper panels) shows that aggregate net issuance of bonds and notes in the local currency market has risen substantially in all areas.[19] By 2006, the annual net issuance in domestic markets was running at over $380 billion a year. Country details of domestic issuance are given in Table C3. As will be discussed in more detail in Chapter F, this rise has been dominated by increased government and central bank issuance.

As for the sectoral composition, Graph C2 (lower panels) shows that net external issuance by the government sector has become less dominant. The only exception to this is the substantial borrowing by governments in central Europe. In contrast, financial institution and corporate issuance has risen substantially. The aggregate net issuance of the corporate sector in EMEs rose to $74.9 billion in 2006 from an annual amount of $9.4 billion in the

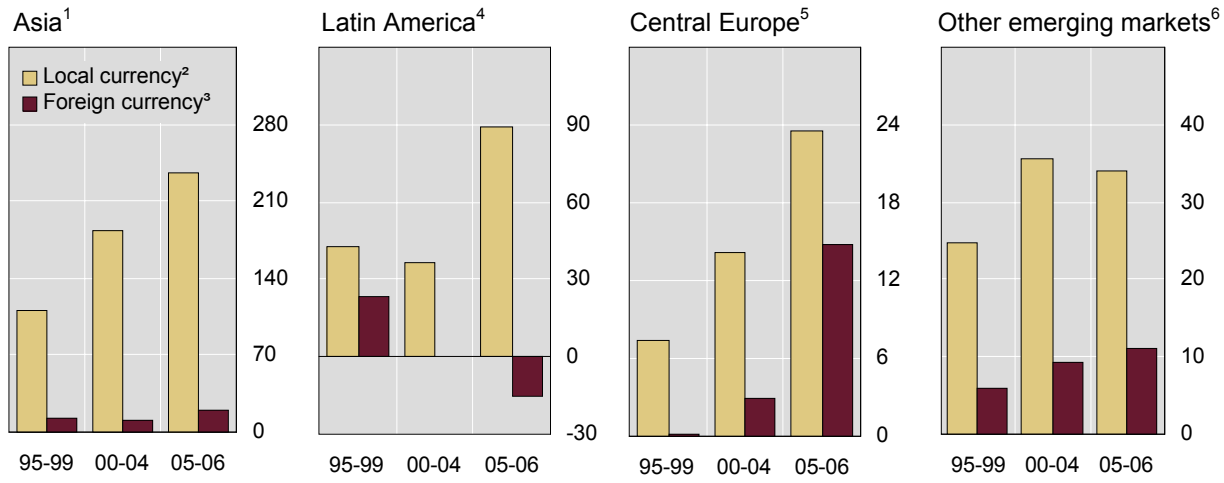
[19] That is, recalling the definitions in Table C2, domestic bonds plus international bonds in local currency.

period 2000–04. The proportion of international corporate bond issuance rated investment grade continues to increase. The most rapid growth is coming from corporates in Latin America and banks in emerging Europe.

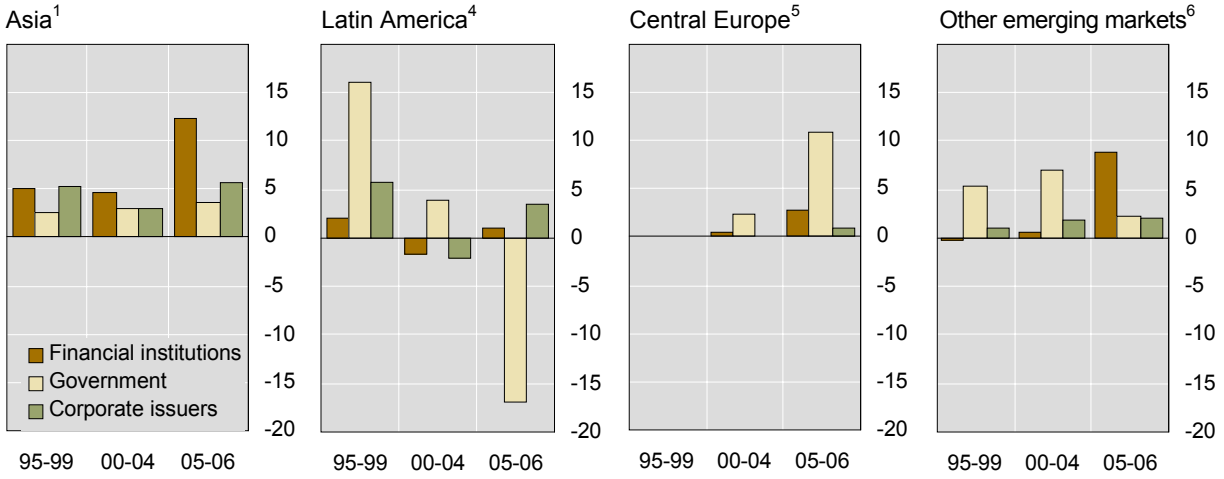
Graph C2

Net issuance of bonds and notes by region and sector

Local currency versus foreign currency issuance



Issuance of international bonds by region and sector[7]



[1] China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan (China) and Thailand. [2] Includes both domestic issuance and international issuance of bonds and notes in national currency, in billions of US dollars. [3] Net issuance of international bonds and notes in foreign currency, in billions of US dollars. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] The Czech Republic, Hungary and Poland. [6] Israel, Russia, Saudi Arabia, South Africa and Turkey. [7] By residence of issuers, in all currencies, by immediate business sector of issuer, expressed in billions of US dollars.

Sources: Dealogic; Euroclear; ICMA; Thomson Financial Securities Data; national authorities; BIS.

Table C3

Changes in stocks of domestic bonds and notes

Annualised, in billions of US dollars

	1995–99	2000–04	2005	2006[1]
Latin America	**42.0**	**36.2**	**83.2**	**88.4**
Argentina	1.8	2.2	19.0	0.3
Brazil	22.2	2.5	7.4	57.0
Chile	3.5	1.9	–2.5	–2.4
Colombia	0.5	0.8	0.1	–0.2
Mexico	11.0	25.3	31.4	33.0
Peru	0.6	0.3	0.5	0.6
Venezuela	2.3	3.2	27.3	0.0
Asia, larger economies	**90.1**	**161.4**	**202.6**	**218.4**
China	25.2	64.9	105.9	112.1
India	13.2	25.3	27.2	27.7
Korea	44.2	54.4	57.9	69.2
Taiwan, China	7.5	16.8	11.5	9.5
Other Asia	**20.8**	**22.2**	**23.6**	**26.3**
Indonesia	8.7	3.9	–0.2	2.6
Malaysia	6.6	8.4	7.1	5.8
Philippines	0.7	3.6	1.9	–0.5
Thailand	4.8	6.2	14.9	18.4
Central Europe	**7.3**	**14.1**	**24.0**	**23.1**
Czech Republic	1.0	2.4	5.4	7.3
Hungary	2.5	4.0	3.7	4.0
Poland	3.8	7.8	14.9	11.9
Russia	6.4	2.2	4.9	5.6
Israel	…	…	…	…
Turkey	14.9	29.0	25.3	10.3
Saudi Arabia	…	…	…	…
South Africa	3.2	4.3	8.6	9.2
Total	**184.7**	**269.3**	**372.2**	**381.4**

Note: Regional and overall totals refer to listed countries only.

Sources: National authorities; BIS.

Table C4

International bonds and notes by currency

Amounts outstanding at year end, in millions of US dollars

	1995	2000	2005	2006
Latin America	**47**	**2,759**	**11,628**	**25,018**
Argentine peso	0	2,286	579	826
Brazilian real	0	15	5,494	10,730
Chilean peso	0	239	74	247
Colombian peso	0	0	1,296	1,993
Mexican peso	47	220	3,682	9,943
Peruvian new sol	0	0	283	439
Venezuelan bolívar	0	0	220	841
Asia, larger economies	**95**	**3,235**	**5,069**	**4,875**
Chinese renminbi	0	0	1,503	1,665
Indian rupee	0	0	111	145
Korean won	0	94	979	1,183
New Taiwan dollar	95	3,141	2,476	1,882
Other Asia	**380**	**1,769**	**2,745**	**4,652**
Indonesian rupiah	0	40	239	619
Malaysian ringgit	203	42	519	1,439
Philippine peso	48	189	60	72
Thai baht	130	1,499	1,927	2,522
Central Europe	**320**	**5,340**	**20,101**	**22,575**
Czech koruna	320	2,431	10,181	12,474
Hungarian forint	0	61	4,425	4,299
Polish zloty	0	2,848	5,495	5,802
Russian rouble	0	493	570	3,499
Israeli new shekel	0	0	347	597
Turkish lira	0	0	5,696	9,516
Saudi riyal	0	0	187	187
South African rand	685	5,949	18,909	23,394
Other EMEs	*2*	*750*	*3,947*	*7,828*
Total	**1,529**	**20,295**	**69,197**	**102,140**

Note: All issues worldwide in currency of the respective country. Regional totals refer to listed countries only.

Sources: Dealogic; Euroclear; ICMA; Thomson Financial Securities Data; BIS.

A possible explanation for the surge in corporate external debt is that the reduction in sovereign foreign bond issuance has left room for corporate borrowing. Another is the strong demand for funds from commodity-producing companies. Finally, corporate credit ratings have improved.[20]

Global bonds in local currency

A new development over the past two years has been the issuance of bonds denominated in local currency in the international markets. At the end of 2000, international bonds outstanding that were denominated in local currencies amounted to only $20 billion (Table C4). By late 2006, this amount had risen to $102 billion. The single most important currency of issuance was the South African rand, followed by the Czech koruna and the Brazilian real. In 2006, out of the $94 billion in global local currency bonds outstanding in the surveyed countries, $44 billion had been issued by non-resident financial institutions. IFIs were the second largest issuers, with $28.5 billion outstanding. The amount issued by EME residents was only $17.5 billion. The largest issuers in 2006 were South Africa ($2.1 billion), Brazil ($1.4 billion), Mexico ($1.2 billion) and Colombia ($0.5 billion). Box C1 presents an overview of sovereign issuers. By issuing local currency bonds in international markets, sovereign issuers have tried to tap international investors while changing the currency mix of their debt portfolio.

At the Working Group's workshop in Latin America, different views were expressed on the relative merits of domestic versus global issuance in local currency. Most participants felt that, as far as **government issuance** was concerned, local currency financing in international markets was only a second best solution. Priority should rather be given to nurturing domestic markets, which can make countries more resilient to financial shocks. The authorities in Brazil, for instance, removed a constraint on foreign investment in local bonds by eliminating the withholding tax on capital gains made by foreign investors. Efforts have also focused on facilitating registration requirements. Nevertheless, it was also felt that, given the growing appetite of international investors for exposure to local currency securities, the issuance of long-dated international issues could be expedient – especially if local markets are not yet deep enough to accommodate very long-dated issues.

[20] See also IMF (2007).

Box C1

Global government bonds in local currency: Brazil and Colombia

Several Latin American governments have issued global bonds denominated in local currency (see Tovar (2005)). Global bonds are debt securities that are issued simultaneously in the international and domestic markets, in a variety of currencies, and settled through various cross border systems.

In November 2004, the Colombian government issued COP 954.2 billion ($375 million) worth of global bonds denominated in domestic currency and settled in US dollars. These bonds were issued under very favourable conditions for the borrower, as reflected in a coupon of 11.75% and a maturity of more than five years. Demand was strong, allowing two tranches to be issued at below comparable costs in the domestic market. In February 2005, a new issue was made with very similar conditions, but longer maturity (10.7 years). There was a further issue in 2006 to finance a buyback of dollar denominated debt.

In September 2005, Brazil issued BRL 3.4 billion ($1.5 billion) worth of global bonds with a maturity of more than 10 years and a 12.5% coupon. The Brazilian global issue was oversubscribed several times, and the distribution was truly international. The issue also extended the maturity of the yield curve for local currency denominated fixed-rate government debt to over 10 years (compared with seven years in the local market).

The Brazilian and Colombian issues share some important features. First, the securities have relatively long maturities. Second, they are not indexed to inflation; instead they offer a fixed interest rate, transferring both inflation and exchange rate risks to investors. At the same time, they provide for interest and principal to be settled in US dollars and hence free investors from any risks associated with exchange controls.

In Brazil and Colombia, institutional factors continue to limit the entry of foreign investors into domestic bond markets.

As for the foreign/local currency choice in **corporate issuance**, one major corporate issuer explained at this workshop that its choice was in part determined by financial conditions in its local market. In 2004, when conditions became more volatile in the local market, the company shifted its funding to the dollar market. It then resumed local currency issuance in 2005 in the context of a rally in the local debt market and a stronger currency. One puzzle is that the company's spreads in the local market remained nearly constant over these years, whereas they were falling in the international market. Such stickiness of local spreads may reflect a lack of credit differentiation, competition and the narrowness of the investor base in the domestic market.

The structure of domestic debt securities

A wide variety of instruments are issued in local debt markets, including: long-term fixed-rate debt (nominal and real); floating-rate debt with a coupon that fluctuates with the short-term interest rate; foreign currency denominated (or exchange rate linked) securities; and inflation-linked debt. The risk exposures associated with various instruments and the policy implications are quite different. The results of the Working Group's survey of the types of instrument for central government debt are shown in Table C5. The pattern that emerges is analysed in the following paragraphs.

(a) Nominal fixed-rate debt

The issuance of long-maturity fixed-rate debt is most conducive to financial stability because borrowers are protected from currency depreciation and interest rate increases. There are also other attractions: because government financing by long-dated fixed-rate debt insulates budget deficits from fluctuations in short-term interest rates, it reduces the pressure on central banks to keep short-term interest rates too low.[21]

In the major industrial countries, the vast bulk of government bonds outstanding are nominal fixed-rate bonds (see memo item in Table C5). The proportion of straight fixed-rate debt in the EMEs is much lower, but has increased from 65% to 71% over the past five years. Yet there are still large variations across countries and regions, with fixed-rate bonds prevalent mainly in Asia and central Europe, while only 23% of Latin American debt outstanding is in the form of fixed-rate instruments.

(b) Floating-rate issuance

Floating-rate debt, by contrast, leaves borrowers exposed to increases in short-term rates. The review of earlier episodes of instability in the workshop in Mexico confirmed that a major problem for policymakers in countries where floating-rate debt is predominant is that a restrictive monetary policy stance can lead to a large deterioration in the fiscal accounts. The solvency of local firms dependent on floating-rate debt can also be compromised. The risk of a financial crisis is thereby increased and fiscal policy confronted with difficult dilemmas.

Reliance on floating-rate issuance remains significant in Latin America, but has declined somewhat. It is still high in Turkey. Such a high proportion of floating-rate debt means that interest rate risk exposures remain significant.

(c) Foreign currency denominated or linked debt

Foreign exchange denominated debt leaves borrowers exposed to exchange rate shocks. Data available on foreign currency denominated or exchange rate linked debt suggest that exchange rate linked debt has declined in Latin America – from 22% in 2000 to 5% in 2005. As an underlying trend, foreign currency linked debt is being gradually phased out in some countries, especially Brazil, where it declined from 21% in 2000 to 3% in 2005. However, foreign currency denominated or linked debt continues to be issued in other countries where there is significant dollarisation (Peru, Venezuela). In addition, countries have often responded to exceptionally heavy exchange rate pressure by temporarily increasing foreign currency issuance (eg Brazil during 2001).[22]

(d) Inflation-linked debt

Assessment of the financial stability implications of inflation-linked debt is complex. Inflation-linked bonds offer many of the financial stability advantages of classical fixed-rate nominal debt: they generate a long-term market-determined interest rate that is not directly related to the central bank's policy rate; because such bonds are denominated in local currency, currency mismatches are avoided; and interest rate or refinancing risks are reduced.

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[21] For these reasons, Mehl and Reynaud (2005) measure the riskiness of local debt composition by the proportion of debt that is not long-term and fixed-rate. On the basis of a study of 30 countries, they argue that a heavy debt burden, poor monetary policy credibility, and a narrow base of local institutional investors are all factors that push countries to more risky debt structures. See Box B2 on page 9.

[22] There can be good grounds for such flexibility; a key condition, however, is that the overall stance of macroeconomic policies remains tight enough to contain inflation pressures.

Because tax revenues are linked to inflation, it seems natural for governments to issue inflation-linked debt.

Table C5

Domestic bonds by instrument[1]

As a percentage outstanding

	2000				2005			
	Floating-rate	**Straight fixed-rate**	**Inflation-indexed**	**Foreign currency denominated or linked**	**Floating-rate**	**Straight fixed-rate**	**Inflation-indexed**	**Foreign currency denominated or linked**
Latin America	**47**	**12**	**13**	**22**	**46**	**23**	**23**	**5**
Argentina	12	0	0	88	2	1	74	20
Brazil	58	15	6	21	60	21	16	3
Chile	0	0	92	8	0	18	64	18
Colombia	0	50	41	7	0	70	29	1
Mexico	35	6	16	0	47	28	13	0
Peru	17	0	54	29	3	35	36	25
Venezuela	100	...	...	...	44	...	...	56
Asia, larger economies	**19**	**81**	**0**	**0**	**9**	**91**	**0**	**0**
China	46	54	...	...	19	81	...	...
India	0	100	0	0	5	95	0	0
Korea	8	92	0	0	3	97	0	0
Taiwan, China	0	100	0	0	0	100	0	0
Other Asia	**15**	**83**	**0**	**2**	**9**	**91**	**0**	**0**
Indonesia	51	42	0	7	53	47	0	0
Malaysia	...	100	...	...	...	100	...	...
Philippines	8	92	...	...	4	96	...	...
Thailand	0	100	0	0	0	100	0	0
Central Europe	**18**	**82**	**1**	**0**	**12**	**87**	**1**	**0**
Czech Republic	0	95	5	0	0	100	0	0
Hungary	...	...	...	...	...	...	...	...
Poland	20	80	0	0	15	84	2	0
Russia	...	100	...	...	...	97	3	...

...table continues on the next page

Table C5 (cont)

Domestic bonds by instrument[1]

As a percentage outstanding

	2000				2005			
	Floating-rate	**Straight fixed-rate**	**Inflation-indexed**	**Foreign currency denominated or linked**	**Floating-rate**	**Straight fixed-rate**	**Inflation-indexed**	**Foreign currency denominated or linked**
Other	**11**	**86**	**1**	**1**	**21**	**63**	**7**	**7**
Israel	23	53	22	1	10	78	12	...
Turkey	24	70	0	6	31	42	11	15
Saudi Arabia	9	91	0	0	17	83	0	0
South Africa	1	97	0	...	9	77	9	...
Total emerging markets	**24**	**65**	**3**	**6**	**19**	**71**	**6**	**2**
Hong Kong	0	100	0	0	3	97	0	0
Singapore	...	100	...	...	...	100	...	...
Memo item: Industrial countries[2]	**6**	**90**	**4**	**0**	**12**	**83**	**6**	**0**

[1] Comprises only bonds and notes and excludes money market instruments. Regional totals based on the countries listed in the table. Totals do not add up to 100% due to the exclusion of hybrid instruments. Ratio calculated taking the central government and all other issuers as reported in Table 2d of the Working Group questionnaire. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

In economies where monetary policy credibility may not be well established, indexed bonds may enable governments to extend the maturity of their debt and thus foster the development of long-term capital markets.[23] Therefore, indexed bonds have been used in Latin America as part of a gradual extension of the maturity structure of domestic government debt. The Annual Borrowing Plan of Brazil includes the objective of gradually replacing floating-rate and forex-linked bonds with inflation-linked (as well as fixed-rate) bonds.

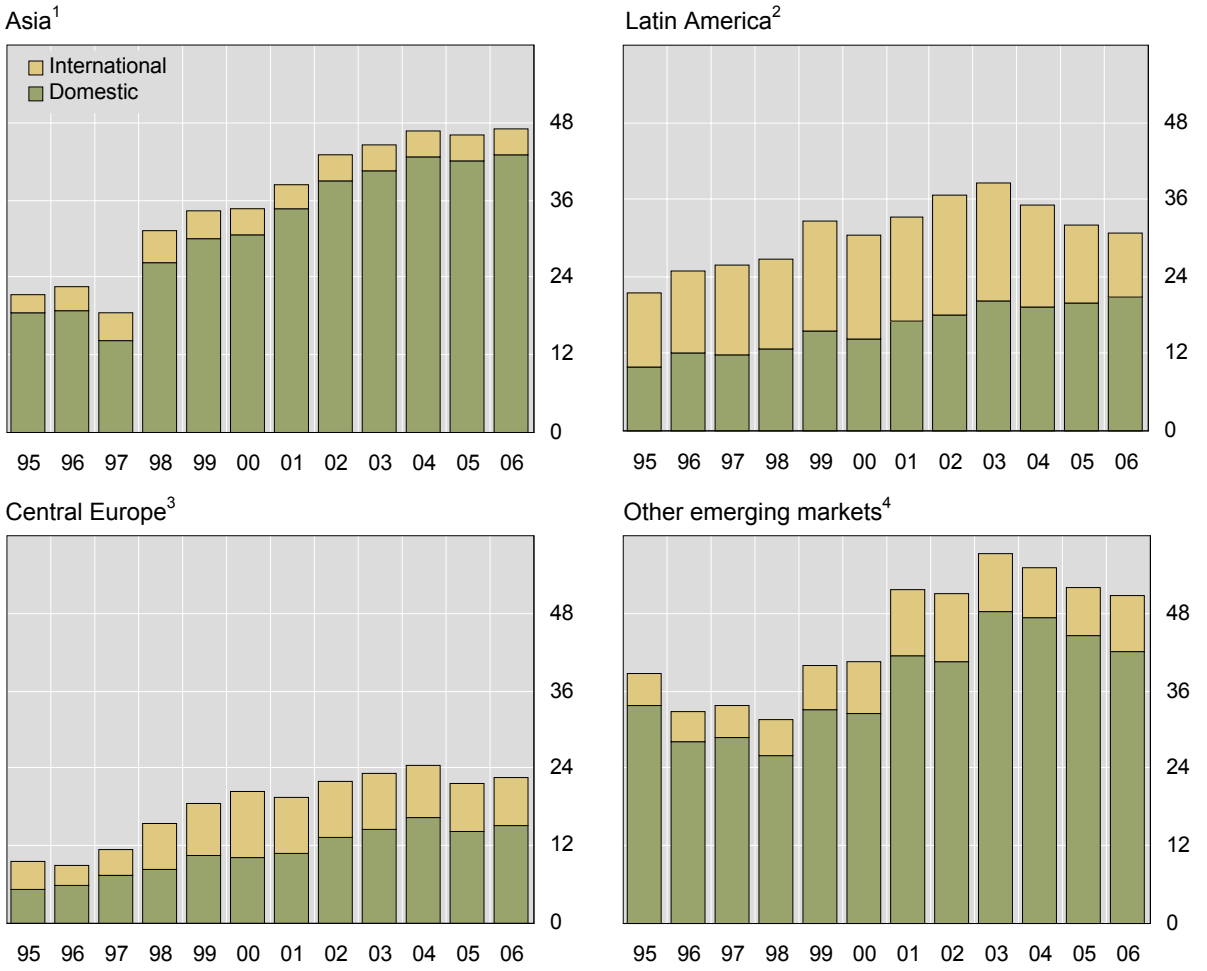
The harmful effects of comprehensive indexation in a number of countries during the periods of high and volatile inflation during the 1970s and 1980s are often cited as an argument against index-linked bonds. By making inflation easier to accept, such bonds might perpetuate inflation pressures. Some countries with comprehensive financial indexation, such as Brazil and Mexico, have taken steps designed to reduce the scope of indexation as a way to break the psychology of ingrained inflation expectations. There is, however, no

[23] See Mishkin (2006) and Ize and Levy-Yeyati (2003) on the value of index-linked debt as a way of limiting liability dollarisation.

necessary connection between indexation practices and inflation. Inflationary pressures result primarily from weak macroeconomic policies. Chile's earlier experience of combining substantial indexation with steady progress in disinflation demonstrates this point well.

Graph C3

Debt securities as a percentage of GDP



[1] China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan (China) and Thailand. [2] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [3] The Czech Republic, Hungary, Poland and Russia. [4] South Africa and Turkey.

Sources: National data; BIS.

Paradoxically, it is in countries where inflation has been under control for some time that the longer-term prospects of inflation-linked debt seem brightest (Price (1997)). The UK government launched its first bonds linked to inflation in 1980. The market received increased attention in 1997, when the US government began issuing Treasury Inflation Protection Securities, known as TIPS. By mid 2004, there were $551 billion of inflation-linked bonds outstanding globally, of which half where issued in the United States.

Several private sector participants at the Working Group's workshops noted that inflation-linked debt was attractive for local institutional investors. In several countries, insurance companies and pension funds have started to purchase these bonds in order to more closely match their liabilities, which rise with inflation. Investors that face real, rather than nominal, funding requirements, such as endowments and foundations, have found that inflation-linked bonds can provide predictable real returns to meet that need. In addition to providing an inflation hedge, real return bonds may help diversify a portfolio of stocks and bonds because

they offer low volatility and low, or even negative, correlations with many other asset classes.[24]

Debt ratios and sustainability

The substantial increase in local currency debt outstanding meant that the ratio of total bonds outstanding (international plus domestic) to GDP rose significantly from the mid 1990s to 2003 or 2004 in all major areas (Graph C3).[25] What this rise in gross debt represents and how far it would give rise to financial stability concerns is examined in more detail in the next chapter. This upward trend, however, reversed for 2003 or 2004, as total bonds outstanding fell as a proportion of GDP. The decline in Latin America was particularly significant.

Table C6

The determining factors of changes in debt[1]

As a percentage of GDP

	Brazil	Colombia	Indonesia	Russia	Turkey
Year of crisis	**2002**	**2003**	**2001**	**1999**	**2001**
Net debt	**–5.7**	**–5.8**	**–23.9**	**–81.5**	**–33.9**
due to:					
Primary balance	–13.7	–7.3	–8.5	–34.4	–23.1
Shift to local currency debt	6.4	2.6	–2.3	–23.7	6.4
Exchange rate changes	–2.5	–2.7	–10.1	11.3	–0.9
$(r–g)^2$	4.1	1.6	–3.0	–34.7	–16.3

[1] Changes are computed from the year of crisis to 2005. [2] Average interest rate less the rate of GDP growth.

Source: Acevedo et al (2006).

The implications of these changes have been addressed in an analysis of debt sustainability in five EMEs (Brazil, Colombia, Indonesia, Russia and Turkey) by Acevedo et al (2006). Table C6 summarises the determinants of the evolution of the ratios of debt to GDP for a sample of emerging economies in the years since the peak of their crisis. Two aspects of the table are notable. First, the emergence of a primary fiscal surplus had a major impact on the decline in the debt/GDP ratio that was observed. Second, the shift to local currency debt in Brazil and Turkey had the mechanical effect of limiting the decline in the debt/GDP ratio – because of the appreciation in these countries' currencies in the most recent years.[26]

[24] Poland began to issue inflation-linked debt in August 2004. Korea issued its first inflation-linked bonds in March 2007.

[25] This corresponds, of course, to gross debt. Net debt ratios, however, have fallen substantially because foreign reserve assets have increased (see page 32).

[26] This appreciation, however, reflected better domestic policies – including more prudent debt management strategies involving reducing reliance on foreign currency debt.

D. Analysis of risk exposures

The development of local currency instruments and changes in the structure of debt financing have had a major impact on the risk exposures of borrowers and lenders. This chapter reviews some common aggregate measures of foreign currency and interest rate exposures and attempts to quantify how the rise of local currency debt has changed some major exposures in recent years. Some statistical gaps that hinder the monitoring of exposures are considered. A final section reports on some macroeconomic stress tests of the public debt/GDP ratio that quantify how the exposure to shocks has changed as a result of changes in the composition of debt.

Foreign currency exposures

Currency exposures

Measurements of currency exposures in general use have two dimensions. One is liquidity risk – that is, the ease or difficulty of obtaining foreign exchange.[27] The other is balance sheet risk – that is, the sensitivity of a borrower's net wealth or net income to changes in the exchange rate. In practice, these two effects are often difficult to distinguish precisely because liquidity often dries up for borrowers with very weak balance sheets. Nevertheless, many of the crises in the EMEs in the 1980s and 1990s were aggravated by the virtual evaporation of foreign liquidity.

Liquidity risk has been quantified in several ways.[28] An indicator of short-term currency exposure that was widely used in the aftermath of the Asian crises was the ratio of usable foreign exchange reserves to short-term external debt (that is, debt with a maturity of less than one year) and current external payments during that year (the so called Guidotti-Greenspan Ratio). A simple rule of thumb was that this ratio should exceed 1 – that is, the country should be able to finance all external payments for one year without new borrowing[29] Since the late 1990s, higher forex reserves, a shift from deficit to current account surplus, and reduced reliance on short-term external debt have moved this ratio for most EMEs into the safety zone (Graph D1, panel A). Brazil and Mexico, which had ratios well below 1, now have ratios well above 1; the ratios for Hungary and Turkey are still less than 1. Another common indicator is the ratio of external bond and banking debt to M2 (Graph D1, panel B). Increased borrowing in local currency has also contributed to substantial reductions in this ratio.

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[27] This is often known as a risk of a "sudden stop".

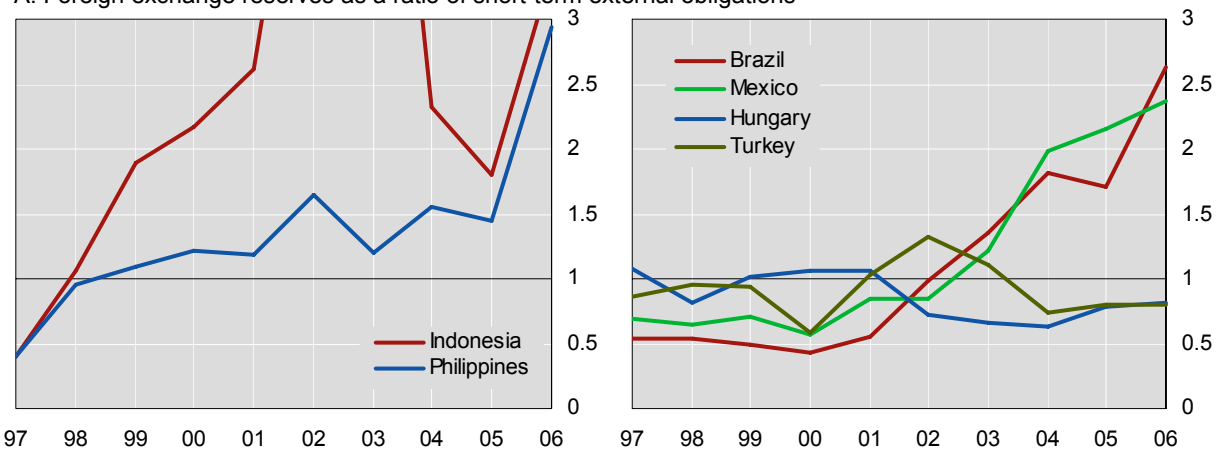
[28] Goldstein and Wong (2005) present a comprehensive review, providing estimates of the many different measures commonly used.

[29] Greenspan (1999a) proposed this rule in 1999, citing Guidotti (1999). An earlier measure used by Reddy (1997) combined two rules of thumb. He expressed India's reserves in terms of "months of payments for imports and debt service taken together" but also noted the need to supplement these statistics with other indicators.

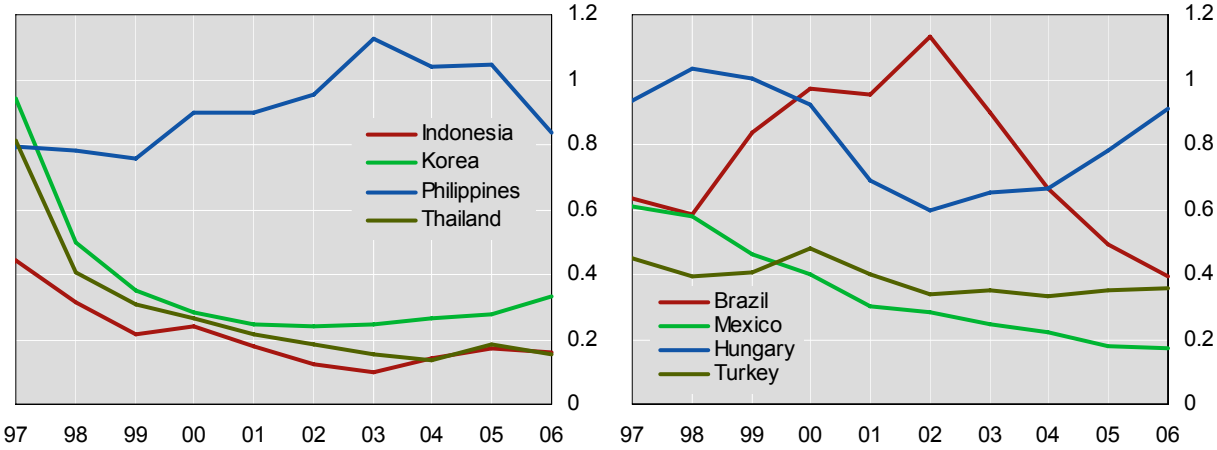
Graph D1

Two indicators of external liquidity

A. Foreign exchange reserves as a ratio of short-term external obligations[1]



B. External bond and bank debt[2] as a ratio of M2



[1] Short-term external obligations are defined as the sum of short-term external debt and the current account deficit; short-term external debt is defined as short-term liabilities to BIS-reporting banks, ie consolidated cross-border claims of all BIS-reporting banks on countries outside the reporting area with a maturity up to and including one year plus international debt securities outstanding with a maturity up to one year; based on outstanding year-end positions. [2] International debt securities outstanding and bank cross-border liabilities to BIS reporting banks.

Sources: IMF; national data; BIS.

An analysis of balance sheet risk tells a similar story. How vulnerable a country as a whole is to a mismatch triggered crisis depends in part on its net foreign currency position vis-à-vis non-residents. When foreign currency debt to foreigners exceeds foreign currency assets, then an exchange rate depreciation has a negative effect on the country's wealth. If large enough, it can undermine financial stability.

A major change over the past decade is that many emerging market countries have greatly reduced – and some have reversed – their earlier foreign currency liability position. The aggregate position of the countries identified in Table D1 changed from a net foreign currency liability position of almost $200 billion in 1997 to a net foreign currency asset position of over $2 trillion by 2006. Although much of this shift reflects the build-up of foreign assets in China, most countries that have had crises in the past have also seen a substantial improvement in their net foreign currency positions. The implication is that risk exposures arising from currency depreciation have been greatly reduced across the board.

Table D1

Net foreign currency assets[1]

	1997	2000	2004	2005	2006
Total of EMEs	**–192**	**162**	**1,032**	**1,466**	**2,057**
Latin America[2]	–269	–256	–207	–112	–77
Asia, larger economies[3]	183	442	1,133	1,414	1,807
Other Asia[4]	–91	–3	54	65	121
Central Europe[5]	12	27	28	11	11
Russia	–15	–20	44	86	182
Israel	14	16	21	28	33
Turkey	–15	–39	–58	–49	–45
South Africa	–11	–6	18	23	28

[1] In billions of US dollars. Net foreign currency positions are defined as net foreign assets of the monetary authorities and deposit money banks (IMF monetary survey) plus non-bank foreign currency cross-border assets with BIS reporting banks less non-bank foreign currency cross-border liabilities to BIS reporting banks less international debt securities outstanding in foreign currency; outstanding positions at year-end. [2] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [3] China, India, Korea and Taiwan (China). [4] Indonesia, Malaysia, the Philippines and Thailand. [5] The Czech Republic, Hungary and Poland.

Sources: IMF; national data; BIS.

A country's net foreign currency position vis-à-vis non-residents, however, is an incomplete measure of foreign currency risk exposures. Sizeable exposures can also exist within a country: households can hold foreign currency denominated government debt or local bank deposits, domestic bank lending can be denominated in dollars, and so on.

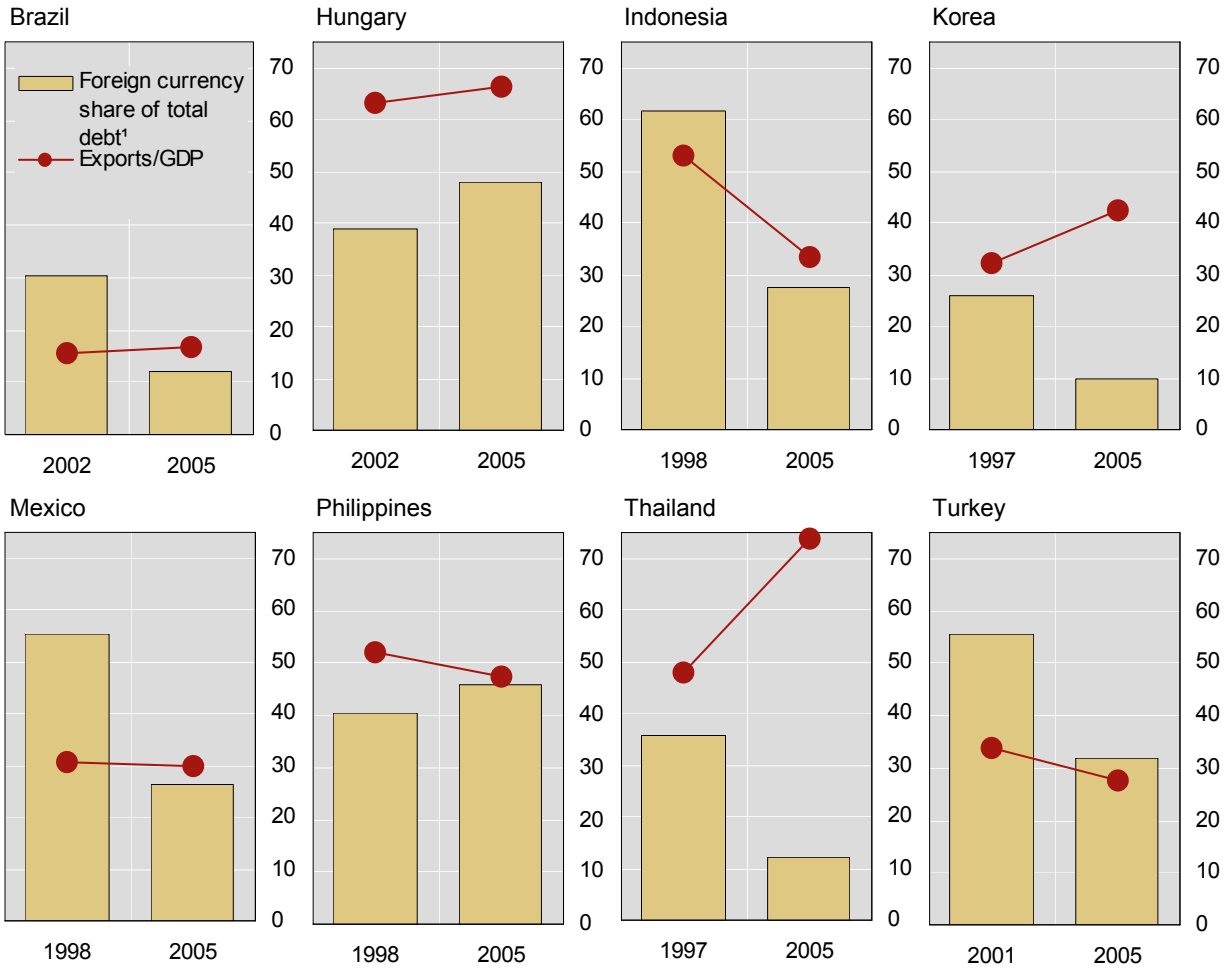
The currency of denomination of debt contracts between residents matters because a sharp change in the exchange rate will affect sectoral or individual net worth and can disrupt such contracts. This can have real economic effects: while foreign currency debts between residents may "cancel out" in normal times (a liability for one being an asset of another resident), they might not do so in a crisis in which contracts are breached. Government deficits and debt could explode; banks, corporations and households may face bankruptcy. Several crises have demonstrated the importance of sectoral mismatches.[30] Because cross-country data on the currency composition of local debt (for example, bonds and bank lending) are not generally available from international sources, the Working Group's survey attempted to collect such data.

[30] See in particular Levy-Yeyati (2006). The analysis of Allen et al (2002) of the sectoral asset and liability positions in Thailand just before the 1997 crisis finds that of the $207 billion in claims of the commercial banking system on the domestic non-bank sector, $32 billion was denominated in foreign currency.

Graph D2

The foreign currency share of total debt and the exports/GDP ratio

In per cent



[1] These estimates cover debt contracts between residents as well as debt vis-à-vis non-residents. The earlier year was a year when the foreign currency share of debt peaked during the 1995–2005 period.

Sources: IMF; national data; BIS.

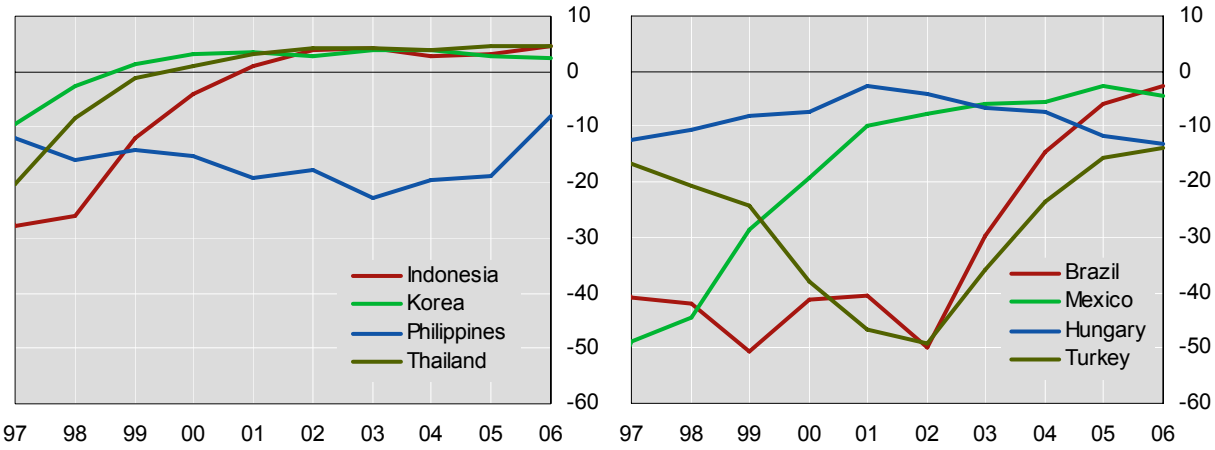
In order to compute a relatively comprehensive measure of the foreign currency share of total debt,[31] data from the BIS's International Financial Statistics (on the currency denomination of international bank loans and of international plus domestic bonds) were combined with data collected in the Working Group's survey on the currency of denomination of government debt and domestic bank loans. The estimates are given in Tables 8 and 12 of Appendix 1. Graph D2 shows the development of the foreign currency share of total debt for several major emerging market countries that have experienced crises (or at least severe exchange rate pressure) over the past decade.[32] In most cases, this share has fallen

[31] Lack of comparable data means that this indicator does not cover the currency of denomination of corporate debt issued in local markets. Nor does it take account of off-balance sheet measures.

substantially. The exceptions to this are Hungary and the Philippines, largely because of the foreign currency denomination of bank loans.

Graph D3

Indices of aggregate effective currency mismatches (AECMs)[1]



[1] The AECM is the product of the country's net foreign currency asset position (as a percentage of GDP) and the simple mismatch ratio (ie the foreign currency share of aggregate debt relative to the export/GDP ratio). Hence a country with a net foreign currency liability position has a negative AECM; the larger this is in absolute magnitude, the greater the effective currency mismatch.

Sources: Goldstein and Turner (2004, updated); IMF; national data; BIS.

There is, of course, no "ideal" foreign currency share of debt. However, a simple aggregate benchmark for the foreign currency share of debt in a country is the share of tradables in GDP. Foreign currency borrowing is more sustainable if it finances the production of tradables (which can yield foreign currency denominated incomes) rather than non-tradables. Hence, one simple measure of mismatch is the ratio of the foreign currency share of aggregate debt to the share of exports in GDP (as a proxy for the share of tradables). The higher this indicator, the greater the country's foreign currency debt relative to its foreign currency earnings. If this ratio is greater than 1 – a higher proportion of foreign currency debt than the foreign currency share of income – then the country has a currency mismatch in aggregate.

These percentages are compared in Graph D2. The foreign currency share of debt in Brazil, Indonesia, Mexico and Turkey was much higher than warranted by the export/GDP ratio in the late 1990s; but this has since been corrected. Although the calculated mismatch ratio in Korea and Thailand never exceeded 1, the true mismatch was much larger because of contingent foreign currency claims on official forex reserves.[33]

Combining a mismatch ratio with a measure of a country's net foreign currency position gives a measure of aggregate effective currency mismatch (AECM). A numerical example is given

[32] Argentina is not shown in this graph because of discontinuities and valuation difficulties related to default. Over the period 1997–2000, almost 50% of total debt was denominated in dollars, but exports were only 10–11% of GDP. Hence the country had a massive mismatch on this measure. See the analysis of Redrado et al (2006).

[33] In the case of Thailand, the central bank had substantial forex exposures in forward markets; foreign subsidiaries of Korean firms had substantial foreign currency liabilities.

in Box D1.[34] This measure of effective mismatch can be thought of as a stress test for the economy: it is a simple summary measure of the forex risk for the economy as a whole.[35] Developments in these indices for a selection of countries over the past decade are shown in Graph D3. In most countries, aggregate effective mismatches have been reduced in magnitude and are now low or have been eliminated altogether.

Box D1

Aggregate effective currency mismatch in Brazil

In 2002, the net foreign currency liabilities of Brazil amounted to 25% of GDP (line 4 below). At the same time, the foreign currency share of debt was 1.95 times larger than the share of exports in GDP (line 3), largely because of the effective dollar denomination of a significant proportion of government domestic debt. Hence Brazil's aggregate effective mismatch was large.

By 2005, this situation had changed. The "pure" mismatch ratio had been reduced to 0.71. The build-up of reserves meant that the country's net foreign currency assets position vis-à-vis that of non-residents was considerably improved.

The AECM – defined somewhat arbitrarily as the product of these two dimensions – was thus substantially reduced in magnitude.

	2002	**2005**
1. Foreign currency share of total debt	30.3	12.0
2. Exports/GDP	15.5	16.8
3. "Pure" mismatch (= 1 ÷ 2)	1.95	0.71
4. Net foreign currency assets vis-à-vis non-residents (as % GDP)	–25.2	–8.3
5. Aggregate effective currency mismatch (= 4 x 3)	**–49.2**	**–5.9**

Monitoring the size of foreign currency exposures is important because this conditions the potential financial stability implications of the choice for new debt issuance between foreign currency and local currency paper. When foreign currency exposures are already large (as they were in the 1990s in many EMEs), issuance in foreign currency aggravates the financial stability risks that such exposures entail – both directly and indirectly by encouraging the foreign currency denomination of other debt. But when foreign exchange exposures are small (as at present in many countries), the financial stability implications of such a choice are more limited.[36]

[34] This measure is defined simply as the product of the basic mismatch ratio and net foreign currency liabilities as a percentage of GDP. For further applications of this methodology, see Goldstein and Turner (2004) and Turnbull (2006).

[35] In a dollarised economy, the pure mismatch ratio – basically the foreign currency share of total debt relative to the share of exports – is very high, but how much of a risk this presents to the country depends on the country's net foreign currency position. Peru, for instance, has a largely dollarised economy but its foreign currency assets vis-à-vis non-residents exceed its liabilities, which considerably reduces the country's exchange rate exposure. Recent policies of de-dollarisation are reviewed briefly in Annex 2: a finding of general interest is that the development of the local currency bond markets helps to de-dollarise bank lending.

[36] The indicator discussed in this section measures vulnerability to currency **depreciation**. Similar analysis can be developed for exposures to currency appreciation.

Table D2

Key corporate balance sheet ratios: the case of CEMEX[1]

Balance sheet data, whole sample, using all the firms within the sample

		1999	1999	2004	2005
		Total	Cemex		
Dollar indebtedness					
% of firms with dollar debt	Mean	89.5			
	No of obs	*143*			
Debt dollarisation ratio (%)[2]	Mean	42.2	92.1	73.2	56.9
Short dollarisation ratio (%)[2]	Mean	34.1	30.6	19.8	16.1
Long dollarisation ratio (%)[2]	Mean	51.1	61.5	53.3	40.8
Asset dollarisation ratio (%)[3]	Mean	13.0	64.0	73.1	86.5
Debt maturity[4]					
Total debt maturity (%)	Mean	36.0	61.5	53.3	50.5
Dollar debt maturity (%)[5]	Mean	44.9	67.8	76.1	79.6
Leverage[6]					
Leverage ratio (%)	Mean	52.5	45.8	52.7	61.3
	Median	44.6			
	No of obs	*150*			
Exports					
As % of total assets	Mean	11.9	0.7		
As % of total sales	Mean	16.4	1.7		
Foreign sales					
As % of total assets	*Mean*	–	*22.5*	*30.2*	*46.4*
As % of total sales	*Mean*	–	*55.3*	*64.3*	*81.1*
IMF currency mismatch solvency[7]			*1.8*	*1.3*	*0.8*

[1] Cemex is a Mexican building materials and glass company listed in the Fortune Global 5000. [2] Dollar-linked debt as a percentage of total liabilities. [3] Dollar-linked assets as a percentage of total assets. [4] Long-term liabilities/total liabilities. [5] Dollar debt maturity = long-term dollar liabilities/total dollar liabilities. [6] Total liabilities/total assets. [7] Debt denominated in foreign currency/hard currency generating assets.

Sources: Kamil (2004); Bank of Mexico calculations.

Microeconomic measures

This analysis at an aggregate level should be complemented by estimates of currency mismatches at a firm level.[37] But data on the currency composition and the maturity of debt

[37] See Rosenberg et al (2005) and Goldstein and Turner (2004) for an explanation of how to analyse currency mismatches at the sectoral level.

are generally only available for the government sector, for banks and for foreign borrowing by corporations. Less information is available for the local borrowing of the non-financial corporate sector in emerging market countries.

A further important issue pertains to the foreign currency exposure of individual corporations. Bleakey and Cowan (2005) examine 400 non-financial firms in five Latin American countries and find that firms producing tradables have a higher share of foreign currency debt, constituting a natural hedge. Using a large sample of firms listed on the Mexican stock exchange, Martinez and Werner (2002) report that, while firm size was the main determinant of dollar debt during the fixed exchange rate period, exports became the key explanatory variable during the floating-rate period; hence, the composition of foreign currency debt shifted towards the borrowers that were better able to service that debt. This finding is echoed by Cowan et al (2005), who find that net currency exposure declined after the exchange rate was floated in 1999. They argue that a "flexible exchange rate increases the risk of dollar debt, inclining the balance in favour of peso debt".

Cowan et al (2005) also find evidence that derivatives play a role in insulating firm-level investment from exchange rate shocks in Chile. Firms in Chile actively reduce the risks associated with exchange rate exposure by matching the currency composition of their debt to that of their income and assets and by taking on derivatives if no "real" hedge is available. If this is so, it suggests that the development of derivatives markets – to which bond markets can contribute – helps non-financial firms to manage forex and interest rate risks. It is important to use indicators that reflect the true currency exposure of a firm. For instance, for a global firm it is necessary to look at foreign sales by subsidiaries located abroad (not just the export/sales ratio). As Table D2 indicates, these ratios can diverge sharply.

There was agreement at the discussions at the workshop in Mexico that the quantification of currency mismatches was very useful. Regular monitoring is essential because there is no guarantee that, under less benign international conditions or as a result of political developments, the progress made over the past few years will be maintained. Analysis of the exposure of individual firms should complement the use of aggregate indicators.[38] Although the currency composition of debt in aggregate should reflect the share of exports in output, it is not possible to define precisely an optimal composition, particularly as exchange rates are often driven by transient pressures.

Off balance sheet positions

As derivatives markets develop, it will be important to complement balance sheet positions with measures of off balance sheet positions. Australia illustrates the extent to which derivatives transactions can alter the aggregate foreign currency position of a country (Table D3). At the end of March 2005, the country had a net foreign currency debt position of AUD 252 billion (or around 29% of GDP). This suggests that a depreciation of the Australian dollar would lead to a significant deterioration in the aggregate balance sheet position of Australian residents (assuming that asset prices remain unchanged). The banking sector accounted for around three quarters of this exposure, as Australian banks raised funds offshore in an effort to lower the cost of their funds and diversify their base of funding (more than a quarter of their liabilities are sourced in this way). Much of the issuance by banks was denominated in either US dollars or euros.

[38] This should be possible if companies follow a Financial Stability Forum (FSF) recommendation that they "disclose, in their audited report and accounts, the composition of their liabilities and financial assets, including by maturity and currency" (FSF (2000)).

Table D3

Australia's foreign currency position, 2001 and 2005

In billions of Australian dollars

Indicator	30 June 2001	31 March 2005
Net debt position based on outstanding debt	–165	–252
Derivatives position to hedge debt	126	199
Net position on debt (after derivatives)	–39	–53
Net equity position based on holdings	229	344
Derivatives positions to hedge equity	–28	–72
Net position on equity (after derivatives)	201	272
Net positions arising from trade	…	4
Residual derivatives positions	–13	–5
Foreign currency position (after derivatives)	149	218
As a percentage of GDP	*22*	*26*

Note: Negative values indicate a short foreign currency position.

Source: Australian Bureau of Statistics Catalogue no 5308.0.

The economic exposure of the banks and of Australia more broadly, however, was quite different. The banks used (and still use) a wide range of derivatives instruments, such as forward foreign exchange, cross-currency interest rate swaps, and currency options, to hedge these transactions immediately back into Australian dollars. Once these derivatives positions are taken into account, the aggregate net foreign currency debt position was much smaller, at around AUD 53 billion (or 6% of GDP). In fact, once net equity assets (mostly denominated in foreign currency) are taken into account, Australia had a positive net foreign currency position of AUD 218 billion (or 26% of GDP). Thus a depreciation of the Australian dollar (assuming unchanged asset prices) leads to an improvement in the aggregate balance sheet position of Australian residents.

This case illustrates that, when gauging financial stability based on assessments of interest rate and currency mismatches, it is important to take into account the impact of derivatives transactions on the transfer of economic risk. As local currency yield curves develop and become the building blocks for a range of instruments that transfer financial risk, information based solely on debt positions outstanding (or issuance) becomes less reliable and potentially misleading. Thus there is a need to improve the reporting of off balance sheet exposures.

Interest rate exposures

Chapter A noted that replacing foreign currency debt with local currency denominated domestic debt of short maturity could increase interest rate exposures. This section examines the evidence for such a development. As with currency exposures, there is both liquidity risk and balance sheet risk (the sensitivity of the borrower's net worth or net income to changes in short-term interest rates).

Because liquidity risk (especially for sovereign borrowers) is less common in the case of local currency debt, most measures of interest rate exposure focus on balance sheet risk. The sensitivity of the borrower's net worth (or net income) to changes in short-term interest rates depends on: (a) the average maturity of its debt; (b) the extent to which the coupon on long-

dated debt is linked to short-term interest rates; and (c) the structure of assets (as well as liabilities) on the balance sheet of the borrower.

The following paragraphs outline what is known about each of these factors. It will be pointed out that there are a number of instances where inadequate data impede an accurate assessment.[39]

(a) Maturity

The main published source of information on the maturity of domestic bonds is data on domestic debt securities outstanding published in the *BIS Quarterly Review*. Unlike the BIS data on international bonds, however, these data do not contain comprehensive data on maturity. Instead, they provide only a breakdown between short-term paper (money market instruments, generally with a maturity of less than one year) and longer term paper (maturity greater than one year).

This gap in the data means that the ratio of short-term to total debt from these data has often been taken as a proxy for the maturity of debt. This ratio has risen appreciably in recent years in China and in some countries in Latin America, which is often seen as supporting the view that domestic debt has indeed become more short-term. The increase in China has been particularly significant: short-term debt securities now account for 40% of total debt securities. This important development is analysed in Subsection (c) below.

In order to fill this data gap, the Working Group sought information from central banks on the maturity of central government debt. This information was often not readily available even in national statistical publications. Table D4 presents estimates of average original and remaining maturities of central government bonds. The average remaining maturity for local bonds is shorter in emerging markets than in industrial countries. Maturities are also much shorter than those on international bonds.[40]

There is nevertheless clear evidence for the countries shown that remaining maturities on domestic bonds have been lengthening (from 3.2 years in 2000 to 4.5 years in 2005). Hence interest rate exposures of borrowers have been gradually reduced for most borrowers.

Shorter maturities and floating-rate debt continue to prevail in *Latin America*, although Brazil has lengthened its yield curve. In 2002, Chile created various benchmarks in both the nominal and the real yield curve, with benchmarks in the latter of five, 10, and 20 years. As debt instruments have taken on a standardised structure and the central bank has committed itself to the benchmarks, liquidity has improved. A major lengthening of maturities has also occurred in Mexico. A 30-year bond was issued in a single auction of MXN 2 billion at end October 2006. The bond is the longest-maturity local currency sovereign bond in Mexico (the 20-year bond was issued in 2003 and the 10-year bond in 2001). The new bond is expected

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[39] An FSF report on capital flows published in 2000 underlined the need for better data on domestic debt. It noted that there are "important gaps in [data on domestic debt securities]. In principle, information is needed on maturity structure (amortisation schedule), the nature of interest payments (whether fixed, floating-rate, or indexed to the price level), and currency status (foreign currency denominated or indexed). It may be particularly important to have such data for public sector debt" (paragraph 159 of FSF (2000)).

[40] The average remaining maturities of international bonds issued by EME entities have actually risen in the past few years. Measured in years, they are: 1995–99 (8.1); 2000–04 (7.8); 2005 (12.1); and 2006 (11.1). Source: BIS.

Table D4

Maturity of domestic central government debt outstanding[1]

Average original[2] and remaining maturity in years

	1995		2000		2005	
	Original	**Remaining**	**Original**	**Remaining**	**Original**	**Remaining**
Latin America	**3.1**	**0.7**	**5.1**	**2.4**	**6.8**	**3.9**
Argentina	...	…	...	…	...	12.0
Brazil	...	0.7	...	2.7	...	2.3
Chile	...	…0	...	…	...	...
Colombia	3.1	(2.0)	5.1	3.6	6.8	3.8
Mexico	...	0.8	...	1.4	...	3.4
Peru	...	(7.6)	...	(6.4)	...	...
Venezuela	...	2.9	...	2.5	...	10.1
Asia, larger economies	**7.2**	**2.6**	**9.6**	**2.7**	**9.8**	**6.1**
China	...	…	...	…	...	...
India	...	…	13.0	(7.1)	14.0	10.0
Korea	...	…	4.0	2.4	6.1	4.1
Taiwan, China	7.2	2.6	10.6	3.2	10.8	3.4
Other Asia	**…**	**…**	**13.0**	**5.0**	**10.7**	**5.0**
Indonesia	...	…	10.0	6.0	10.0	7.0
Malaysia	...	(5.2)	13.0	5.0	12.0	5.0
Philippines	...	(17.3)	...	(14.7)	...	...
Thailand	...	…	...	…	9.0	...
Central Europe	**1.7**	**1.2**	**4.2**	**2.6**	**6.2**	**3.6**
Czech Republic	...	(1.4)	...	(1.7)	...	...
Hungary	...	(1.0)	...	(2.3)	...	...
Poland	1.7	1.2	4.2	2.6	6.2	3.6
Russia	...	…	4.0	1.7	11.1	8.6
Other	**8.5**	**6.5**	**2.1**	**4.5**	**4.4**	**3.2**
Israel	8.5	(5.2)	8.5	(3.6)	9.7	...
Turkey	...	…	1.5	1.1	4.3	2.1
Saudi Arabia	...	6.5	...	6.0	...	5.0
South Africa	...	…	...	…	...	...
Total emerging markets	**5.3**	**3.2**	**7.5**	**3.2**	**8.3**	**4.5**
Hong Kong SAR	...	…	...	(1.2)	...	...
Singapore	1.6	1.0	4.1	2.7	5.1	3.6
Industrial countries[3]	6.7	5.3	9.5	6.4	10.3	5.7

[1] Includes bonds, notes and money market instruments. Regional totals based on the countries listed in the table and weighted by the corresponding amounts outstanding. Average original and remaining maturities of central government amounts outstanding reported in Table 2e of the Working Group survey. Numbers in brackets represent the results of the 2001 survey published in Table 6 in BIS (2002). [2] These estimates should be regarded as indicative and may not be strictly comparable across countries. [3] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

to boost access to long-term credit for Mexican firms by offering a benchmark for corporate issuers at the long end of the curve. With the exception of China, *Asia's larger economies* have made marked progress in increasing average remaining maturity – from 2.6 years in 1995 to 2.7 years in 2000 and to 6.1 years in 2005. The yield curve is rather short for many countries in *central Europe*, where short-term rates tend to be low, complicating the pricing of the entire yield curve. The prospect of adopting the euro within the next five to six years has reduced the incentives to develop the long end of the local currency debt market. Nevertheless, the three larger economies have issued some bonds with a maturity of 10 years or longer.

(b) Floating-rate debt

A significant proportion of long-dated debt in some countries is issued at a floating-rate. Although data on fixed versus floating-rate issuance are available in national sources for central government debt securities, such data are not readily available in international data sources. As this has a major bearing on interest rate exposures, this is a major gap. The Working Group's survey found that the share of floating-rate debt remains substantial in several countries: see Table C4 on page 22. This means that the debt service costs of a significant proportion of long-dated debt are sensitive to changes in short-term rates. During the past few years, this has not proved to be a problem because short-term rates have fallen almost everywhere. But it is still a source of vulnerability to future possible interest rate increases.

(c) Assets and net debt

A borrower's interest rate exposure depends on the borrower's assets, as well as its liabilities. Because much of the rise in gross domestic debt liabilities in the emerging markets has been associated with a substantial rise in foreign exchange reserve assets, recent changes in the **gross** debt exposures of some countries are not a good guide to their **net** debt exposures. In the early 1990s, the value of forex reserves (an asset on the central bank's balance sheet) in the emerging market world as a whole was less than the value of currency in circulation (a liability on the central bank's balance sheet). Hence the central banks did not need to issue domestic debt securities to finance forex reserve holdings. As reserves have risen substantially above the value of currency in circulation over the past decade, however, the monetary authorities have had to issue local currency debt paper to finance the acquisition of reserves. This implies that the large rise in short-term gross debt has been matched by a very similar rise in short-term assets, leading to more limited interest rate exposures on a net basis.[41]

Quantifying the implications of this effect for net debt exposures is difficult. Sterilisation operations normally involve the issuance of short-term debt securities, but banks' reserve requirements can also be varied (Mohanty and Turner (2006)). Issuance of central bank securities provides only a partial measure of the scale of sterilisation operations because in some countries government securities are used for sterilisation. Most securities issued by the People's Bank of China and the Reserve Bank of India (largely government bonds under the monetary stabilisation scheme) have maturities of less than one year. In Korea, 12% of outstanding monetary stabilisation bonds have a maturity of one year or less and the residual 88% has an outstanding duration of above one year and less than three years. The maturity

[41] But interest rate exposures are not necessarily eliminated. Countries could still be hit by a crisis in which domestic interest rates rose more sharply than foreign interest rates. The improved external position of most countries, however, makes this less likely than previously. The beneficial impact of higher reserves on the credit rating and funding costs of sovereign debt is outside the scope of this analysis.

of other interest-bearing instruments such as foreign exchange swaps and remunerated deposit facilities is generally much shorter, ranging from a few days to a few months.

The results of the Working Group's survey show that issuance of central bank securities by EMEs has risen by about $500 billion in the past five years or so, and most of these are short-term securities. China's outstanding stock of short-term debt securities issued by the central bank has risen by $274 billion, accounting for about half of the increase in forex reserves (Table D5).

Table D5

Central bank domestic debt securities outstanding and foreign exchange reserves

In billions of US dollars

	2000		2005		Change (2005–2000)		Memo (2005–2000)
	Money market instru-ments	Bonds and notes	Money market instru-ments	Bonds and notes	Money market instru-ments	Bonds and notes	Change in FX reserves less currency in circulation
China	1	...	275	...	274	...	537
Other EMEs	56	120	151	269	95	140	450

Note: Money market instruments (Table 2a of the Working Group survey) and bonds and notes (Table 2b of the Working Group survey). Outstanding debt in local currency are used for the calculation of the "Change" columns. The exchange rate vis-à-vis the US dollar at end-2005 is used to convert the figures to US dollars so that the changes do not include valuation effects.

Sources: IMF; Working Group survey; BIS.

Stress tests

One useful way to analyse how overall exposures have changed is to conduct a "stress test" of the public debt/GDP ratio of a country. As noted in CGFS (2000), stress tests can provide useful information on the behaviour of the system under exceptional but plausible shocks, helping policymakers to assess the broad patterns of risk taking. Central banks and financial policymakers might use them to assess the present structure of instruments and the maturity of debt more effectively. The information collected for the stress tests can also help to identify weaknesses in debt management, data collection, reporting systems and monitoring.

Three caveats are warranted. First, stress tests estimate the exposure to a specific event, but not the probability of the event occurring. The improved composition of debt over recent years has reduced the probability of a crisis event. Second, stress tests cannot address dynamic aspects of changes in market behaviour under stress. Third, the calculations provide approximate, not precise, estimates.

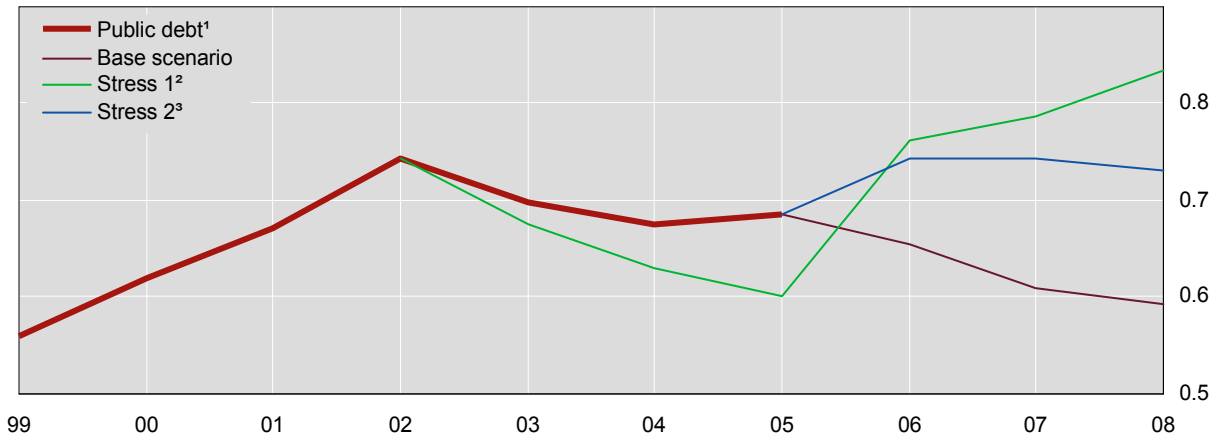
Nevertheless, a recent stress analysis conducted by the Ministry of Finance in Brazil is illuminating. In managing the federal public debt (FPD), Brazil took decisive measures to: lengthen the average maturity of debt, primarily by increasing the average term of the securities issued in auctions; reduce the share of short-term debt, thus lowering refinancing risk; gradually replace debt indexed to short-term rates (Selic) and the exchange rate with fixed-rate and inflation-linked paper. Steps have also been taken to develop yield curves for federal public securities on domestic markets; and to broaden the investor base. The

improvement in the composition of debt has reduced exchange rate risk and interest rate risk. The Ministry of Finance's stress test[42] shows that an extreme shock to interest rates and exchange rates would increase debt by only 4.7% of GDP. If the debt structure had been the same as in 2002, the impact would have been 22.2% of GDP.

Acevedo et al (2006) have also conducted a comprehensive analysis of debt sustainability (discussed separately in Chapter C above). They also report on interesting stress tests that take account of macroeconomic dynamics. Their stress tests measure the impact on public debt net of reserves, as a percentage of GDP, of an episode of financial turmoil analogous to that suffered by the five countries they studied. The most dramatic improvement has been in Brazil, as presented in Graph D4. Under the base scenario, which reflects the continuation of the present trends, debt decreases gradually towards 60% of GDP, from a peak of 75% in 2002. Under the stress scenario, with the present debt structure, debt increases and then stabilises above 70%. Without the proactive shift towards domestic debt, however, debt would have increased to over 80% of GDP.[43]

Graph D4

Brazil: public debt under stress scenarios



[1] Net of reserves, as a ratio of GDP. [2] Stress under 2002 debt composition (counterfactual). [3] Stress under current debt composition.

Source: Acevedo and al (2007).

[42] This stress test assumes that three standard deviation shocks on the interest rate (7.8 percentage points) and the exchange rate (56.6%) persist for one year.

[43] In order to build this counterfactual case, only the discretionary changes in debt composition are considered. The reduction in the share of foreign currency denominated debt due to exchange rate appreciation is netted out. For a detailed analysis, see Acevedo et al (2006).

E. Liquidity in government bond markets

Many of the benefits of having local currency bond markets depend on the ability of investors to trade cheaply and to adjust their positions in a timely manner. An illiquid government bond market will not be very helpful for the efficient pricing of other financial instruments, for effective government debt management, or for the transmission of monetary policy. In addition, an adequate degree of liquidity is essential for financial stability. This chapter, therefore, examines how far liquidity of local currency bond markets has improved as issuance has expanded. Much remains to be done to improve liquidity in many countries: four major areas for policy action are considered in this chapter.

Liquidity and financial stability

Although there is no unique way to define market liquidity, three common characteristics of a liquid market are *depth*, *tightness* and *resilience*.[44] Depth indicates the market's ability to absorb large transaction volumes without disturbing the equilibrium price; tightness measures the cost efficiency in transacting; and resilience indicates the market's ability to absorb a shock. Based on these characteristics, liquid markets are usually characterised by large turnover, low bid-ask spreads and limited day to day price volatility.

Markets that are deep and liquid can enhance the stability of the financial system in several ways. First, liquid markets can help to absorb occasional market "stresses" that cause extreme price fluctuations and thereby reduce the risks of financial system disruptions.[45] By contrast, illiquid markets amplify the effect of shocks by generating large price changes, unstable price expectations, and a greater risk of spillover to other market segments.[46]

Liquidity is also essential for limiting the financial distortions that increase systemic vulnerability. If government bond markets become illiquid during periods of heightened political uncertainty, for example, the market may demand a large liquidity premium. In such circumstances, public debt issuance tends to become concentrated in short maturities. This has been demonstrated by several liquidity crises in the emerging markets (for example, Brazil in 2002). Some have argued that a narrow investor base can make a market illiquid by increasing the markets' vulnerability to "herding" investor behaviour. Liquid markets with a diversified investor base are less likely to witness one-way price bets than markets that are relatively illiquid: these issues are discussed further in Chapter F.

In addition, an illiquid bond market can adversely affect financial stability by reducing both agents' capacity to manage risk and the authorities' ability to monitor risk. In particular, lack of liquidity and high transaction costs could prevent market participants from smoothly rebalancing their portfolio against anticipated shocks, thus limiting their capacity to manage risk. The presence of liquidity risk may mean that risk exposures can be underestimated.[47]

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[44] For a detailed discussion, see CGFS (1999b).

[45] Studies show that, in markets that are traditionally liquid, a fall in prices that investors regard as overshooting leads them to reduce selling, confident that market liquidity will return. In illiquid markets, where there is no such confidence, a fall in prices can trigger further intense selling, which Muranaga and Shimizu (1999) call an "endogenous price crash".

[46] CGFS (1999a).

[47] This arises from the fact that VaR models may not take adequate account of liquidation risk. In several countries, financial institutions have complemented their VaR methodologies with stress tests that enable them to gauge their potential vulnerability to liquidity events. However, there are also a number of caveats with

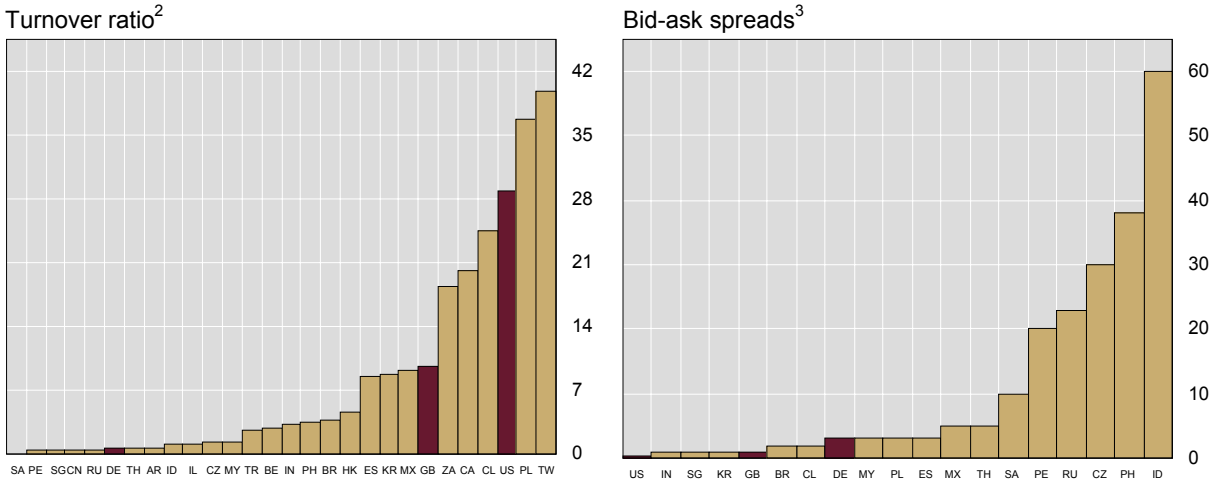
Moreover, supervisors' ability to monitor risk and take preventive actions depends on the availability of proper market price indicators for valuing financial institutions' securities holdings.

Has liquidity improved in the government bond market?

Several indicators suggest that liquidity is improving in many markets in the EMEs. Market depth does appear to have increased.[48] In a number of countries, the annual turnover of central government securities has risen over the past five years.[49] In 2005, the ratio of turnover to outstanding stocks in some emerging markets (for instance, Chile, Poland, South Africa and Taiwan (China)) was comparable to that in mature markets (Graph E1). There is also some evidence that the number of key benchmark securities is also increasing in many countries, suggesting greater market depth. In several countries, the typical number of benchmark securities has increased, from one or two securities in 2000 to between three and five by 2005.

Graph E1

Liquidity in the government bond market, 2005[1]



AR = Argentina; BE = Belgium; BR = Brazil; CA = Canada; CL = Chile; CN = China; CO = Colombia; CZ = the Czech Republic; DE = Germany; ES = Spain; GB = the United Kingdom; HK = Hong Kong SAR; ID = Indonesia; IL = Israel; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = the Philippines; PL = Poland; RU = Russia; SA = Saudi Arabia; SG = Singapore; TH = Thailand; TR = Turkey; TW = Taiwan (China); US = the United States; ZA = South Africa.

[1] Refers to central government bonds and notes. [2] Turnover over previous year's outstanding stock. [3] Most liquid issue, in basis points; for the United States, 10-year government bond yields.

Sources: Bloomberg; Working Group survey of central banks; BIS.

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the use of such tests: they do not measure the probability of such events; and they are subject to risk managers' judgment.

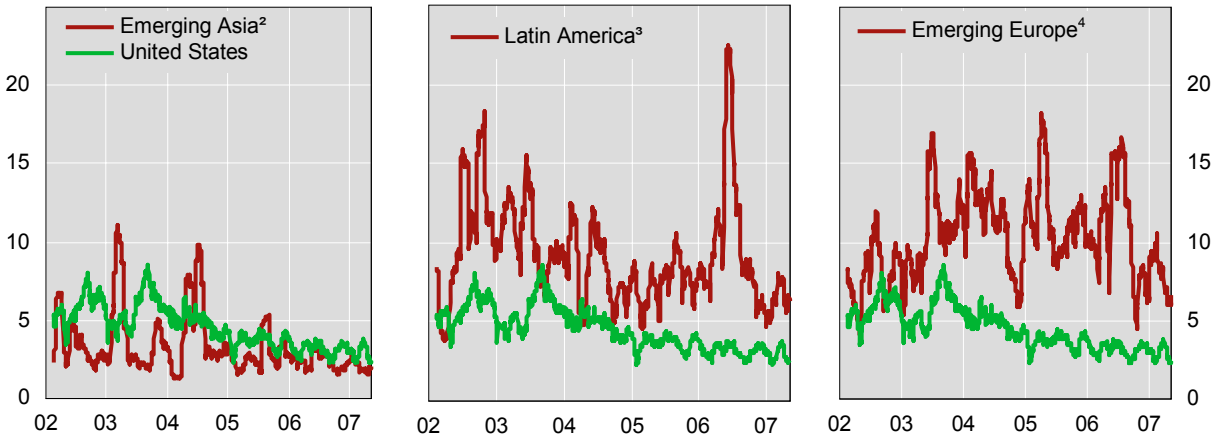
[48] An earlier quantitative assessment of liquidity in the government bond market is presented in Mohanty (2002), which uses many of the measures employed in this chapter.

[49] For instance, gross turnover of central government bonds increased by two to four times in India, Israel, Korea, Malaysia, Mexico, Singapore, Taiwan (China), Thailand and Turkey between 2000 and 2005.

Nevertheless, **market depth** varies considerably across countries. Liquidity continues to be low in a majority of countries, and the gap between emerging and mature bond markets remains wide. In particular, liquidity tends to be relatively low for long-term bonds. It is important to note, however, that turnover data may not be fully comparable across countries (for example, some countries include central bank repurchase operations in their statistics, and others do not), and a high turnover ratio may not necessarily indicate better liquidity if the volume of outstanding stocks is also low (this is for instance the case in Taiwan (China)). Ideally, measures of turnover should also reflect derivatives transactions since a liquid futures market can compensate for some of the inefficiencies of an illiquid cash market. For example, investors might find it easier to hold an open position in the derivatives market because the market is liquid rather than taking a similar position in the spot market, where they might not be able to change their portfolio so easily.

Graph E2

Volatility of local currency bond returns[1]



[1] Calculated as the standard deviation of daily percentage changes in the return index, with a 30-day moving window, annualised. Data refer to unhedged returns in US dollars of JPMorgan Chase's traded index. [2] China, India, Indonesia, Malaysia and Thailand. [3] Brazil, Chile, Colombia, Mexico and Peru. [4] The Czech Republic, Hungary, Poland, Russia, Slovakia and Turkey.

Source: JPMorgan Chase.

An indicator of **tightness** is the bid-ask spread for the most liquid benchmark security. For instance, in 2005, spreads in Brazil, Chile, India, Korea and Singapore were among the lowest among the countries shown in Graph E1. At the same time, low bid-ask spreads may not provide a representative measure of liquidity if transaction costs vary widely between the most and least traded securities. In some countries, market regulation might also limit the extent to which market-makers can vary their spreads.

Assessing market **resilience**, the third dimension of liquidity, is difficult as it reflects both technical conditions in the market, as well as investor perceptions of the macroeconomic and credit fundamentals.[50] Emerging bond markets have so often in the past seen liquidity dry up suddenly following an adverse shock (say, a decline in capital inflows or monetary tightening). As a simple measure of market resilience, Graph E2 shows annualised volatility of local currency bond returns in major emerging market regions and the United States over

[50] The emergence of electronic bond platforms and exchange-based trading systems might be reducing this difficulty somewhat. For instance, intraday price volatility could provide vital information about the relative resilience of the bond market to liquidity shocks.

the past five years. To the extent that liquidity premia are embedded in bond returns, illiquid markets are expected to exhibit higher volatility than liquid markets, reflecting a time-varying risk component. Based on this measure, Asian bond markets seem to be becoming more resilient, given the sharp decline in volatility over the past two years. To a smaller extent, this also appears to be true for Latin America and central Europe, particularly since the middle of 2006. Even so, bond returns in these areas are still far more volatile than elsewhere.

Box E1

The impact of the May–June 2006 sell-off on Turkey

Increased global risk aversion during May and June 2006 triggered a sudden reversal of large "carry" positions on Turkish bonds, leading to a sharp decline in local currency bond prices and the exchange rate (Graph E3). The net withdrawal by foreign investors from lira-denominated bonds was estimated to have reached $4 billion during these two months. The unexpectedly sharp currency depreciation, in turn, triggered stop-loss clauses in derivatives contracts on lira-denominated debt issued in offshore markets, leading to further depreciation and a rise in domestic yields.

To counter the sell-off and stabilise inflation expectations, the central bank announced several measures: (a) the raising of the policy rate by 425 basis points in June and July; (b) the draining of large amounts of money market liquidity to reduce lira speculation; and (c) the selling of forex reserves to stem the lira's depreciation. In the short-term, higher policy rates hurt domestic investors with long positions in Turkish liras. Banks that had taken longer-term foreign currency loans from international banks at low rates and hedged their positions using foreign exchange forwards saw their hedging costs rise sharply with higher domestic rates.

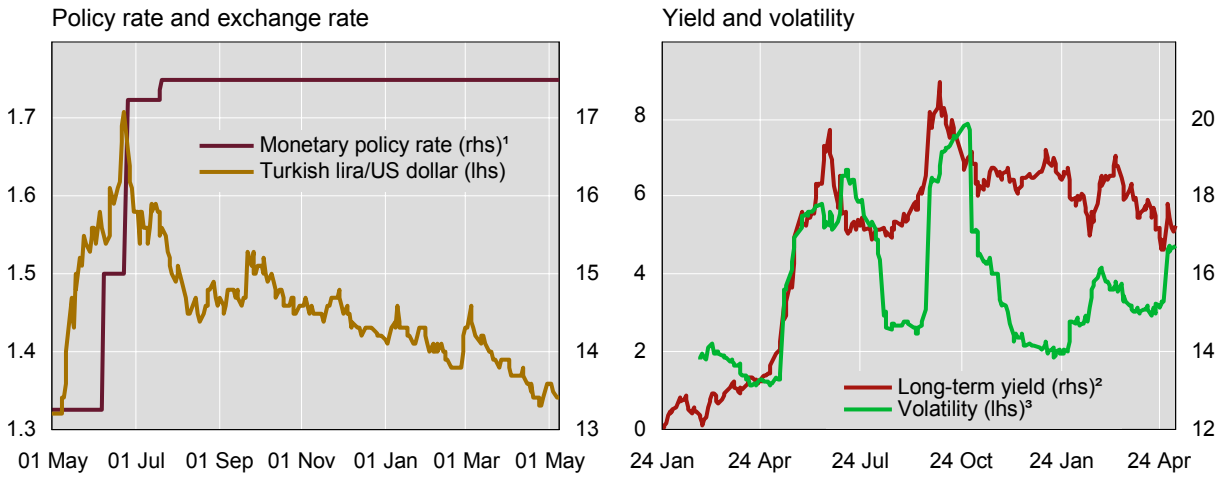
Yet both foreign exchange and the local currency bond markets stabilised relatively quickly (Graph E3). By mid-August, the lira had recovered and long-term bond yields began to decline. Inflation expectations, which had shot up during the second quarter of 2006, moderated substantially by October 2006. Aggressive monetary tightening by the central bank and the government's announcement that it would exceed the target for the primary budget surplus for 2006 (5.9% of GDP) helped to underpin investors' confidence in medium-term macroeconomic stability, and capital inflows rebounded. Other factors helping Turkey's resilience were improved public debt sustainability, particularly the reduced share of foreign exchange linked bonds in the stock of total debt (falling from 56% in 2001 to 40% at the end of May 2006) and a recovery of inflows to local debt and equity markets in the second half of 2006.

Event studies focus on market response to common as well as idiosyncratic shocks as a measure of resilience. Graph E4 focuses on the experience of emerging markets during the May–June 2006 global market sell-off. Although several key local currency bond markets came under heavy selling pressure during this period (particularly those of Indonesia, the Philippines and Turkey), the subsequent recovery generally was relatively rapid. (Even Turkey, which experienced the largest and most sustained rise in yields, and a large exchange rate depreciation, was much less affected than it had been during past episodes of global or country specific volatility (see Box E1)). Many key markets (such as Brazil and South Africa) that have often been vulnerable to deterioration in investor sentiment in international markets suffered only temporary dislocations, which could reflect increased resilience to external shocks as well as the rapid recovery of risk appetite globally.

At the same time, some EMEs have had to struggle with what has been seen as "excessive" capital inflows. The recent case of Thailand is of particular interest. With a floating exchange rate, few capital controls and a functioning short-term forward market, non-residents found it attractive to invest in Thai financial assets, including local currency bonds. The upward pressure on the exchange rate presented a difficult dilemma for the Thai authorities who opted for capital controls. This episode reminded investors that reforms liberalising capital flows could be reversed.

Graph E3

Turkish yields and monetary policy in 2006 and 2007



[1] Turkish Lira Announced Interbank Overnight Rate, in per cent. [2] Government bond issued by the central bank on 25 January 2006 and maturing on 19 January 2011. [3] Thirty-day rolling annualised volatility of daily returns of the government bond.

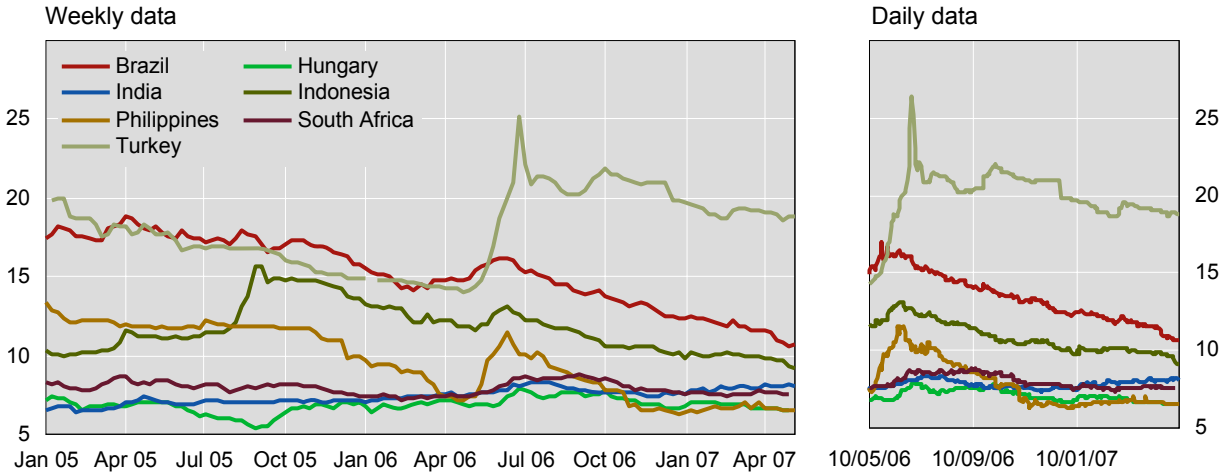
Sources: Bloomberg; BIS calculations.

As regards country specific shocks, responses from central banks to the Working Group's survey are somewhat mixed. For instance, none of the industrial countries reported liquidity-related market events over the past five years. This also appears to be true in a broad spectrum of emerging economies (for instance, China, Hong Kong SAR, India, Israel, Malaysia, Mexico, Singapore and South Africa). In contrast, in 2002 Colombia witnessed

Graph E4

Local currency long-term bond rates during the May–June 2006 sell-off

In per cent



Note: For Hungary, India, Indonesia, the Philippines and South Africa, 10-year government bond; for Brazil, three-year government bond; for Turkey, one-year Libor. The right-hand panel begins with the first day of the sell-off, on 10 May 2006.

Sources: Bloomberg; national data.

significant selling pressures in the local bond market following news of the country's deteriorating fiscal situation. Peru witnessed a similar event in the first quarter of 2006 ahead of its presidential elections. Chile, even with its well-developed bond market, had to cancel

debt auctions in late 2005 in response to heightened market volatility. Both Poland and Hungary have seen bond market sell-offs over the past few years; liquidity shortages in Poland in November 2003 led many market-makers to stop providing two-way quotes and some banks to withdraw from market-making.

In several countries, fundamental concerns have in the past led to liquidity runs in the mutual fund sector, illustrating the interaction between fundamental and technical factors. Korea has witnessed several runs on the investment trust companies – a group of firms dominating the market for government securities. Indonesia came to the brink of a crisis in its bond fund sector in 2005, following a sharp rise in the domestic interest rate. Mutual funds that had invested over 80% of their assets in government securities during a time of rising bond prices faced heavy redemption pressure as their losses mounted and net asset values fell. An illiquid secondary market was said to have exaggerated the price fall resulting from selling pressures from the mutual funds. Retail investors, who were unaware of this risk (and perhaps not adequately warned by financial intermediaries), were hit particularly hard. The crisis was averted by government intervention to inject liquidity through a large bond buyback operation.[51]

Factors affecting liquidity

These indicators suggest that, despite notable improvements, local currency bond markets in a number of countries remain relatively illiquid. The experience of industrial countries has shown that developing a liquid bond market involves considerable effort and time. In Europe, for instance, bond market liquidity improved substantially after restrictions on cross-border capital inflows had been eliminated and national tax rates had been substantially harmonised.

Over the past decade, major efforts have been underway in emerging markets to remove constraints that impede bond market liquidity.[52] Fundamental fiscal and monetary reforms have reduced inflation and interest rate volatility, enhancing public debt sustainability and monetary discipline. This has attracted investors to local currency bond markets and boosted secondary market trading. In addition, efforts have been made to boost investors' confidence in "young" markets. The abolition of interest rate controls, the elimination of official intervention in the primary market (for instance, in India and Mexico) to influence the yield curve, and an increased number of market participants have all gone in this direction. Many countries have made progress in developing the market microstructure by establishing market-makers, introducing modern trading platforms, reforming the payment and settlement system, and increasing market transparency. India is one important example, where a sequence of reforms and market-building efforts since the beginning of the 1990s has led to a substantial improvement in bond market liquidity in recent years (see Box E2).

This record of achievement raises the question of what remaining constraints are still hindering liquidity in emerging bond markets. It is instructive to mention here that an earlier CGFS working group in the context of mature markets had noted a number of guiding principles for designing a deep and liquid government bond market (CGFS (1999b)). These principles include reducing market fragmentation by enhancing close substitutability of different securities, lowering transaction costs by choosing appropriate taxation policies, ensuring a sound and robust market infrastructure, enhancing heterogeneity of market

[51] For details, see ADB (2006).

[52] Some of these measures and country experiences have been discussed extensively in BIS (2000, 2006a and 2006c), Turner (2003), Mohanty (2002), World Bank (2001) and IADB (2006).

participants, and creating a level playing field between resident and non-resident investors. These principles suggest four major focuses of policy action to boost liquidity in emerging bond markets: (a) encouraging the trading of securities; (b) diversifying the investor base; (c) developing a repo market; and (d) deepening derivatives markets. The rest of this chapter considers these elements in turn.

(a) Encouraging the trading of securities

One set of factors attracting increasing attention from analysts and market players is how far emerging markets are adopting policies and practices that encourage trading in securities. Many emerging markets continue to have investment regulations for banks and long-term institutional investors. For instance, the mandatory investment requirement for banks to invest in public sector securities varied between zero in Mexico and 30% in the Philippines in 2006. Several countries, such as India, Indonesia and Saudi Arabia, had mandatory investment ratios equal to or exceeding 20%. Requirements for institutional investors are even higher (exceeding 30% in a number of countries). In some countries, certain investor groups are required to invest all their assets under management in government securities.

These investment restrictions encourage buy-and-hold behaviour among banks and institutional investors. Since these investors are required to maintain a high proportion of their assets in government paper at all times, they may prefer to hold long-dated bonds, guaranteeing a fixed rate of return over the cycle. This strategy reduces their incentive to trade in securities. On the other hand, a buy-and-hold strategy may be desirable from the investor's viewpoint even without such restrictions.

Box E2

Policy and liquidity in the Indian government bond market

Market liquidity in the Indian debt market has improved over the past decade well in line with that in the developed world, with the bid-ask spreads on the most liquid security being as fine as 1–3 basis points.

The Reserve Bank of India (RBI) – the debt manager for the government – has taken a series of steps to boost liquidity. Early reforms focused on establishing primary dealers (PDs) in 1996 with liquidity support from the RBI. While the structure of PD business was later expanded to include banks, PDs were allowed to diversify their activities. Specialised public sector agencies such as the Discount and Finance House of India and the Securities Trading Corporation of India were set up to promote secondary market trading. As the market developed, the RBI divested most of its shareholdings in these institutions in favour of other market players. The objective was to avoid problems of moral hazard associated with the RBI's role as the lender of last resort as well as the money market regulator (Reddy (2002)).

Efforts were made to mitigate settlement risks by introducing delivery versus payment (DVP) in securities in 1995 and later integrating it with the Clearing Corporation of India Limited as the sole clearing house and central counterparty. The launching of a negotiated dealing system (NDS) in 2005 helped to create an anonymous electronic order-matching trading and settlement system. Permitting the rollover of repos combined with the adoption of a uniform T+1 settlement cycle enabled market participants to manage their positions more efficiently. To facilitate wider participation and easier access, government securities were permitted to be traded on stock exchanges, non-bank participants were allowed to undertake repos in government securities, and limits on foreign portfolio investment in debt securities were raised (to $3.2 billion in 2006).

Various new instruments were introduced in the first half of the 1990s to increase the depth of the government bond market. These included 91-day treasury bills, zero coupon bonds, floating-rate bonds and capital index bonds, where the principal investment is linked to the inflation rate. The introduction of over-the-counter (OTC) interest rate derivatives (interest rate swaps and forward rate agreements) in the second half of the 1990s facilitated the hedging of interest rate risk. Consolidation through the reissuance/reopening of government securities and buyback of illiquid securities was used to develop key benchmark securities. To develop a smooth yield curve for longer terms and to minimise refinancing risk, the maturity of government bond issuance was increased up to 20 and further to 30 years.

The RBI also initiated a number of steps to improve market transparency. To provide timely and clear information to market participants, an auction calendar for government securities was introduced in 2002. Reporting and dissemination of information about securities trading have been done through the fully operational electronic bond trading system (NDS) since 2005. A "when issued" (WI) market (ie where securities can be traded before the date of issuance) was introduced in 2006 to facilitate price discovery.

Although initially WI trading was permitted in reissued securities, it is proposed to extend WI trading to new securities as well. While intraday short selling in central government securities was allowed in 2006, it was recently proposed to allow banks and primary dealers to cover their short positions within an extended period of five trading days.

However, despite significant improvements, liquidity in the government securities market is concentrated in a few instruments (five out of 112 outstanding securities) and the derivatives market remains underdeveloped. The participant base is still dominated by mandated holders like banks, insurance companies and retirement funds that are predominantly buy-and-hold investors. To help banks manage their large government securities portfolio, the RBI allowed them to expand their "held to maturity" portfolio up to the mandated 25%, thereby insulating them from interest rate risk.

Moreover, investment restrictions can also reduce the authorities' incentive to subject these institutions to fair value accounting. Countries with high mandatory investment requirements typically lag behind in adopting mark-to-market practices. This is especially true in Asia, where public pension funds dominate the market. This leads to a vicious cycle of low trading volume, low liquidity, and underdevelopment of yield curves that could be used for fair value

accounting by other investors. In contrast, in a relatively liquid bond market such as South Africa's, institutional investors hold only 5–15% of their assets in government securities and are required to mark to market on a frequent basis. This is also true in Chile, where private pension funds can invest in foreign securities and hold up to 80% of their assets in equities.

(b) Diversifying the investor base

Many observers have emphasised the role of a diversified investor base – particularly domestic and foreign institutional investors – in promoting market liquidity because of its positive effect on market competition, innovation and sophistication (a following section discusses this issue in more detail). This appears to be particularly important from the viewpoint of market players, as revealed by a recent survey conducted by the ADB (Table E1). Most market-makers canvassed in this survey felt that a diversified investor base is the single most needed element in improving liquidity in the Asian local bond markets.

Table E1

Market-makers' views about liquidity in Asia

Most needed reforms in government bond markets

	Average	CN	HK	ID	JP	KR	MY	PH	SG	TH	VN
Increasing diversity of investors	3.58	3.6	3.8	3.6	3.0	3.0	3.8	3.4	3.9	3.8	3.7
Increased availability of hedging products	3.20	3.8	2.3	3.6	3.0	3.0	3.3	3.2	3.4	3.3	2.7
Improving repo markets	3.16	3.4	2.3	3.6	3.0	3.0	3.0	3.2	3.3	3.0	3.7
Mandatory bid-ask spreads by market-makers	2.82	3.2	2.5	3.0	2.0	2.5	2.8	3.0	3.0	2.8	3.0
Increasing intraday price transparency	2.80	3.2	2.3	3.4	2.0	2.5	2.5	2.8	3.3	2.0	3.3
Increasing tax incentives	2.69	2.6	1.0	3.0	3.0	2.3	1.8	4.0	3.1	2.5	3.0
Improvements to clearing and settlement	2.60	3.6	1.3	3.2	2.7	1.3	2.0	3.0	2.6	3.0	3.0

Note: 4 = "Very important", 3 = "Important", 2 = "Somewhat important", 1 = "Not important at all", 0 = "Don't know".

Sources: Asian Bonds Online survey results; ADB (2006).

Country experience varies regarding the relative importance of domestic and foreign institutional investors in boosting liquidity. For instance, Singapore, a small country but with a very high saving rate and a strong financial system, has allowed foreign issuers and investors to play a bigger role in the local debt market. In 2005, non-residents accounted for 14% of the outstanding stock of Singapore dollar bonds both as investors and issuers (although some restrictions still limit the taking of positions on the Singapore dollar). Recently, the authorities have allowed retail hedge funds to enter the local debt market. Foreign investors have also played a leading role in boosting market liquidity in several larger emerging markets (for instance, Brazil, Hungary, Israel, Mexico, Poland, South Africa and Turkey).

Domestic institutional investors play an equally – if not more – important role in many countries, particularly in the early stages of market development. In Latin America, for

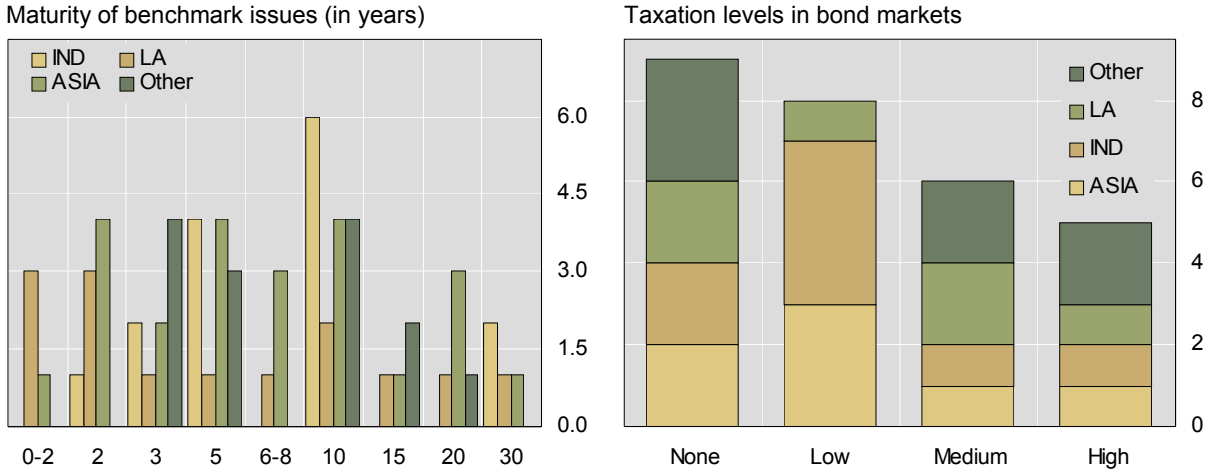
instance, private pension and insurance funds are a key source of market liquidity. One important example is Chile, which restricted foreign inflows into the local debt market for a long time. Similarly, local investment funds in Colombia account for a very large part of local bond market turnover, with only marginal participation by foreign investors.

With risk-return profiles and trading expertise varying across investor groups, a critical mass of investors might be necessary to enhance market competition and liquidity. For instance, large foreign mutual funds that possess superior portfolio management expertise can provide a countervailing force to domestic pension funds that might dominate the long-term yield curve. Allowing foreign investment banks to compete with domestic entities as market-makers can help by reducing bid-ask spreads. In countries with deeper markets and stronger fundamentals, hedge funds can play a major role in enhancing market liquidity.

A certain degree of initial liquidity may be essential to attract the more sophisticated foreign investors. In particular, a lack of proper benchmarks might prevent foreign (even domestic) pension and insurance funds from taking larger positions in the local currency bond markets because their investment strategies critically depend on such indicators. In mature markets, liquidity tends to be concentrated in a few key benchmarks, increasing their attractiveness to investors (Graph E5). While many emerging market economies have successfully extended their benchmark yield curves, liquidity is still dispersed across a large number of maturities. Many countries have attempted to correct this by issuing larger amounts of specific benchmarks (for instance, Brazil and Mexico), by reopening existing benchmark securities (for instance, India) and buying back old illiquid securities (the Philippines).

Graph E5

Liquidity-related characteristics



IND = industrial countries, LA = Latin America, ASIA= Asian emerging markets, Other = European emerging markets plus Israel and Turkey.

Note: In both panels, the number of countries reporting in each category is plotted on the vertical axis. Maturity is plotted on the horizontal axis in the left-hand panel. In the right-hand panel, taxation levels reported were used to sort countries into four groups, plotted on the horizontal axis. The reported situation was approximately summarised in four levels: no taxes on bond transactions = none, some taxes = low, more general taxes on income up to 10% = medium, taxes on income exceeding 10% = high.

Sources: Working Group survey; BIS.

Several recent studies focusing on emerging local currency bond markets have underlined the critical importance of market size as well as legal and market infrastructure for attracting

large institutional investors into young bond markets.[53] Liquidity is often higher in markets with larger volumes of outstanding stocks that are governed by transparent and efficient trading and settlement systems as well as effective property rights. Many participants in the regional workshops stressed the need for pre- and post-trade transparency as a key for making bond markets attractive to institutional investors. Asking specific participants (such as primary dealers) to quote securities on a regular basis or establishing dedicated pricing agencies serves to improve the exchange of information among participants and helps to increase turnover and reduce transaction costs. In Korea, three private companies price all securities every day (and are paid a fee by market participants to do so), similar to the system in Mexico. Singapore and Hong Kong SAR have recently introduced electronic bond platforms to improve transparency in the bidding process. Reducing high taxation levels on securities transactions (as in several Latin American countries) and eliminating or simplifying withholding taxes could also help to attract more investors.

(c) Developing a repo market

Developing a repurchase (repo) market in securities has often proved extremely useful in fostering market liquidity. A view emerging from the regional workshops was that repos are essential to boosting liquidity in the cash market as they help securities dealers perform their market-making role more efficiently (particularly from the viewpoint of inventory risk management). An underdeveloped repo market creates significant risk for primary dealers and can threaten their financial viability. It was argued that margins earned by underwriters do not cover the economic risk they face in providing this service. Repos have several other advantages: they encourage the establishment of standardised documentation among market participants; they increase the revenues of bondholders; they reduce the liquidity problems raised by the presence of buy-and-hold investors; and they help sophisticated foreign investors enter domestic markets – in particular, those investors willing and able to short securities and to manage their portfolios actively.

In recent years, central banks in many countries have introduced or widened the repo market by using these transactions in their monetary policy operations. Yet interbank or inter-dealer repo markets remain largely underdeveloped because of the lack of securities lending operations. In liquid markets, market-makers and leveraged investors often borrow securities to finance a new position or meet settlement requirements while short-selling. This requires development of both sides of the securities lending operation – that is, permission to those who possess securities to lend and to those in need of them to borrow. Many countries have recently allowed short selling, although several constraints remain. For instance, in Hong Kong SAR only market-makers are allowed to take short positions during the trading day. In several countries, the market for securities lending has not picked up because of either high transaction costs or a lack of certainty about creditors' legal rights over collateral. To remove this impediment, Israel recently passed a law establishing the priority of the collateral holder in the repo and securities lending transaction.

(d) Deepening derivatives markets

Derivatives markets (such as those for interest rate swaps and futures) can be used to protect a portfolio of bonds against losses from interest rate volatility. They can also be used to protect against volatility in foreign exchange markets. Liquidity in the cash and derivatives markets is closely linked. Derivatives offer primary dealers and market-makers instruments with which to manage financial risks and permit them to hold larger inventories. This ability of

[53] See, for example, McCauley and Remolona (2000), Eichengreen et al (2006) and ADB (2006).

investors to protect themselves from movements in interest rates allows them to increase transaction volumes in the spot market. Experience in the US and European context shows that liquidity is often higher and transaction costs lower in the futures market than in the cash market, enabling investors to hedge their interest rate and foreign exchange risks at a lower cost than would otherwise be possible.[54]

Table E2

Interest rate derivatives turnover

Daily averages, notional amounts in millions of US dollars

Country	OTC instruments[1]		Exchange-traded short-term futures		Exchange-traded long-term futures	
	April 2001	April 2004	April 2001	April 2004	April 2001	April 2004
Brazil	175	850	8,555	16,858	0	0
Czech Republic	129	344	0	0	0	0
Hong Kong SAR	1,527	3,097	1,870	239	0	0
Hungary	0	179	0	0	0	0
India	39	419	0	0	0	0
Korea	41	384	0	9	2,260	2,697
Malaysia	2	27	60	137	0	4
Mexico	366	1,188	82	4,559	0	0
Poland	460	848	0	0	0	0
Singapore	355	3,571	306	133	0	0
South Africa	473	2,737	0	0	3	5
Taiwan, China	22	410	0	0	0	37
Thailand	5	54	0	0	0	0

[1] Net of local inter-dealer double-counting and including forward rate agreements, swaps, options and other products in domestic currency.

Sources: BIS Triennial Central Bank Survey on Foreign Exchange and Derivatives Market Activity (2005); FOW TRADEdata.

In emerging markets, the development of futures markets can be an important step in promoting foreign investors' interest in the local currency bond market. For instance, investor interest in the local bond market increased sharply in South Africa with the development of a liquid derivatives market. While interest rate swaps and forward rate agreements accounted for 90% of total interest rate derivatives transactions in 2005, about 70% of these instruments were held by foreigners. In Brazil, derivatives markets play a central role in providing market liquidity. The highly traded one-day interbank deposit futures contracts enable bondholders

[54] See, for example, Fleming and Sarkar (1999) and Schulte and Violi (2001) for the US and European market, respectively.

to transfer their risk positions in an efficient and cost-effective manner.[55] A liquid futures market, in turn, has helped develop a benchmark fixed income yield curve, compensating for the low liquidity in the cash market.[56] The authorities in Brazil thus have actively encouraged the development of a futures market by providing partial exemptions from transaction taxes and the reserve requirement. In Mexico, active trading in short-term futures (28-day balanced interbank interest rate) is reported to have benefited the longer segment of the yield curve by helping to price long-term interest rate swaps.

However, derivatives markets remain rather underdeveloped in several countries. In Asia, for instance, with the exception of Hong Kong SAR, Singapore and Korea, turnover in interest rate swap and futures markets is comparatively low (Table E2). One major finding from the Asian regional workshop was that a shallow onshore derivatives market diverts global fund managers from local currency bond markets to offshore non-deliverable forward (NDF) markets. Informed investors (such as hedge funds) that would otherwise be willing to accept more maturity or credit risk cannot do so because of the absence of instruments for managing them. This also appears to be the case in some Latin American economies. Peru provides one example of risk to the development of local bond markets stemming from a shortage of forward contracts.

A key factor constraining the development of short-term derivatives markets is the lack of a well-developed benchmark yield curve to be used as a settlement rate for derivatives transactions. Several countries have attempted to address this problem by developing key interbank reference rates. Second, foreign exchange regulations in some countries limit the extent to which foreign investors can use the derivatives market to hedge their local currency exposures. One important example is the strict limit imposed by some countries on non-residents' ability to borrow domestic currency, which has led to the emergence of large offshore NDF markets that dwarf the onshore forward market. In this regard, the authorities often fear that they face a trade-off between adopting policies to enhance bond market liquidity and the perceived threat that investors might use the derivatives market to short the currency.

[55] Financial institutions, domestic institutional investors and non-resident investors have all used this market to manage risks (accounting for 37%, 45% and 18%, respectively, of the outstanding gross positions of one-day interbank deposit futures contracts in May 2006).

[56] See Amante et al (2006).

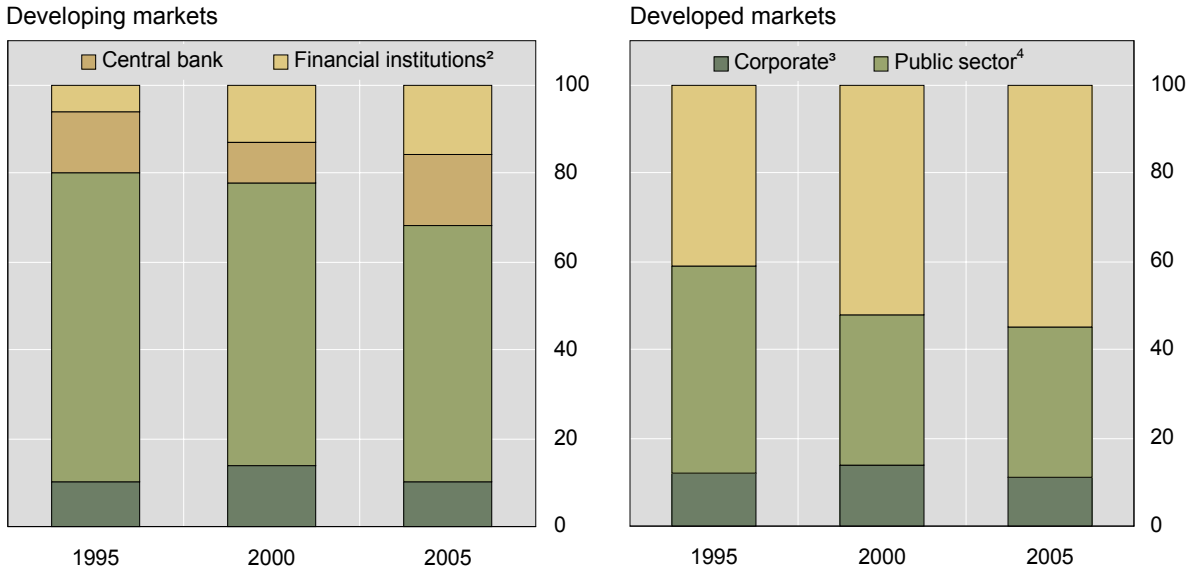
F. The issuer base

Domestic bond issuance in the emerging markets is dominated by the central government and other public sector entities. In 2005, public sector debt securities (including those issued by the central bank) accounted for 74% of domestic securities outstanding (Graph F1), well above the average figure in industrial countries. Central bank issuance in particular is much greater, reflecting the large-scale accumulation of forex reserves. Financial institutions are the next largest issuer, accounting for 16% of debt outstanding in 2005. Despite the benefit of corporate access to local debt markets, corporate debt accounts for only 10% of outstandings. Finally, the securitisation of bank loans – a major source of bond market growth in the industrial world – has developed in only a limited way in most EMEs.

Graph F1

Issuers of domestic debt securities[1]

As a percentage of total domestic debt outstanding



[1] Money market instruments, bonds and notes. Regional aggregates are based on the countries listed in Annex Table 5 of the Working Group survey. [2] Sum of banking sector, non-bank financial institutions and other non-resident issuers as reported in Tables 2a (money market instruments) and 2b (bonds and notes) of the Working Group survey. [3] Non-financial, corporate sector other than quasi-government as reported in Tables 2a (money market instruments) and 2b (bonds and notes) of the Working Group survey. [4] Sum of central government, other government, quasi-government and non-resident official issuers as reported in Tables 2a (money market instruments) and 2b (bonds and notes) of the Working Group survey.

Source: Working Group survey.

Public sector

Public sector debt issuance in emerging markets is dominated by the central government and central bank.[57] Relatively little state and local government issuance takes place in emerging markets. Although some countries are seeking to decentralise public spending for

[57] Central bank issuance was discussed in Chapter D, page 42.

social services and infrastructure, one challenge is to prevent any sub-sovereign financing undermining fiscal discipline nationally. Major impediments such as a lack of transparency, and inadequate accounting capacity, inhibit market-based sub-sovereign financing.

Financial institutions

The banking sector and non-bank financial institutions accounted for 15% of outstandings in developing markets in 2005, a notable increase from 10% in 2000. But this is still lower than in developed countries, where financial institutions account for over half (52%) of debt securities outstanding. Many regard such an evolution as natural: the development of the bond market starts with government securities, followed by financial institutions and ultimately by corporate issuers. Banks and other financial institutions are typically more transparent than other corporates, can diversify their risks better, and in many cases benefit from explicit or implicit government guarantees.

Corporate bonds

In most developing countries, there is a shortage of long-term domestic currency credit for firms. Indeed, the structure of domestic private sector liabilities (high leverage, short maturity, and foreign currency denominated debt) aggravated the crises experienced by some EMEs during the 1990s and 2000s. The development of local currency corporate bond markets could therefore help to reduce vulnerabilities in the corporate sector. To provide a more stable source of long-term currency funding, but partly also to stimulate growth,[58] the development of strong local currency corporate bond markets has become an important objective of policy in many emerging market economies. The development of domestic corporate bond markets could enhance financial stability through several channels.

Perhaps the most important benefit is that the detailed disclosure of information required for bond issuance induces a general improvement in the quality of corporate reporting.

As an earlier report by the Financial Stability Forum underlined, fuller disclosure by companies (in their audited reports and accounts) of the composition of their liabilities and financial assets (particularly by maturity and currency) would greatly help market participants to better monitor risks (FSF (2000)). With support from financial analysts and rating agencies, corporate bond issuance can thus improve financial stability by reinforcing market discipline.

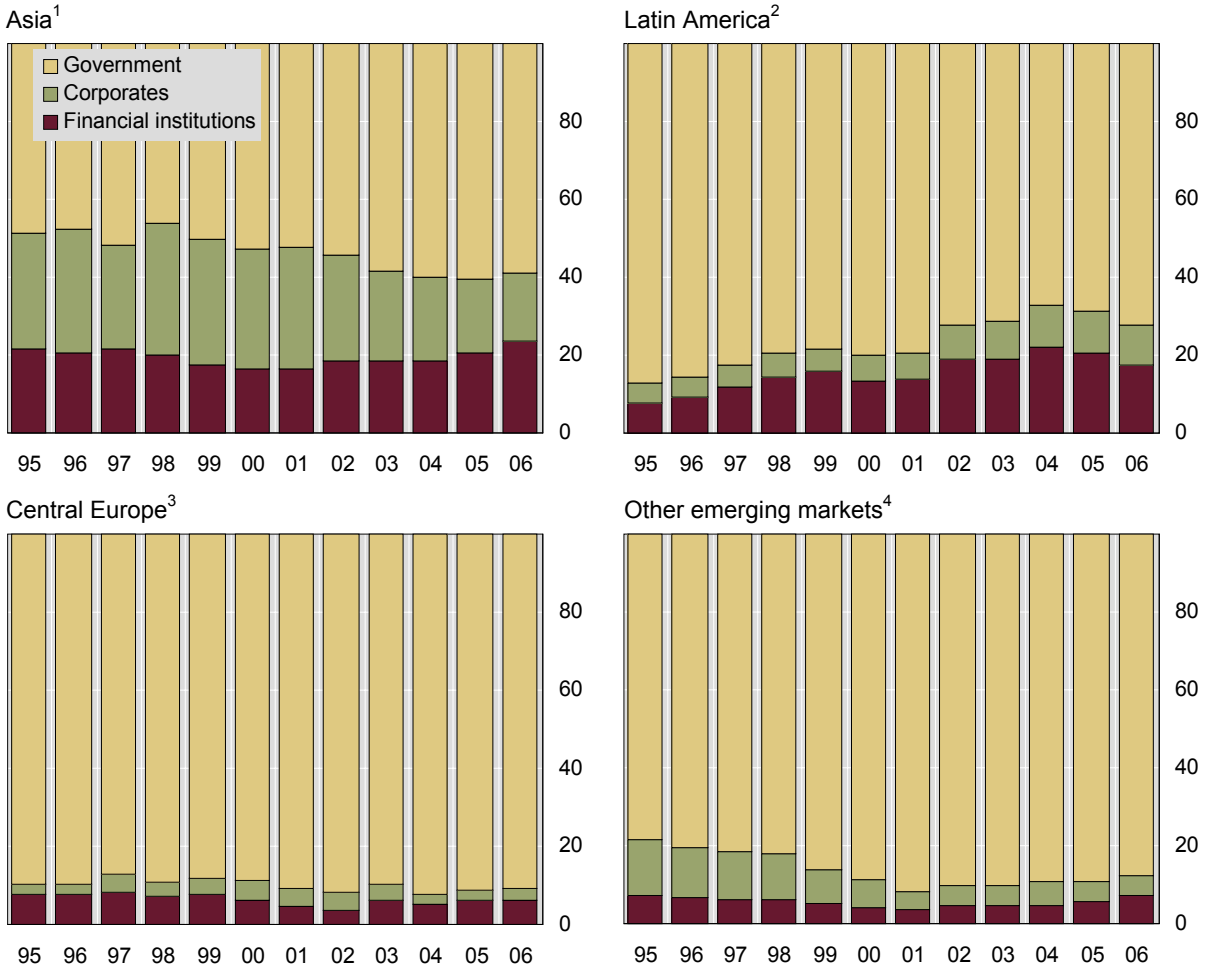
A second possible financial stability benefit is that corporate bond markets could widen the range of instruments which investors can use to place funds. This can be particularly important for institutional investors such as mutual funds, pension funds and insurance companies.

[58] There is considerable evidence that the absence of long-term debt finance hinders growth. For instance, Caprio et al (1998) find that the scarcity of long-term finance was an impediment to greater investment and growth in the EMEs.

Graph F2

Domestic debt securities outstanding, by issuer

As a percentage of total domestic debt securities outstanding



[1] China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan (China) and Thailand. [2] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [3] The Czech Republic, Hungary and Poland. [4] South Africa and Turkey.

Sources: National data; BIS.

Third, corporate bond markets can improve the assessment of corporate credit risks. The yields in corporate bond markets can help banks to price lending to a wide range of corporate borrowers and can give timely warnings of changing creditworthiness in the corporate sector as a whole. In addition, the concentration of corporate credit risk in the local banking system can be reduced.

Last, and perhaps most controversial, is the view that bond markets can act as a "spare tyre", substituting for bank lending as a source of corporate funding at times when banks' balance sheets are weak and banks are rationing credit.[59] This has been an important

[59] The simile is that of Greenspan (1999b). This was the case in the early 1990s in the United States and there were some signs of it in Hong Kong SAR in the late 1990s, when domestic banks adopted a conservative lending stance as property prices collapsed. Hawkins (2002) finds, however, that bond markets have rarely fulfilled this role in the emerging markets.

channel in a number of industrial countries during times of (temporary) banking sector weakness. Discussions of this aspect in the regional workshops, however, suggested that such an effect has not in practice been important in the emerging economies to date. The main reason appears to be that, where corporate bond markets are small, it is difficult for the corporate sector to issue debt when there is a general loss of confidence in the economy. This is all the more true in those countries where a large number of bond investors are banks. One warning voiced in the workshops was that, given the role of banks as bond investors, the increased volume of bonds outstanding might well provide a false sense of security about how widely credit risks have been dispersed: "A bond that doesn't trade is a loan". For the "spare tyre" channel to become viable, then, corporate bond markets need to develop further and the investor base widen beyond banks.

Despite the potential benefits, corporate bond issuance is much more limited in the emerging market economies than in the industrial countries. Corporate bonds outstanding account for 11% of the total, a slight decline from 12% in 2000, and issuers in the domestic corporate bond market are limited to large domestic and multinational companies. The extent of development is uneven across regions (Graph F2): 7% of total outstandings in Latin America, 12% in the larger economies of Asia, and only 2% in central Europe. Nevertheless, there have been some successes, notably in East Asia (with 30%) as governance arrangements have been strengthened. The corporate bond markets in Malaysia (52%), Korea (18%) and Thailand (25%) have been growing. The Korean corporate bond market has become less dependent on bank guarantees (Lee and Kim (2006)). The Malaysian corporate bond market grew once regulatory impediments were relaxed and the approval process was streamlined (see Box F1 and Ibrahim and Wong (2006)).[60] In Latin America, Chile has a developed corporate bond sector that accounts for 38% of domestic debt.

Box F1
Corporate bond markets in Malaysia

The corporate bond market in Malaysia, which hardly existed in the late 1980s, grew to the equivalent of 21% of GDP by 1997 and 38% of GDP by 2005; private debt securities thus emerged as the largest source of private sector financing in the aftermath of the 1997 financial crisis.

What contributed to the growth of the corporate bond market? Part of the answer is reforms to develop an efficient benchmark yield curve for government securities. But the main explanation appears to be a significant strengthening of corporate governance and information disclosure. Two independent rating agencies were established to provide independent opinions on default risk. In addition, the approval process for corporate issuance was reduced from between nine and 12 months to no more than 14 days.

The factors inhibiting the development of corporate bond markets were discussed intensively in the Working Group's workshops in Asia, Latin America and central Europe. As discussed in Chapter E, the lack of a liquid long-term government benchmark remains a significant constraint in many countries. When government bond markets are liquid, the lack of price transference tools (such as swaps) can mean that this liquidity is not smoothly transferred to corporate markets.

One major impediment specific to corporate bonds is that **reliable** information about borrowers is still inadequate. This often reflects deep-seated weaknesses in corporate

[60] See also BIS (2006a) for a review of Asian corporate bond markets.

governance.[61] The lack of well-established independent credit rating assessments was often mentioned. This shortcoming tends to limit the issuance prospects of even large firms that operate mainly at home because it is frequently the companies that are active internationally that are the most highly rated. But several participants said that the very fact of issuing bonds to be listed on the stock exchange makes firms more disciplined and accustomed to publishing accurate financial statements.[62] The quality of corporate sector financial reporting has improved most in East Asia since the 1997–98 crisis (especially in Korea and Malaysia), and this has largely accounted for the strengthening of corporate bond markets.

A second impediment that was brought up is the **narrowness of the investor base**.[63] Government regulations on banks and other financial institutions have the effect of steering investments in bonds towards government securities and away from higher-yielding corporate debt. Moreover, the number of institutional investors is small, and competition between them in bidding for different corporate debt securities is not always keen. However, this could change as domestic institutional investor funds grow and as foreign investors come to play a bigger role.

A third limiting factor is **competition from commercial banks**. It was noted that the banks in several countries are, at present, unusually liquid, and their search for business has so compressed margins for lending to firms that corporations see little gain in going to the market. In some cases, however, it was said that local banks either deliberately impede the development of a corporate bond market or simply lack the requisite investment banking expertise.

Finally, a study of South African bond markets found that sovereign spreads are the main determinant of corporate spreads. If this result extends to other countries, it could be a financial stability concern in situations where sovereign performance is a poor proxy for the corporate sector.[64]

Securitisation and asset-backed securities markets

Securitisation is a transaction in which future cash flows or financial assets are pooled into tradable and liquid securities or other obligations. A major advantage of securitisation is that, by pooling idiosyncratic risk[65] and promoting risk sharing across a wide base of investments and investors, it can reduce funding costs. Banks can reduce their excessive exposures to a particular industry or borrower credit risks. Equally, securitisation can transform long-term assets subject to credit and liquidity risks, such as leases, mortgages or small enterprise loans into tradable instruments with much lower credit risk.[66] Therefore, pooling and selling

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[61] Hail and Leuz (2006), who examine how the effectiveness of a country's legal institutions and securities regulation is related to cross-country differences in the cost of equity capital, find that firms from countries with more extensive disclosure requirements, stronger securities regulation and stricter enforcement mechanisms are better able to raise funds and thus have a significantly lower cost of capital.

[62] Some participants noted concerns about the greater opacity regarding the private placement of debt securities. Such private placements are often generally preferred because of the reduced time to issue and the lower cost of issuance. The Indian authorities, for example, maintain restrictions for the Indian commercial banks that want to invest in those products.

[63] As noted in Chapter E, a survey of dealers reported in Asian Bonds Online also finds that too narrow an investor base is the biggest impediment to liquidity.

[64] Grandes and Peter (2005).

[65] The risk of price change due to the unique circumstances of a specific security, as opposed to the overall market. This risk can be virtually eliminated from a portfolio through diversification.

[66] The lower credit risk can reflect pooling, the use of subordination and guarantees.

different asset classes reduces the credit, interest rate and liquidity risks of banks' portfolios. As a result, the financing for several important areas (eg housing, small enterprises and infrastructure) can be improved.

In the absence of long-term debt markets, mortgage lending in many EMEs was very limited and often denominated in foreign currencies. As local currency bond markets have developed, it has become more possible for banks to price and hedge local currency mortgages at long-term maturities. The discussions with market participants at the three workshops suggested that public entities might, at least in the early stages of development, play a role in fostering the development of liquid primary and secondary mortgage markets.[67]

Box F2

Securitisation in Brazil and Mexico

Securitisation still represents only a small share of a Brazilian market dominated by fixed income securities. However, issuance of securitised assets has risen from $1.7 billion in 2004 to $3.9 billion in 2005, suggesting that the market for securitised assets is growing. The investment vehicles known as Fundos de Investimentos em Direitos Creditórios (FIDCs) created in 2001 have been largely responsible for this growth. The FIDCs are structured as closed-end or open-end mutual funds, with at least 50% of the assets in the funds invested in eligible receivables and other fixed income assets. Payroll-deductible personal loans account for the biggest share of receivables, while others include vehicle loans and credit card and utility service bills.

Mexico's domestic market for securitised assets only emerged in 2000, but it is already the most active in Latin America. Issuance in Mexico amounted to $5.4 billion in 2004 and $4.8 billion in 2005. Much of the activity over the past two years has been due to very large transactions backed by loans held by the Instituto para la Protección al Ahorro Bancario (IPAB), the agency set up in 1999 to manage the debt resulting from the rescue of the banking sector. Apart from the deals enacted by IPAB, most transactions in the Mexican market have securitised bridge loans for construction and residential mortgages. Fostering the development of primary and secondary mortgage markets has been entrusted to Sociedad Hipotecaria Federal (SHF), a government sponsored development bank created in 2001, with a mandate to provide funding, financial guarantees and mortgage insurance to banks and private sector non-banks (Sofoles) operating in the real estate and mortgage sectors.

Such institutions can hedge the inherent interest rate risk of mortgage-backed securities (MBSs), offer mortgage insurance and provide certain guarantees on bonds. An alternative is the German Pfandbrief model (backed by property mortgages). The Pfandbrief represents the biggest segment of the German bond market. The twin lines of defence; namely the special supervisory procedures that apply to specialist issuing banks; strict rules about the administration of collateral, and other factors made these instruments simple and transparent (Fritsch (2004)). Many central European countries have adopted instruments of this type. Developing liquidity in the mortgage market by standardising MBS products was another important objective.

Other assets that can be securitised include credit card receivables, auto and retail loans, non-performing loans and leases, and toll and utility payments. A comparatively recent

[67] This is the case in Mexico as outlined in Box F2. Even in the absence of a national mortgage corporation, the establishment of special private institutions such as real estate securitisation companies and real estate investment trusts (REITs) under newly introduced regulations could also be effective in promoting the development of mortgage securities markets.

development has been the securitisation of public goods and services, which can facilitate the divestment of government infrastructure investment to the private sector.

Table F1

Issuance of asset-backed securities[1]

	Asset-backed securities				Mortgage-backed securities			
	1998–2003[2]	**2004**	**2005**	**2006**	**1998–2003**[2]	**2004**	**2005**	**2006**
Latin America	**1,983**	**7,262**	**2,845**	**7,490**	**42**	**729**	**740**	**1,268**
Argentina	39	369	258	1,546	0	27	0	37
Brazil	905	1,370	905	2,977	0	0	0	5
Chile	23	204	409	175	18	45	0	0
Mexico	1,016	5,320	1,273	2,792	24	657	740	1,225
Asia	**18,702**	**17,820**	**22,789**	**15,876**	**888**	**6,494**	**7,895**	**4,189**
China	5	0	486	3,177	0	0	362	145
Hong Kong SAR	38	769	0	0	363	257	436	257
India	37	527	931	97	13	0	0	0
Indonesia	6	0	1,000	0	0	0	0	0
Korea	18,086	15,178	16,125	11,366	247	3,909	4,458	1,833
Malaysia	82	707	987	345	20	52	1,087	0
Singapore	334	220	42	193	236	1,641	1,197	1,399
Taiwan, China	111	419	2,868	623	0	636	355	284
Thailand	4	0	350	75	9	0	0	272
Other	**156**	**1,800**	**2,975**	**5,943**	**30**	**0**	**1,287**	**1,907**
Russia	0	1,475	75	2,397	12	0	0	308
South Africa	42	0	0	2,254	18	0	1,287	1,599
Turkey	115	325	2,900	1,293	0	0	0	0
Total	**20,841**	**26,883**	**28,608**	**29,309**	**959**	**7,223**	**9,922**	**7,364**

[1] In millions of US dollars. [2] Annual average.

Source: Dealogic Bondware.

Securitisation also offers advantages for local institutional investors. The availability of securitised assets with longer maturities provides scope for extending the duration of their asset holdings and, as a consequence, helps to reduce asset–liability mismatches. Recognising the benefits of asset securitisation, governments in emerging economies have undertaken initiatives to promote securitisation.

Mortgage-backed and asset-backed securities are a modest, but growing, segment of the fixed income universe in many emerging economies. According to Dealogic Bondware, the amounts outstanding are still only a fraction of securitisation in the developed countries

(Table F1).[68] At this stage, secondary market liquidity in securitised assets continues to be limited, as many investors tend to follow a buy-and-hold strategy. Mortgage-backed issuance is non-existent in many countries and very small in aggregate. Nevertheless, discussions at the workshops showed that interest in such markets is growing and that there is potential for very rapid development in the next few years.

In Latin America, securitised assets account for only 3.5% of the domestic fixed income market (or about $37 billion), which is roughly one-tenth of the comparable share in the United States (see Box F2 for developments in Brazil and Mexico). In Asia, the genesis of securitisation was often linked to the Asian crisis and the disposal of non-performing loans. Developments in Korea, the largest market, show an interesting evolution from government led to market driven mechanisms. Box F3 explains how the asset-backed securities market in Korea has bolstered financial stability at times of stress. In Asia as a whole, consumer and mortgage loans have now overtaken corporate loans in securitisation.

How to further the securitisation of loans for small and medium sized enterprises is a matter of some interest, as reflected particularly in the workshop in Asia. A recent successful initiative in Singapore required considerable assistance in the form of government purchase of the equity tranche of the deal (see Box F4).

[68] The figures in Table F1 are based on Dealogic Bondware data and are thus subject to the vendor's inclusion criteria regarding what constitutes asset-backed and mortgage-backed securities. As a result, these figures might differ from official data.

Box F3

Asset-backed securities in Korea: helping financial stability

The rapid development of the asset-backed securities (ABS) market in Korea was linked to financial stress in specific sectors of the financial system and, indeed, helped to overcome significant threats to financial stability.

The development of the ABS market in Korea covers two different periods, in terms of who took the initiative to develop the market. The first period was 1999 to 2001, in which the market's development was driven in large part by government-initiated programmes to facilitate both financial and corporate restructuring in the aftermath of the financial crisis. Otherwise, the situation might have escalated and threatened the domestic financial system as a whole.

During those times of stress, the issuance of ABSs was intended to make possible the rollover of maturing corporate bonds issued by lower-rated companies, including small and medium-sized enterprises (SMEs), and the restructuring of non-performing corporate loans held by banks facing bank runs. During 2000–01, ABS issuance exceeded issuance of won Korean treasury bonds (KTBs) for the same period. The popular types of ABSs were collateralised bond obligations (CBOs), comprising bonds issued by lower-rated companies, and collateralised loan obligations (CLOs), made up of loans to lower-rated companies.

In the second period, 2002–05, the ABS market developed at the initiative of the market itself for firms' financing purposes, and exceeded KRW 170 trillion by end 2005. The size of annual ABS issuance declined during those years. The range of underlying assets widened to include credit card receivables, auto loans, mortgage loans,[1] student loans and many other types of loans. With recent booms in the real estate sector, KRW 5 trillion of project financing loan ABSs were issued. This amounted to 20% of the entire issuance of ABSs in 2005.

The ABS market in Korea has played a significant role in financial stability during times of financial stress. Moreover, ABS issuance has become a viable funding tool for the private sector bond market in Korea. The ABS market has helped to strengthen the infrastructure in the local bond market. For example, issuance of various ABS tranches with different maturities has broadened the investor base to bring in individual investors. It has also improved the pricing of bonds over a range of maturities. The market is expected to continue developing, with efforts to further facilitate the securitisation of SME loans.

[1] The MBS market became fully established with creation the of the Korea Housing Finance Company (KoMoCo) in March 2004.

Box F4

ABSs and SMEs in Singapore

In Singapore, structured products have dominated the local currency bond market, constituting 52% of the market size in 2005. The range of structured products includes ABSs, credit-linked notes, collateralised debt obligations and equity-linked notes. The diversity of instruments points to increased sophistication and risk appetite on the part of local investors, a necessary ingredient in developing the breadth of the bond market. The SME ACCESS Loan Scheme, a government initiated programme to help SMEs to seek alternative funding sources to bank loans, has met with much success. Under this scheme, loans to SMEs are pooled together in ABSs and sold to investors. As of April 2006, this scheme had a portfolio of SGD 100 million, providing finance for more than 400 SMEs.

The pace of the development of securitisation depends on the liquidity of the banking system and the growth of institutional investors. Banks with excess liquidity will not be motivated to sell their assets; without institutional investors, securitised products will not find deep markets. The institutional requirements for securitisation are well known. The legal framework should allow for a true sale of assets, and safeguard the assets in the event of the

insolvency of the originator. One generic impediment to securitisation has been the absence of the legal concept of a trust in civil law countries.

Appropriate regulatory treatment of securitised assets, including how capital will be treated for the securities to prevent regulatory arbitrage between the originator and the purchaser, is essential. The tax framework should be neutral (that is, the transfer of assets should not be subject to taxation).

Perhaps because these requirements are demanding, structured finance is still in the formative period in most EMEs. This is true in Latin America, where commercial banks have traditionally dominated the intermediation process. Nevertheless, several forces have created opportunities for the expansion of structured finance in Latin America, including the existence of pressures to improve banks' return on assets, the introduction of better adapted legal frameworks and bankruptcy procedures, a resumption of demand for residential housing and commercial office space, and institutional investors' need for higher-quality assets.

G. The domestic investor base

The diversity of the investor base has a major bearing on the efficiency of price discovery and on the stability and liquidity of bond markets. The Working Group's survey and extensive discussions with private sector participants therefore attempted to draw a picture of the ownership structure of local debt markets, noting, in particular, differences with the pattern of holdings of industrial country debt securities. As regards domestic ownership, a major difference is that the share held by banks is much larger, and that of other financial institutions is much smaller, in the EMEs than in the industrial countries. The narrowness of the domestic investor base in part reflects captive market arrangements and other distortions.

In all three regional workshops, the narrowness of the domestic investor base was a recurrent theme. Several market participants noted that restrictions preventing firms from investing in higher-risk assets created market distortions. Requirements on pension funds in some countries to guarantee minimum returns limited the funds' willingness to invest in corporate bonds.

According to the Working Group questionnaire, domestic investors hold 94% of EME debt securities (Table G1).[69] Nevertheless, an analysis of the past five years suggests some changes in the base of domestic investors for emerging market sovereign debt. Banks continue to be the largest domestic investors in local currency sovereign debt, holding 42% of all domestic debt securities in 2005. This share has increased substantially and is now nearly four times the average percentage seen in the industrial countries. Although the banks' share remains high, the share of other institutional investors has been increasing. The total share of domestic non-bank financial institutions – institutional investors – in the countries covered in the Working Group's survey increased from 29% in 2000 to 38% in 2005.

Holdings by banks

Commercial banks have particularly large holdings of government and central bank securities in Argentina (47%), Turkey (39%), India (34%), Venezuela (34%), Indonesia (32%), the Philippines (24%) and Colombia (20%).

Both supply and demand factors explain the increase in holdings of government debt. On the demand side, following the crisis in the late 1990s, non-financial firms adopted more prudent financial practices, including a substantial deleveraging of their balance sheets. Because of earlier overinvestment, corporate investment has since remained low. Deliberate efforts were made to reduce reliance on debt and improve internal cash generation: the demand for bank loans declined. An equally important factor has been the increased risk aversion among banks in the aftermath of the crisis; the low risk weight in the calculation of regulatory capital for local currency government debt may have reinforced this for capital-strapped banks – better than lending to firms for which the risk weight is 100%. Yet another contributing factor was the recapitalisation of banks in Indonesia, Korea and Turkey with government securities. In Latin America, the increased demand for dollar-indexed government securities as a hedge

[69] However, the statistics on outright holdings by non-residents considerably underestimate effective non-resident exposures because foreign participants often seek exposure to local currency debt markets via derivatives markets; see Chapter H.

Table G1

Holders of domestic debt securities[1]

As a percentage of total debt securities outstanding

	2000				2005			
	Banks	**Other financial**	**Other residents**	**Non-residents**	**Banks**	**Other financial**	**Other residents**	**Non-residents**
Latin America	27	32	30	1	28	47	13	2
Asia, larger economies	31	18	7	0	51	38	10	0
Other Asia	17	33	2	0	18	35	14	3
Central Europe	39	14	32	15	31	34	10	20
Russia	…	…	…	…	...	...	...	3
Other	21	60	16	3	33	32	30	5
Total emerging markets	**28**	**29**	**14**	**1**	**42**	**38**	**14**	**2**
Hong Kong	...	...	...	...	…	…	…	…
Singapore	…	…	…	…	44	11	12	13
Industrial countries[2]	**13**	**46**	**18**	**22**	**11**	**46**	**17**	**26**

Note: The definitions and country details for this table are shown in Annex Table 9 of the Working Group survey.

[1] Includes bonds, notes and money market instruments. Regional totals based on the countries listed in Annex Table 9. Ratio calculated taking the holders of central government and all other issuers' securities reported in Tables 4a (money market instruments) and 4b (bonds and notes) of the Working Group survey. Totals do not add up to 100% due to the presence of "unallocated holders" for some countries. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

against exchange rate risk has played a role at times, particularly where banks took substantial dollar denominated deposits from the public.

On the supply side, the main factors were: large government borrowing in countries where fiscal deficits were high; a shift from foreign currency external financing; concerted efforts to develop the domestic bond market; and central bank operations of sterilised intervention.

In several countries, holdings of government bonds account for a much greater proportion of total assets than in the past (Table G2). Such increased holdings may well represent an optimal response by banks to such changes in demand and supply.

Table G2

Banks' holding of government and central bank securities

As a percentage of total banks' assets

	Annual average		
	1994–96	**1999–2001**	**2004–06 (latest month)**
Latin America			
Argentina	15.2	17.7	46.6
Chile	16.1	13.1	9.3[3]
Colombia[5]	1.1[6]	6.5	19.9[7]
Mexico[2]	0.9	0.7	7.0
Peru	…	1.2	10.0
Venezuela	33.0	19.0	34.0
Asia			
China			10.3
Hong Kong SAR	2.4	4.2	4.8
India[10]	27.1	30.8	34.2
Indonesia	9.6	38.1	31.6
Korea	5.3	7.2	8.4[9]
Malaysia	3.7	3.5	2.9
Philippines	…	26.0	23.8
Singapore	6.9	10.2	10.7[4]
Thailand[3]	0.8	4.3	6.5
Central Europe			
Czech Republic	…	3.8	11.4[1]
Hungary	22.6	14.3	8.0
Poland	28.0[8]	17.2	18.8
Israel	13.5	9.1	11.9
Saudi Arabia	21.5	26.0	19.0
South Africa	6.1	6.1	5.6
Turkey	10.0	20.0	39.0

[1] Latest month June 2006. [2] Does not include FOBAPROA IPAB securities. [3] Up to April 2006. [4] Up to June 2006. [5] End-year outstanding stocks to total assets for the commercial banks. [6] Data only available for December 1996. [7] Up to June 2006. [8] End of December 1996. [9] As of June 2006. [10] All data pertain to end-March of the respective year.

Source: Working Group survey.

Nevertheless, large holdings of government securities by banks could have several implications for the financial system. One is that interest rate exposures may have increased.[70] A simple stress test applied to the Colombian financial system's holdings of public securities showed that a 100 bp parallel increase in the TES spot curve could cause a decline of close to 17% in the profits of credit institutions. The Reserve Bank of India was concerned during 2003–04 about the impact of rising bond yields on banks' balance sheets.[71] A large or growing stock of government securities could even affect the risk premium on sovereign debt.[72] In extreme cases where the losses on banks' portfolios of government bonds wipe out a significant proportion of the capital of the banking system, the central bank may be constrained in its ability to raise interest rates.

A second implication is that the lure of easy profits from the accumulation of government securities during a period when interest rates are falling can make the management of banks too complacent and unwilling to improve efficiency or to manage the risks of lending to the private sector.[73]

A third implication is the increased need for risk management capacity in the banking system. The development of bond markets is creating a setting in which price movements in financial markets can have major implications for banks. Changes in the asset and liability structure of banks' balance sheets necessitate changes in risk management practices which can have implications for financial stability. On the liability side, the quantitative findings of the questionnaire show increased reliance on money market funding (Annex Table 4A: Structure of money market instruments outstanding). This shift to capital market financing means that financial intermediation is increasingly being conducted at competitively determined rates, which exposes intermediaries to greater market risk than in the past.

The management of market risk has become more complicated and can be particularly difficult in illiquid markets. A shock affecting the major banks could lead to a concentration of heavy selling which can destabilise the market. The need to deal with new sources of risk has obliged financial institutions to upgrade their risk management systems. In the past 10 years, banks have increased their capacity to deal with risk management issues (for example, via the establishment of risk management units and closer oversight of such issues by boards of directors). There have been changes in the approach to valuation, including marking to market or fair value assessments, and greater quantification of various risks, including the use of VaR calculations and stress testing focused on market risks.[74]

The Working Group's survey found that the reported capacity for risk management varies widely across countries. Economies that are more developed (for example, Hong Kong SAR, Korea and Singapore) or where foreign bank penetration has increased the most (Mexico, Chile and central Europe) appear to have benefited from the transition to advanced risk management systems. However, even in some of those countries, weaknesses in the local financial infrastructure and markets may have prevented the wholesale implementation or

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[70] In the past, however, banks were often exposed to interest rate risk in loans to corporations – either directly in the case of long-term loans or indirectly when increasing interest rates increase credit risks. This is much more dangerous because interest rate exposure cannot be liquidated as quickly on loans as on a government securities portfolio.

[71] See Reserve Bank of India (2004).

[72] An alternative risk is that if banks hold predominantly **short-term** government securities (for example, due to sterilisation operations), the liquidity of the banking system could create difficulties for policymakers.

[73] This issue is discussed in BIS (2006b).

[74] See Moreno (2006).

Table G3

Assets of institutional investors in 2003

In billions of US dollars

	Insurance companies[1]	Pension funds[2]	Mutual funds	Total	*Memo: Total as % of GDP*
Africa					
South Africa	95.9	57.3	34.5	187.7	*112.9*
Asia					
Korea	149.0	95.1	121.7	365.8	*60.1*
Malaysia	20.1	58.5	18.4	96.9	*93.2*
Philippines	3.2	3.1	0.8	7.1	*8.9*
Singapore	33.6	56.5	11.8	101.9	*109.9*
Thailand	11.9	7.2	12.0	31.0	*21.7*
Europe					
Hungary	4.2	4.4	3.9	12.6	*15.1*
Poland	14.1	11.5	8.6	34.1	*15.8*
Turkey	5.5	0.2	14.2	19.9	*8.3*
Latin America					
Argentina	5.4	16.1	1.9	23.4	*18.3*
Brazil	25.3	64.4	171.6	261.3	*51.7*
Chile	12.7	49.7	8.6	70.9	*96.2*
Colombia	0.6	7.1	…	…	*…*
Mexico	11.5	37.2	32.0	80.7	*12.6*
Peru	1.7	6.3	…	…	*…*

[1] 2002 figure for the Philippines. [2] 2002 figure for Singapore; 2004 figure for Turkey. For Korea, including pension reserve funds.

Sources: IADB, *Economic and Social Progress in Latin America, 2007*; *IMF Global Financial Stability Report*, September 2005; OECD; CEIC; Investment Company Institute.

functioning of those systems. Several respondents to the Working Group's survey drew attention to the problems of inadequate risk management expertise in the financial industry, limited instruments, and inadequate clearance and settlement infrastructure.

Regulatory initiatives have also played a role in the development of risk management capacity. The supervisory authorities have had to shift from static rules-based approaches to

more quantitative and risk sensitive approaches. Most countries plan to adopt Basel II,[75] although many countries will remain with the standardised approach for some time.[76]

Non-bank financial institutions

In most developing countries, the financial system is gradually extending beyond traditional banking institutions to include insurance companies, pension funds, mutual funds and other financial service providers. These non-bank financial institutions provide services that are not necessarily suited to banks, serve as competition for banks, and specialise in sectors or groups. Domestic institutional investors play a beneficial role by providing depth and liquidity to the local currency bond market. Because institutional investors have different investment objectives and strategies, they have heterogeneous investment views and may respond quite differently to shocks. The data in Table G1 indicate that non-bank financial institutions account for 38% of holdings of domestic debt. Pension funds and mutual funds are the second largest investor class in some domestic markets.

However, successful efforts to develop non-bank financial institutions provide major sources of long-term capital only in a limited group of countries (including Brazil, Chile, Korea, Malaysia, South Africa and Singapore): see Table G3. Extensive sectoral country studies under the Financial Sector Assessment Program (FSAP)[77] find that many developing countries often lack a coherent policy framework and effective regulations to foster the development of non-bank financial institutions. The typical weaknesses identified in many FSAPs are in the areas of regulation, enforcement, competition, taxes, skills and investor education.[78]

Pension funds

The role of pension funds in emerging markets has been increasing. Annex Table 13 shows the evolution over the past decade; there are, however, significant gaps. In developed countries, pension fund assets exceed 67% of GDP. By contrast, in emerging markets, pension fund assets are far more modest. According to the World Bank (2006b), pension reforms often contribute to fiscal sustainability but, in many countries with multi-pillar systems, pension funds are poorly diversified and the secondary objectives of funded pillars – to increase savings and to develop capital markets – remain largely unrealised. Therefore the total assets of resident pension funds exceed 20% of GDP in only a few EMEs: Chile (64.6%), Malaysia (53.6%) and Korea (25.1%).

Because pension funds need to hold long-dated debt in order to match annuity streams, many consider the expansion of pension funds as key to the development of long-term local

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[75] According to the Financial Stability Institute (2006), 82 out of 98 respondents to a questionnaire distributed to non-Basel Committee members, many of which are emerging market economies, plan to adopt Basel II. Nearly 100% of respondents in Asia, Latin America and Europe plan to adopt Basel II.

[76] The Financial Stability Institute (2006) reports that, by 2008, 59 countries will have adopted the standardised approach to credit risk (which most resembles Basel I) and 32 will have adopted the fundamental internal ratings-based approach. Between 2010 and 2015, the numbers are 70 and 55, respectively.

[77] The FSAP, a joint IMF and World Bank initiative introduced in May 1999, aims to increase the effectiveness of efforts to promote the soundness of financial systems.

[78] See, for instance, World Bank (2006a and 2006c) and Das and Quintyn (2002).

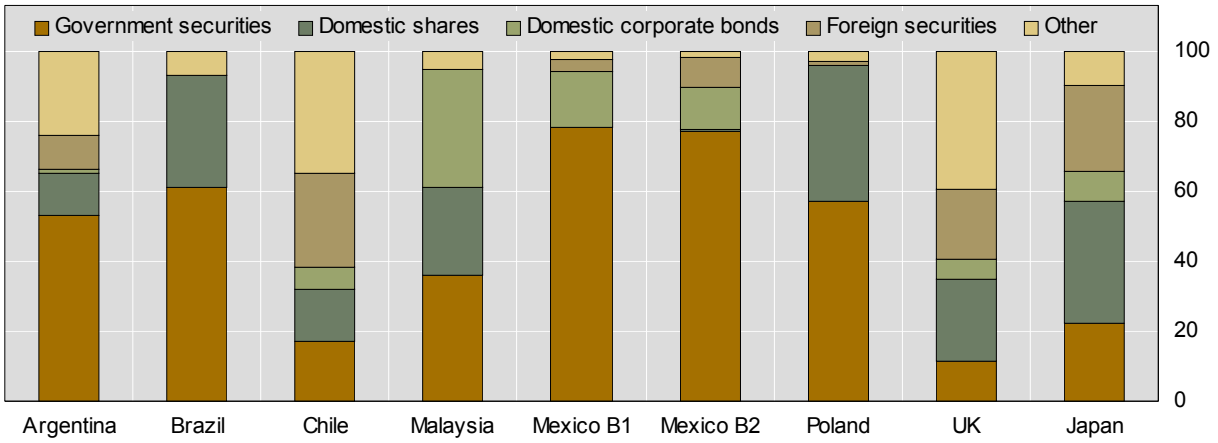
currency debt markets. Indeed, pension fund development went hand in hand with bond market development in Chile, which launched a funded pension system in 1981.[79]

The temptation, however, is to force local institutional investors to hold too high a proportion of their assets in domestic government bonds. Doing this may mean that new issues are not priced in a way that correctly reflects market conditions and that a high proportion of such paper does not subsequently trade in secondary markets. Such a "captive" market therefore works **against** the creation of a true market and keeps out other investors.

Graph G1

Asset allocations of funded pension systems

Percentage of financial assets under management



Note: The data pertain to: Argentina, May 2006; Brazil, March 2006; Chile, December 2005; Malaysia, December 2005; Mexico, September 2006; Poland, July 2006; United Kingdom, 2004 and Japan, December 2005. For Brazil, the government securities category includes all fixed income holdings. Mexico Afores offer two pension funds, "Básica 1" (Mexico B1) and "Básica 2" (Mexico B2). The "Básica 1" fund follows more conservative investment guidelines than the "Básica 2" fund. Almost 90% of assets in the Afores system are invested in the "Básica 2" fund.

Sources: Credit Suisse estimates; BIS.

With the notable exceptions of Chile and Malaysia, pension fund portfolios in most EMEs are indeed composed mainly of government bonds (Graph G1). In the industrial countries (for example, Japan and the United Kingdom), by contrast, a much smaller proportion of pension fund assets are invested in government securities.[80] Forcing institutional investors to buy domestic securities in the hope of deepening local financial markets and restricting investment in foreign securities can be undesirable on financial stability grounds. First, small countries typically have a greater need to diversify, and hence invest in foreign securities, than large countries. When a high proportion of institutional investor assets are held abroad (denominated in foreign currency), this provides a buffer against local or regional shocks and

[79] Cifuentes et al (2002) note that pension fund investments in the local bond market in Chile continued to rise over a recent period when other investors were pulling out, suggesting that pension funds lend stability to the market. But the authors also stress the importance of a broadly based investment industry in which institutional investors other than pension funds play an important role. This may not be easy to achieve. They note that the pension fund industry in Chile became a virtual monopsony of government bonds among institutional investors because of the small size of mutual funds and investment funds. This is a general shortcoming in many emerging markets.

[80] The investment strategies of institutional investors are reviewed in CGFS (2007), which underlines the stability-enhancing effects of international diversification.

against the volatility of exchange rates (see Kotlikoff 1999). In addition, the acquisition by pension funds of ever larger shares of rather small domestic markets can create major distortions in local market functioning.[81]

Retail investors and mutual funds

The direct participation of retail investors is uneven in the emerging markets: it is growing in some countries, while declining in others. In Asia, domestic investors appear to have a limited appetite for local bonds, especially bonds issued by small and medium-sized enterprises. Raising funding for local debt markets from retail investors is a challenging task but it can be accomplished through mutual funds, because individuals constitute the majority of investors in the mutual fund industry. Although the mutual fund industry is growing in developing countries, penetration remains much lower than in more mature markets, such as in the United States, where 48 percent of households own mutual fund accounts. In order to realise the potential of the mutual funds industry, individuals need a better understanding of mutual funds and the capital markets in general. Investor education has to be an important element of policy and strategy for the development of capital markets and the mutual fund industry.

Because mutual funds tend to be actively managed, they are sensitive to short-term changes in interest rates and can act as a counterbalance to buy-to-hold investors. The emerging markets mutual fund industry is still at an early stage of development in the sample of countries studied by the Working Group. Table G5 shows the trends in the size of the mutual fund industry in Asia from 2000 to 2005. The mutual fund industry has developed in several countries, including China, Hong Kong SAR, India, Korea, Philippines, Singapore and Taiwan (China). In Latin America, only the Brazilian mutual fund industry is developed, with fund assets of $303 billion (Table G4).

Fixed income mutual funds are sizeable in Hong Kong SAR and Korea (Table G5). For instance, in Korea 62.6% of total mutual funds, accounting for 15.8% of GDP, are invested in fixed income. In line with the growth of the Korean bond market, fixed income funds increased from $68.7 billion in 1997 to $124.5 billion in 2005.

In the rest of the emerging markets, there are still insignificant investors in domestic sovereign debt. In Indonesia, retail investors turn to mutual funds as an alternative to deposits, and mutual funds have invested largely in rupiah-denominated long-term government securities (mostly recapitalisation bonds). These offered a higher return but also compromised liquidity in the funds in 2005, when interest rates rose sharply (see Chapter E, page 49).

[81] See Cifuentes et al (2002) for a discussion of this problem in Chile. The authorities allowed pension funds to invest a progressively higher proportion of their assets abroad. Such a strategy, however, may not be very effective if investors regard domestic assets as undervalued.

Table G4

Net assets of mutual funds

In billions of US dollars, end of year

	1998	1999	2000	2001	2002	2003	2004	2005
Latin America	**128.5**	**148.3**	**180.0**	**190.3**	**137.0**	**216.8**	**271.7**	**368.6**
Argentina	6.9	7.0	7.4	3.8	1.0	1.9	2.4	3.6
Brazil	118.7	117.8	148.5	148.2	96.7	171.6	220.6	302.9
Chile	2.9	4.1	4.6	5.1	6.7	8.6	12.6	14.0
Costa Rica	…	…	0.9	1.6	1.7	2.8	1.1	0.8
Mexico	…	19.5	18.5	31.7	30.8	32.0	35.2	47.3
Central Europe	**2.6**	**4.1**	**5.7**	**7.3**	**19.2**	**32.7**	**43.5**	**56.4**
Czech Republic	0.6	1.5	2.0	1.8	3.3	4.1	4.9	5.3
Hungary	1.5	1.7	2.0	2.3	4.0	3.9	5.0	6.1
Poland	0.5	0.8	1.5	3.0	5.5	8.6	12.0	17.7
Romania	…	…	0.0	0.0	0.0	0.0	0.1	0.1
Russia	0.0	0.2	0.2	0.3	0.4	0.9	1.3	2.4
Slovakia	…	…	…	…	…	1.1	2.2	3.0
Turkey	…	…	…	…	6.0	14.2	18.1	21.7
Asia-Pacific	**173.7**	**180.4**	**124.2**	**134.9**	**170.4**	**152.3**	**211.2**	**241.0**
India	8.7	13.1	13.5	15.3	20.4	29.8	32.8	40.5
Korea	165.0	167.2	110.6	119.4	149.5	121.7	177.4	199.0
Philippines	…	0.1	0.1	0.2	0.5	0.8	1.0	1.4
Africa	**12.2**	**18.2**	**16.9**	**14.6**	**21.0**	**34.5**	**54.0**	**65.6**
South Africa	12.2	18.2	16.9	14.6	21.0	34.5	54.0	65.6
Total	**317.0**	**351.0**	**326.8**	**347.1**	**347.5**	**436.2**	**580.5**	**731.5**
Memo: Developed countries[1]	*7,672.7*	*9,523.5*	*9,618.1*	*9,410.5*	*8,889.0*	*10,788.2*	*12,153.0*	*13,349.6*

Note: The data include home-domiciled funds, except for Hong Kong SAR and Korea, for which they include home- and foreign-domiciled funds.

[1] Australia, Canada, France, Germany, Hong Kong SAR, Japan, Switzerland, the United Kingdom and the United States.

Sources: Investment Company Institute; European Fund and Asset Management Association; other national mutual fund associations; BIS.

Table G5

Net assets of mutual funds under management in Asia, by type

In billions of US dollars, end of year

	2000			2004			2005		
	All funds[1]	**Fixed income**[2]	**All funds as a % of GDP**	**All funds**[1]	**Fixed income**[2]	**All funds as a % of GDP**	**All funds**[1]	**Fixed income**[2]	**All funds as a % of GDP**
China	10.3	...	0.9	39.2	10.4	2.0	58.1	28.1	2.6
Hong Kong SAR[3]	311.5	60.3	184.6	551.2	207	332.4	667.5	240	375.6
India	13.5	...	2.9	34.8	24.7	5.2	44.3	26.2	5.7
Korea	110.6	...	21.6	179.6	129.6	26.4	198.8	124.5	25.2
Philippines	0.1	...	0.1	0.9	0.9	1.0	1.4	1.3	1.4
Singapore	4.8	...	5.2	12.2	2	11.3	13.4	2.6	11.5
Taiwan, China[4]	32.1	...	10.0	77.5	59.3	24.0	59.8	40.6	17.3
Total	482.9	...	17.1	895.4	433.9	22.6	1043.3	463.3	23.0

[1] Equity, bond, balanced and money market funds. [2] Money market and bond funds. [3] All funds include equity, bond, money market, diversified, index, guaranteed and hedge funds, funds of funds and other specialised funds. [4] All funds include equity, bond, money market, balanced, exchange-traded, index, guaranteed and real estate securitisation (REITs) funds and funds of funds.

Sources: 11th Asia Oceania Regional Meeting, Members' Report; Hong Kong Investment Funds Association; Investment Company Institute; BIS.

H. Non-resident investors

The appetite of non-resident investors over the medium-term for local currency paper is of central importance for the "risk-dispersing" properties of local bond markets.[82] If domestic debt is held largely by residents, the market and credit risks of creditors are concentrated at home. In contrast, external debt held by non-residents spreads such risks abroad.

How far the presence of foreign investors affects market dynamics and exposure to cross-market contagion is difficult to assess. Because foreign investors hold local bonds as part of a broadly diversified international portfolio, they may have a higher tolerance and appetite for country-specific risk than domestic investors. This can mean that they help to stabilise the local market when local investors become unduly risk-averse in response to adverse local developments. On the other hand, with significant foreign participation, shifts in international monetary or financial conditions may in some instances lead to rapid changes in foreign investor interest across many different emerging market economies. In addition, it is possible that a crisis in one country could lead foreign investors to withdraw from other countries that foreign investors (perhaps wrongly) regard as similar. Sudden non-resident sales of local currency bonds could have a disruptive effect on the exchange rate that will not necessarily arise with the non-resident sale of foreign currency bonds. This depends, in part, on how far the forex exposures of non-resident bond investment are hedged: sales of forex would arise mainly if exposures were unhedged.

Overview of recent trends

This chapter reviews how non-resident investment strategies have changed in recent years. Non-resident investment in local currency bond markets has risen substantially; in addition, large positions in derivative instruments mean that total non-resident exposures are much larger than data on outright holdings suggest. This has several important implications for monitoring and financial stability. This chapter also examines the composition of the foreign investor base (institutional investors and hedge funds). It concludes by reviewing the distinctive perspectives of major investor countries.

The available published data and responses to the Working Group's questionnaire suggest that non-residents represent a small but growing portion of the investor base for local currency domestic debt, although information is lacking for many countries.[83] In particular, aggregate outright foreign holdings of local currency debt instruments in Brazil, the Czech Republic, Hungary, Indonesia, Malaysia, Mexico, Russia, South Africa and Turkey grew sevenfold between end-2002 and end-2006 (Graph H1, left-hand panel). An upward trend in trading of local currency instruments reported by the Emerging Markets Traders Association (EMTA) is also suggestive of a rise in foreign investment activity (Graph H1, right-hand panel). By 2005, trading in the local currency paper of Brazil, Mexico, Poland, South Africa

[82] A related aspect is the comparative effectiveness of domestic versus international bonds in financing net capital inflows. Many observers believe that rapidly growing emerging economies are "natural" capital importers/current account deficit countries. In the past, international bonds sold to non-residents in effect financed current account deficits. Although EMEs as a whole at present have a current account surplus, foreign investment in domestic bonds might be required to finance future current account deficits.

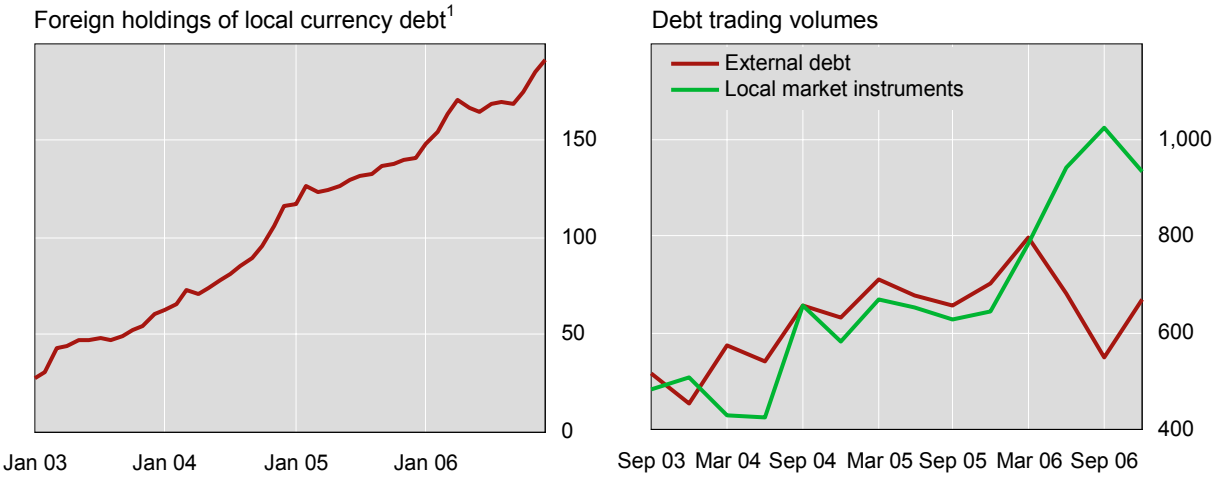
[83] Official Working Group estimates are: Hungary: 27%; Malaysia 5%; Mexico 9%; Poland 22%; South Africa 6%; Thailand 3%; Turkey 11%. The estimates provided by market participants are usually higher: Argentina 8%; Brazil 9%; Colombia 2.5%; the Czech Republic 18.3%; Hungary 30%; Indonesia 12.3%; Korea 15%; Malaysia 10.4%; Mexico 7.9%; Poland 21%; South Africa 3.7%; Thailand 3%; Turkey 15.7%.

and Turkey had risen to over $180 billion in each case. Most notable of all is that trading in the paper of two countries that have experienced recent crises (Brazil and Turkey) has risen sharply.

Graph H1

Foreign holdings and trading of local currency bonds

In billions of US dollars



[1] Includes Brazil, the Czech Republic, Hungary, Indonesia, Malaysia, Mexico, Russia, South Africa and Turkey.

Sources: EMTA; national data.

Not all countries, however, appear to be experiencing sizeable outright inflows, reflecting in some cases the deliberate barriers that some countries maintain to discourage or contain foreign investment in their local debt markets. Although in some instances, foreign exposure to local debt is on a par with that to externally issued debt securities, this is not generally true. As of end-2006, the aggregate stock of externally issued foreign currency bonds still appeared to exceed the volume of outright foreign holdings of local instruments by a factor of four.[84]

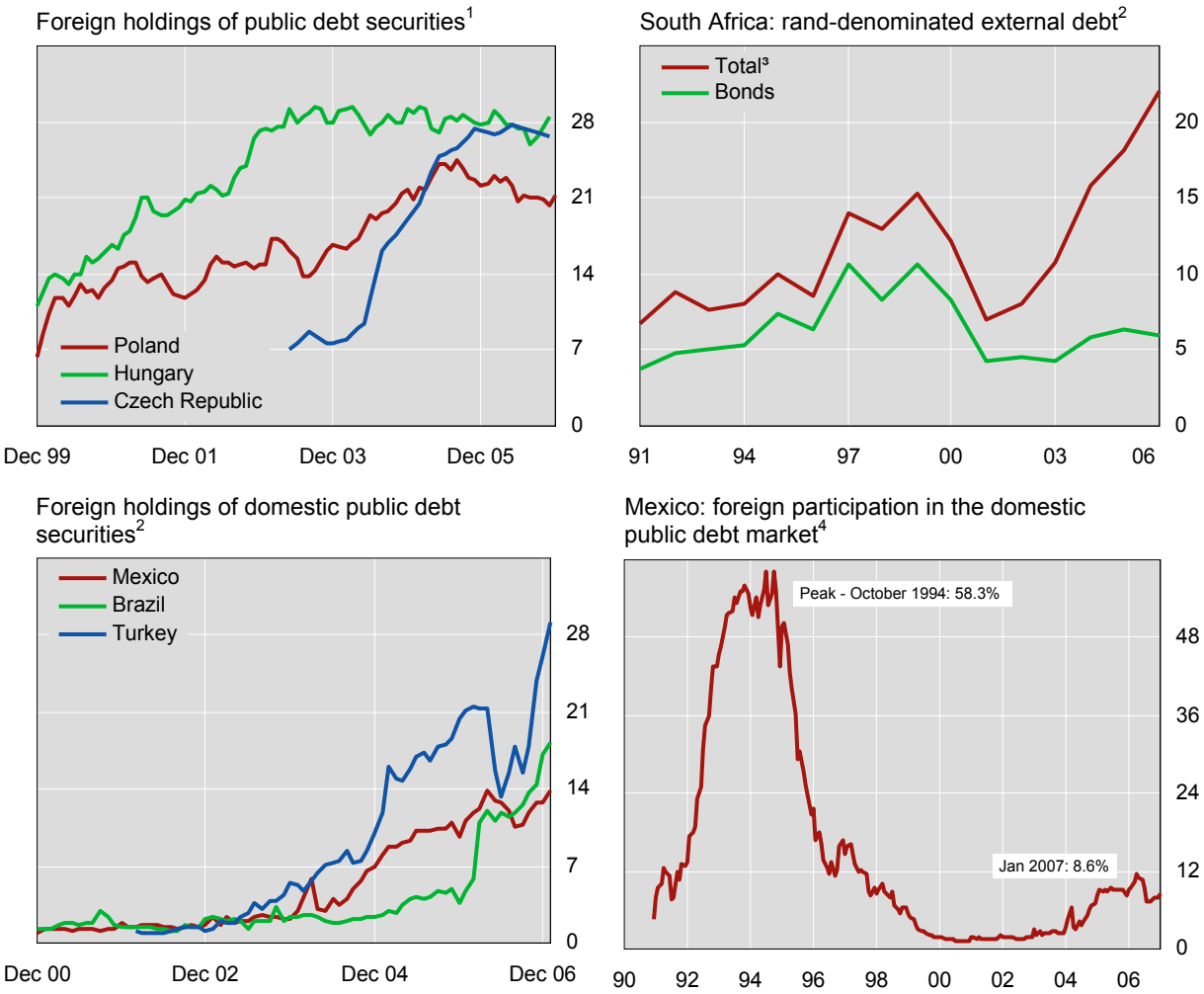
The scale of foreign participation in central Europe appears to be particularly high, with non-residents accounting for nearly 27% of the local treasury market in Hungary, 22% in Poland and 25% in the Czech Republic (Graph H2, top left-hand panel). The rise in foreign holdings in these markets was linked to the EU accession process and pre-dated the general upsurge in local currency exposures observed in other markets. In Russia, the apparent market share of non-resident investors in rouble-denominated debt instruments is even higher: at $44.5 billion at end-September 2006 (almost entirely claims on corporate borrowers), this represents the largest reported dollar value exposure to any single country's local debt market. Discussions with market participants, however, suggest that Russian offshore accounts probably hold most of these securities. Unlike the case in most EMEs, non-residents have long been significant investors in South Africa's local markets. The dollar value of foreign exposure to rand-denominated assets increased threefold between 2002 and mid-2006, reaching $22 billion. In particular, non-resident bank deposits have seen strong growth in recent years (Graph H2, top right-hand panel).

[84] Note, however, that EME residents sometimes hold a substantial proportion of their country's external bonds.

Foreign participation has also been rising sharply in recent years in Brazil, Mexico and Turkey (Graph H2, bottom left-hand panel), albeit from a small base. But in none of these cases has the scale of foreign investment exceeded 12% of the local treasury market in recent years. The pace and scale of outright foreign investment as a share of these local markets remains well below the peaks reached in Mexico in 1993–94 (Graph H2, bottom right-hand panel).

Graph H2

Foreign holdings by country



[1] As a percentage of outstanding stock. [2] In billions of US dollars. [3] Includes non-residents' rand-denominated bank deposits. [4] As a percentage of domestic public debt; net of Bank of Mexico holdings.

Sources: National data; South Africa Reserve Bank Quarterly Bulletin.

There is more limited foreign participation in the larger domestic debt markets in Asia, particularly those of China, India and Korea. In the cases of China and India, restrictions on foreign investment in local securities probably explain the near-zero level of reported foreign participation. In contrast, barriers to foreign investment have been removed in Korea but, as is discussed further below, foreign investors generally prefer to take synthetic exposures through derivatives. The level of outright foreign investment appears to be notably higher in South-east Asia, particularly Malaysia, which experienced inflows into its treasury and corporate debt markets ahead of its currency adjustment in mid-2005, and Indonesia, which has experienced an upsurge in inflows since mid-2005.

Exposures via derivatives

There are several reasons for thinking that the data from host countries on outright holdings provide only a partial picture. In particular, discussions with private investors and authorities in some countries indicate that the underlying exposures of non-residents are in some cases (including Brazil and Korea) considerably larger than the data on outright holdings would suggest. This is mainly due to the use of derivatives (including offshore non-deliverable forwards or NDFs) to gain synthetic exposure to local currency markets. Derivatives allow traders to replicate financial strategies originally conceived with financial assets without the need to directly trade the underlying assets. There also are cases where resident financial firms (including foreign subsidiaries) are counted as final holders when in fact they are holding the debt on behalf of non-residents.

Indeed, many foreign participants in local currency debt and currency markets appear to have a marked preference for accessing local debt and currency market returns via derivatives. For example, representatives of investment management firms that account for two of the largest portfolios of local currency exposures reported investing in local market instruments partly through derivatives, in particular NDFs. They report that they find it more attractive to use derivatives as a way to more efficiently manage their presence in markets in which liquidity is poor. Non-resident investors employ a broad variety of derivative instruments and strategies, including use of total return swaps, credit-linked notes, exchange-traded and OTC interest rate swaps and futures, and deliverable and non-deliverable currency forwards. Contracts for gaining exposure to local bonds via total-return swaps or credit-linked notes are said to be fairly standardised across firms. They involve only modest setup and monitoring costs for investors contemplating entering new markets, compared to the process for entering a new market via outright purchases.

The attractiveness of different approaches depends on a number of factors that are country- or investor-specific and that also may vary over time. In some cases, such as Korea and Brazil (before changes were introduced in March 2006), the desire to avoid capital gains and income taxes is often cited as a key driver that encourages end-investors to access these markets through derivatives. Derivatives can also allow end-investors to avoid setting up local custodial accounts and may provide an efficient means of obtaining leverage and reducing transaction costs. Strategies for instrumentation are also driven by relative liquidity across markets, instruments and derivatives. The choice of instrument may be a function of: the asset preferences of the local investor base; the directional view the investor wishes to express (such as the degree to which the investor is seeking positive or negative exposure, the currency, and potential changes in the shape of the yield curve); and whether the firm faces limitations on its use of leverage or short positions or, for that matter, on its use of derivatives. For example, in some instances derivatives markets are more actively traded and more liquid than the markets in the underlying instruments.

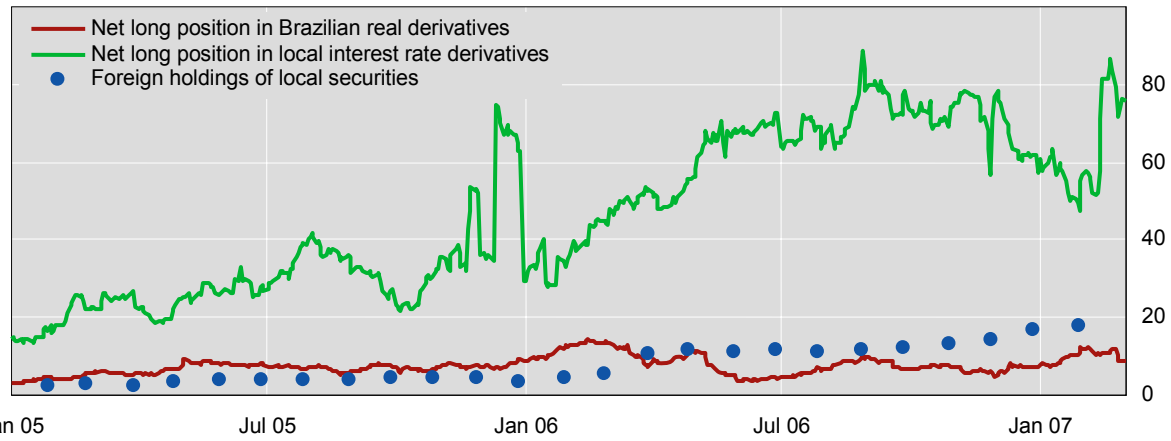
Statistics on non-resident activity in Brazil's large and liquid exchange-traded derivatives market illustrate the importance of derivatives transactions. Statistics published by the CVM, the securities regulator, suggest only modest outright holdings of Brazilian local debt securities by non-resident investors (Graph H3). However, the net long positions that non-residents maintained over the course of 2006 in exchange-traded options and futures on Brazilian debt instruments and the Brazilian real are much greater. Non-residents' net long positions in Brazilian interest rates have been around $70 billion since May 2006, while the net long positions in the currency fluctuated between $4 billion and $14 billion over the course of 2006.

In discussions, market participants highlighted Korea and Mexico as two other cases where foreign investors are significant participants in derivatives trading. In the case of Korea, foreign investors strongly prefer to take positions in Korean rates via the futures markets, as this approach allows them to avoid paying taxes on interest and capital gains. Whereas

Graph H3

Brazil: foreign position in exchange-traded derivatives and domestic debt securities

In billions of US dollars



Sources: Central Bank of Brazil; Securities and Exchange Commission of Brazil (Comissão de Valores Mobiliários).

foreign investors hold less than 1% of the stock of government bonds outright, they account for 14% of the trading in the more liquid treasury bond futures market. Moreover, market participants suggested that at times – indeed, often, in the view of some – foreign investors drive changes in bond market pricing. Non-residents are also key players in Korea's NDF market, which, though smaller than the onshore market, plays an important directional role in pricing developments, as foreign investors are said to be generally more willing to hold their trading positions over more extended time periods.

In Mexico, foreign investors are said to be very active participants in the over-the-counter interest rate swap market (the so-called TIIE swap market). Discussions with some market participants suggest that foreign exposure through OTC swaps may be comparable in magnitude to the outright holdings of medium- and longer-term Mexican bonds. In addition, at the shorter end of the curve, OTC forwards provide an often preferred vehicle for taking on short-term exposure to Mexican rates.

Implications

The preference of many investors to access local markets via derivatives transactions has several implications from the perspective of monitoring and financial stability. First, as noted above, official reporting systems on outright holdings understate the scale of foreign investment activity in local markets, quite substantially in some cases. On the other hand, if financial institutions resident in a country are purchasing local debt to hedge derivatives transactions with non-residents, statistics on holdings may overstate the exposures of domestic financial institutions.

Second, foreign participation via derivatives will deepen and improve the liquidity in the local derivatives and cash markets and thereby expand the risk management choices facing local issuers and investors, contributing to market efficiency. Chapter E examines those issues further.

Third, the existence of significant positioning via derivatives may have important implications for market dynamics. In particular, the use of derivatives may allow some foreign investors to build up complex and potentially highly leveraged positions that might be suddenly unwound in the event of market turbulence. For example, discussions with market participants suggest that the unwinding of large reverse-knockout structures on the Turkish lira, and related

selling activity to hedge these exposures, may have exacerbated the fallout in the Turkish markets in the middle of 2006.

Fourth, derivatives may be used to shift risk onto or away from the domestic private sector in a significant yet not transparent manner. Such risk-shifting may add to or reduce the currency risk borne by the local private sector and financial system. For example, to the extent that foreign investors hedge their currency exposure from their local investments, local investors as a group will build short forex positions that could prove quite expensive in the event of market turbulence. As noted in Chapter A, this was apparently the case for the Russian banking system in 1998. The system incurred significant losses on currency hedges that had been sold to non-resident investors in the GKO (Russian T-bill) market.

While no reporting system can fully capture such risks, Australia has been able via surveys to capture the broad parameters of risk-shifting via derivatives transactions (Chapter D). In a similar vein, firm-level research carried out by Cowan et al (2005) at the Bank of Chile finds that private corporations significantly reduced their exposure to exchange rate risk via the use of derivatives hedges.

Factors behind the growth in foreign investment

Discussions with market participants in a range of countries point to a number of factors behind the recent growth in foreign investment in local markets:

- Market participants universally have pointed to growing confidence that the creditworthiness profiles and macroeconomic stability prospects of the EMEs have been on an improving trajectory and are likely to remain so. Some of the more commonly cited evidence has been the accumulation of large reserve cushions in many countries, progress in implementing new monetary and exchange rate regimes, and a predominant trend towards sovereign upgrades.
- There is also a growing appreciation, supported by the marketing and investor education efforts at leading commercial and investment banks, that adding local debt and currency exposure to an investment portfolio potentially can improve yield and/or reduce volatility (Annex 3 examines the return-enhancing properties of local currency exposure and discusses the recent relatively benign experience with volatility and correlations across local markets).
- Participants also commonly note that the low-yield/low-volatility environment prevailing globally in recent years, the shrinking spreads and declining issuance of EME sovereign external debt, and the decline of the dollar since 2002 have also helped spur interest in the perceived return-enhancing properties of local currency investment.

Some of the difficulties cited that arise when investing in local currency bonds involve the greater complexity of the due diligence process, as it requires assessment of not only traditional country risk issues but also higher-frequency detail about the evolution of the macroeconomic environment in individual countries and its implications for the likely evolution of local market returns. Participants also cited lack of historical data or incomplete data on risks and returns, a lack of transparency, local settlement risks, lack of liquidity in the secondary market and questions about the reliability of custodian services. Furthermore, these markets are perceived as very sensitive to a general change in risk appetite and exchange rate developments. Finally, political risks can occur such as discontinuity in government policies, social instability, transfer risks and capital restriction. As noted above, one way of dealing with some of these risks is by investing via derivatives.

Market participants typically recognised that the internationalisation of local markets may increase correlations and the scope for volatility spillovers across countries' local market returns. However, they generally did not register concern about possible growing contagion

risk. More typically, participants expressed confidence in a perceived general trend towards reduced vulnerability in most emerging markets, which would allow for rapid market recovery from episodes of increased volatility, as occurred in the months following the May–June volatility of 2006. During the global market turbulence in February 2007, several EMEs reported record volumes of trading in local currency bond markets, with the markets remaining very liquid throughout and prices changing little.

The composition of the foreign investor base

Discussions with intermediaries and other market observers suggest that the growth in foreign exposure is being supported by a continued broadening of the investor base. Two to three years ago, hedge funds were said to have accounted for an overwhelming share of non-resident cross-border local currency investment, apart from the holdings of convergence funds in central Europe and the local operations of internationally active banks. Some participants estimate that, since then, the importance of non-hedge fund investors has increased notably. In particular, two types of investor stand out: pension funds and fixed income funds, most of which are dedicated to emerging market fixed income but not local debt. Such funds typically add EME local debt as an ex-index exposure intended to help them outperform their benchmarks and peers. Insurance companies reportedly have less of a presence in local markets.

Institutional investors

The total assets of dedicated emerging market bond funds were $58 billion[85] as of March 2006. Internationally dedicated emerging market bond funds are relatively small, of which only $8 billion was accounted for by dedicated local currency bond funds. These are small amounts relative to the size of global bond markets, but they are growing rapidly. For instance, one of the largest funds grew from $1.4 billion in March 2006 to $3.4 billion in February 2007.

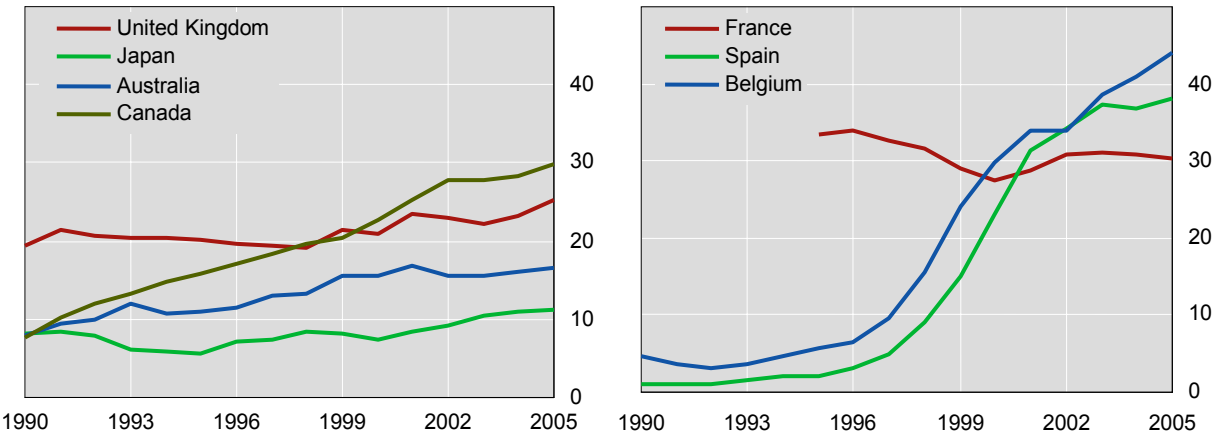
The entrance of pension funds, which is viewed by observers as an ongoing multi-year process, offers the prospect of continued growth in non-resident allocations to local markets, given the funds' low initial holdings of local currency assets in relation to their large total portfolios, and a potentially stable investor base, given the long-term investment horizon of this group of investors. Because of the specialised knowledge required (including knowledge of the market structure and participants across a range of markets, and often intricate tax, legal and custodial issues), most pension funds do not invest directly in EME debt instruments, preferring instead to give mandates to fund managers. Over time, however, some of the bigger institutional investors may be expected to establish a presence in some of the larger markets. Institutional investors that are placing funds with fund managers investing in local currency are said to be increasingly "index-aware". But, on the whole, they are not yet very "index-sensitive" with their local exposure. In contrast, fund managers of EME external debt portfolios are more typically evaluated against well-established market benchmarks. One observer noted that it is reasonable to expect that, in the years ahead, benchmark global bond indices will gradually incorporate EME local bonds into their indices. Such a development would encourage further core allocation to local market investing by funds whose performance is benchmarked against these broad indices.

[85] EmergingPortfolio.com Fund Research.

Graph H4

Holdings of foreign securities by insurance companies and pension funds

As a percentage of total financial assets



Source: CGFS (2007).

The participation of institutional investors from developed countries in local debt markets is part of a broader phenomenon of declining home bias supported by the growth of funds under management by institutional investors. Insurance companies, pension funds and investment companies are becoming increasingly important in global financial markets, including emerging markets. The proportion of household savings channelled through these investors has grown significantly in recent decades, to the extent that their assets are challenging the historical dominance of the banking system as financial intermediaries for the household sector.

The consolidation of assets in the hands of institutional investors offers considerable economies of scale in researching emerging markets. As CGFS (2007) points out, institutional investors have increased their exposure to alternative investments, including both industrial and emerging market securities. Available data suggest a gradual process of international diversification in Australia, Japan and the United Kingdom (Graph H4, left-hand panel). In Belgium and Spain, there was a sharp increase in their holdings after the euro was launched, suggesting that currency risk remains an important component of institutional investors' home bias (Graph H4, right-hand panel). The recent growth in international diversification is also apparent from country-level data. According to the IMF Coordinated Portfolio Investment Survey, most economies increased their portfolio investments abroad between 2001 and 2004, both in terms of US dollars and as a proportion of GDP.

Hedge funds

Because their legal status places few restrictions on their portfolios and transactions, including their ability to use leverage and to access markets via derivatives, hedge funds potentially can move substantial amounts rapidly across markets, subject to the underlying liquidity of the respective local currency and debt markets. Their search for new profitable strategies should make financial markets more efficient and more liquid. But their sheer size in relation to the small financial markets in some EMEs has been a cause for concern in some recipient countries. The fact that different hedge funds follow very different strategies confounds any simple conclusion. As hedge funds take both long and short positions, and as

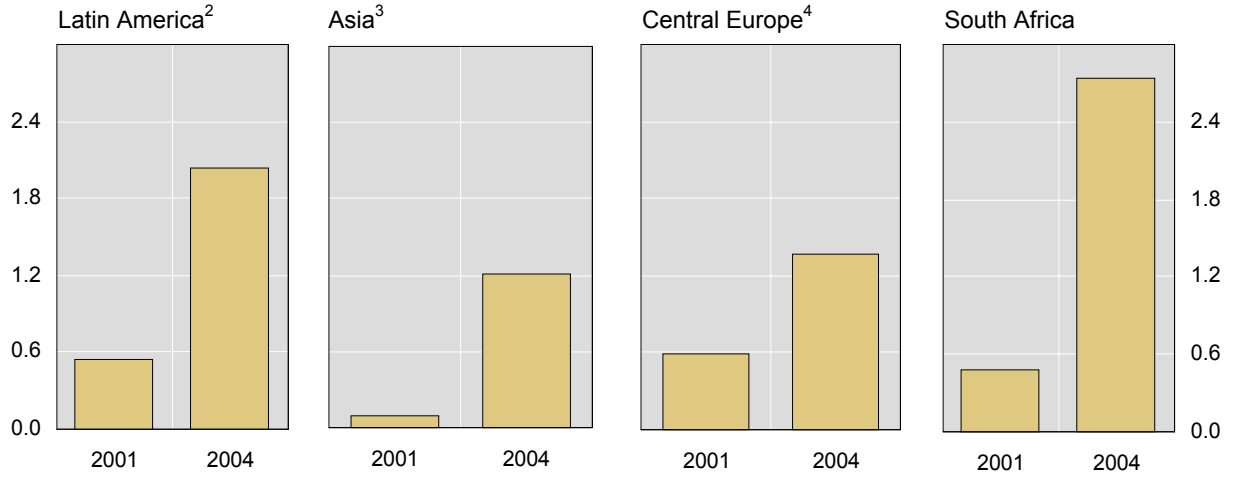
informed traders try to exploit the impact of macroeconomic developments on financial markets, they probably force a faster pace of asset price adjustment.

There is no doubt that there has been significant growth in assets under management by hedge funds investing in emerging market assets.[86] According to the Tremont Asset Flows Report, assets under management by hedge funds pursuing an emerging market strategy rose from $11.3 billion as of the end of June 2003 to $64.4 billion as of the end of June 2006. Market estimates attribute roughly 45% of the trading volume in local currency emerging market bonds to hedge funds. They must have a major influence on liquidity conditions. There is also evidence of rapid growth in the OTC derivatives market (Graph H5). Evidence from exchange-traded derivatives suggests continued rapid growth in recent months.[87] As hedge funds prefer to alter their market exposures through derivatives, access to derivative instruments might also be a factor supporting greater hedge fund activity.

Graph H5

Turnover on OTC interest rate derivatives[1]

Daily averages, notional amounts in billions of US dollars



[1] Net of local inter-dealer double-counting and including forward rate agreements, swaps, options and other products in domestic currency. [2] Brazil and Mexico. [3] India, Korea and Taiwan (China). [4] The Czech Republic, Hungary and Poland.

Source: BIS Triennial Central Bank Survey on Foreign Exchange and Derivatives Market Activity (April 2001 and April 2004).

[86] See Bank of Japan (2006).

[87] Turnover of interest rate futures contracts traded on exchanges is large in Brazil, Korea and Mexico and has grown sharply since April 2004, the date of the last Triennial survey as summarised in Graph H5 (billions of US dollars, daily averages, notional principal):

	April 2004	March 2007
Brazil	16.9	38.0
Korea	2.7	4.6
Mexico	4.6	5.2

Three non-resident investor perspectives

Although there are many common elements in the investment strategies of non-resident investors, the Working Group's workshop and discussions with the private sector brought to light some interesting differences among investor countries. The following sections report on a major US fund manager, Japanese retail investors and French financial firms.

(a) A major US fund manager

The fund manager (long active in EME debt) was interviewed about his approach to managing the dedicated local currency debt fund. The fund has grown rapidly, reaching several billions of dollars in total net assets, making it one of the largest foreign local currency bond funds. The fund manager's perception is that emerging market local debt is being recognised as a conventional asset class, and that broadening and deepening local markets are the next steps in the process. The universe of investable countries has been very similar to the one for external debt, albeit somewhat smaller. That is, in part, because many of the less creditworthy issuers of external debt do not have active local currency debt markets. At the same time, some names that have graduated from the external emerging market index, such as Korea and Singapore, are still included in the local market universe, as their local bond markets are still developing.

The fund manager's approach to EME local markets is consistent with the firm's approach to its EME external debt mandates, but some of the factors that they consider are fine tuned for the specific considerations that relate to local currency investments. They follow a three-pronged approach to selecting credit and countries: conducting fundamental analysis on country specific issues; ascertaining how the country would either benefit from or be hindered by the external environment; and assessing the state of the market to determine how liquidity and exposure concentration factors may determine relative value. Within this framework, they analyse macroeconomic factors that affect local interest rates and currency values, paying attention to domestic savings, investment flows and balance of payments.

The fund manager's benchmark is the JPMorgan ELMI+ index. Non-deliverable currency forwards are a major vehicle, accounting for about one-quarter of the portfolio, and serve as a proxy for money market investments in developing countries. The portfolio is constructed using rolling one, two and three month currency forwards, making for a very short duration index. The fund manager's experience has been that in this way they can achieve better execution, avoid the regulatory, tax and investment eligibility restrictions prevalent in the domestic markets, and enjoy the ease of settlement via international clearing systems such as Euroclear and Clearstream. As of now, the fund manager is investing in the currencies and local market instruments of sovereigns. As the asset class continues to evolve, the fund manager is considering two new funds: one with a long duration and another dedicated to corporate debt.

(b) Retail investors: the case of Japan

In general, recent increases in foreign investment in local markets appear to largely reflect allocation decisions by fund managers and their institutional customers. However, in the case of Japan, retail investors appear to be at the leading edge of recent growth in interest in cross-border local currency investing. At the Working Group workshop in Tokyo in May 2006, participants pointed out that cross border flows are still underdeveloped in the Asian region, in part reflecting a strong home bias among Asian institutions. An important role is played by Japanese bond investors, who are traditionally risk averse and prefer investing in foreign securities issued in Japan (samurai bonds) and high quality credit. This conservative approach has been reinforced by the consequences of the collapse of the 1990s financial bubble. In contrast, Japanese investors looking for riskier investments prefer investing in equities. Indeed, regional foreign direct investment flows are much larger than cross-border bond flows in Asia.

Participants in the workshops expressed the view that this situation is changing. Japanese retail investors have begun to show a strengthening appetite for bond markets in the region, as suggested by their interest in the pan-Asian bond funds introduced recently. The current period of very low interest rates in Japan, low volatility and yen depreciation has raised the appeal of investing in higher-yielding currencies. There is evidence that Japanese households are investing abroad. Japanese investors are attracted to the higher yields available in Australia, New Zealand and Thailand, which are far superior to the long-term domestic bond yields in Japan (now around 1.8%), and have increased exposure to high-yield currency bond instruments. This interest might develop further with the growing recognition of the intrinsic advantages of the emerging Asia debt asset class in terms of both return/volatility (high Sharpe ratio) and portfolio diversification (low correlation with G7 debt markets). At this stage, it is not entirely clear if the present trend is motivated by the low volatility in international markets and a weakened yen or whether it reflects a long overdue structural change that includes international diversification. An important qualification, however, is that Japanese investors are reportedly reorienting their asset allocation gradually, not least because of the need for sufficient data to check the performance of competing strategies. But such portfolio reallocation could be quite rapid once it takes off.

(c) French financial firms

In order to complement the analysis of local currency markets, the Bank of France conducted an informal survey of individual firms in France to find out about their involvement with local currency bond markets in the emerging market economies. This section summarises the main findings.

Although all large international banks and financial institutions take an interest in emerging markets – if only because of the scale of their operations in large emerging economies – few are active in local currency bond markets. And the experience of those that are is very recent. Prior to 2000, virtually no French bank or fund was tapping domestic savings with a view to investing in local currency bonds in emerging markets. However, as the environment in emerging markets stabilised, local currency bond markets began to develop, and so did demand. The representatives of French financial institutions interviewed generally found that:

- **Growing activity in local currency bond markets has brought about few organisational changes in banks.** By contrast, investment funds have adjusted their internal structure to improve their ability to participate in these markets. Banks have not set up special departments to deal with local currency bond markets in emerging markets. Instead, their market operations are often organised around business lines pertaining to asset classes or financial products, making it difficult to invest in local currency bond markets. They are beginning to consider expanding their capacity to conduct field research and creating special units aimed at investing in local currency bond markets. Asset management companies, in contrast, have set up special vehicles with a view to dealing with these markets. Such decisions have been made to improve customer relations. Nevertheless, the staffing of investment funds is limited (five to 10 staff), comprising traders or analysts and modest capacity for research. Given the complexity of, and risks associated with, these markets, funds target only institutional investors. The direct risks incurred by households are still very small, especially since the pension fund industry is at an early stage in France.

- **Local currency bond markets offer attractive portfolio diversification opportunities for international investors.** Investors have a positive opinion of emerging markets, despite the hiccups experienced in May–June 2006, and this positive assessment is expected to last. At present, the share of local currency debt in overall public debt is much lower in emerging than in more developed economies, and it is likely to rise, representing a very large pool of assets that will attract even

more investment and investors. Local debt markets can facilitate portfolio diversification. Not only are the correlations between local debt and other asset classes (in developed countries) low, but the correlation between local debt in different emerging markets is also low from country to country. Their attractiveness can be enhanced when risks can be combined in a highly flexible manner – which depends on the hedging possibilities that exist in the market. The development of local currency debt is highly contingent on the borrowing policy of sovereigns. Weak and inappropriate financial infrastructure often prevents local firms from tapping domestic markets. As regulatory environments improve and sovereign spreads tighten, there may be more room for corporate debt that meets market expectations.

- **There seems to be greater differentiation across countries.** Emerging markets will continue to be classified as a specific asset class, given their differences with more mature markets. Nevertheless, the performance of each country is increasingly being assessed on its own merits and prospects. For example, as a result of debt cancellation and improved fiscal discipline, in addition to very high returns and a sound macroeconomic framework, several African countries have attracted the interest of international investors. The fact that international investors target such countries provides strong incentives for countries to improve their macro policy framework. In addition, emerging economies that are rapidly converging towards developed economies (Mexico, Korea) and those that are expected to adopt the euro or eventually to join the European Union are being distinguished from those at an earlier stage of development. The risks of contagion among emerging markets have abated somewhat since 1998. Foreign investors have a better understanding of the performance of individual countries, and local investors have increased their participation. Local investors are less sensitive than foreign investors to "bad news" involving other emerging markets, and this lowers the risk of contagion. Lower risk of contagion could also be the consequence of the regional specialisation of investors (who underweight bad news from countries outside the region) and better anticipation of the behaviour of market participants.

- **The due diligence process of investors in emerging market assets has become more complex, requiring greater expertise.** Analysis of risk is based on country risk analysis using macroeconomic data, fact analysis sheets, and due diligence pertaining to legal and regulatory frameworks. Financial institutions use the same financial techniques to analyse emerging markets as they use to analyse more sophisticated markets.

- **The importance of domestic investors and hedge funds is growing.** Banks consider two issues in relation to domestic investors and hedge funds: the lack of liquidity stemming from the buy and hold strategies of local investors, and the short time horizon and quick reaction of hedge funds to signs of economic stress. Both may be detrimental to the strategies of banks. Local pension funds and domestic banks often adopt a buy and hold strategy, while foreign players often have a relatively short investment horizon. Typically, banks and investment funds rotate their investments every three months, while hedge funds hold investments for a month at most. In addition, hedge funds tend to "rush to the exit" during times of stress. Consequently, banks try to avoid being caught in markets where liquidity is low or where hedge funds hold a high share of bonds. Over time, the rising share of international investors is expected to improve liquidity.

I. Conclusion

The denomination of debt in dollars (or other foreign currency) has played a key role in virtually every financial crisis in the emerging market world since the early 1980s. In many cases, debts (domestic as well as external) were denominated in foreign currency because there was no well-developed local currency debt market at longer maturities. This gap in financial markets led borrowers to take risky financing decisions that created serious balance sheet vulnerabilities. Such vulnerabilities increased the risk of default, and lenders suffered losses.

The recognition of the importance of balance sheet mismatches made the conscious nurturing of local currency debt markets a major objective of financial policy in many countries. With the support of better domestic macroeconomic policies, reliance on foreign currency debt has indeed been reduced in almost all emerging market economies (EMEs). Issuance of local currency bonds has expanded substantially and domestic bond markets have deepened.[88]

A key objective has been the fostering of a local currency yield curve, which is an essential building block in developing a full array of tools for managing financial risk. But many local currency bond markets are still at an early stage of development. New risks and exposures for both borrowers and investors (resident and non-resident) have emerged, and the spread of new financial instruments has made risk monitoring more challenging. This Report therefore reviews the possible financial stability implications of this strategic switch from foreign to local currency issuance.

In preparing the Report, the Working Group organised a series of regional workshops which included market participants and central banks which are not regular participants in the CGFS. It also coordinated a major statistical survey of central banks to fill a number of gaps in existing data on instruments, maturity, issuers, investors and key aspects of market functioning. This exercise led to improvements in data regularly published by the BIS. It also threw new light on how changing exposures were altering the financial risks facing both investors and issuers. But it also revealed several major shortcomings in the data that are currently available.

Data for better monitoring

The survey conducted by the Working Group revealed that different countries use different criteria or definitions to compute statistics. In addition, the issuance of individual securities in many local markets was often not regularly aggregated in analytically useful ways. Historical data on such aggregates were often absent. These shortcomings inhibit comparisons across countries and tend to impede effective monitoring.[89]

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[88] As discussed in earlier chapters of this Report, this increase in issuance also reflected other factors that themselves have major economic consequences. In the late 1990s and early 2000s, two main drivers were large fiscal deficits and bank recapitalisation. Since then, however, fiscal deficits have declined substantially, and increased official reserve accumulation has instead become an important driver of domestic debt issuance. This means that net debt ratios have fallen appreciably, and external debt profiles have generally become more sustainable.

[89] On 19 May 2007, the G8 released an action plan for developing local bond markets in emerging market economies and developing countries. Noting significant statistical shortcomings, the G8 asked the IMF, the World Bank, the OECD and the BIS to undertake a stocktake of data and identify any gaps (see G8, 2007).

The main international source of data on domestic bond markets worldwide is the data provided by individual central banks and published quarterly by the BIS.[90] These data, however, provide little or no information on:

- *Average maturity.* Such data are available from the BIS for international bonds.
- *Terms of debt instrument*: fixed-rate, floating-rate, foreign exchange denominated or linked or inflation-linked.

The Working Group's survey of central banks found that almost all central banks could provide such data for local debt securities issued by government and by the central bank (including on occasion other public entities close to the central government). Although the underlying data are publicly available, comparatively few central banks regularly compute summary measures of maturity or the terms of debt instruments. Some standardisation in the categorisation of debt instruments would be a useful aid to monitoring.

A second major statistical gap is the lack of information on the holders of bonds. Most central banks, however, were able to provide a breakdown of holdings of central government bonds into: banks; non-bank financial institutions; other residents; and non-residents. Such data can provide essential information about balance sheet exposures. (The importance of off balance sheet exposures is discussed below.)

A third problem is the absence of measures of sectoral currency mismatches. Corporations, for instance, could borrow from domestic banks in dollars and households could hold their savings in domestic dollar-denominated bank accounts. Although this does not necessarily involve a **net** forex exposure vis-à-vis non-residents, it can give rise to large sectoral currency mismatches. The Working Group's survey found that data on the evolution of the foreign currency/local currency split of bank deposits and lending are available at a national level for many countries. Such data help to build a more comprehensive measure of currency mismatches.

The discussions in the Working Group and its workshops also highlighted the need for further analysis of risk exposures. A major finding was that exposures apparent from direct ownership or issuance of bonds were often altered through transactions in derivatives markets. One important instance of this was that foreign investors often acquired exposure to certain local currency bond markets in EMEs through derivatives markets. In some cases, their counterparties in such markets may be domestic banks which hold the bonds. Some countries attempt to quantify such exposures.

Main findings

One major finding of the Report is that exposure to currency depreciation risk has declined in most EMEs. Net foreign currency liabilities vis-à-vis non-residents have fallen substantially. In addition, the proportion of financial contracts and instruments between residents that are denominated in foreign currency (notably domestic bonds and bank deposits/loans) has been reduced. Comprehensive debt data collected in the survey confirm that aggregate foreign currency mismatches have declined in all major regions and in most EMEs. The analysis in this Report shows that this mainly reflected specific debt management policies designed to reduce risks, although exchange rate appreciation did help in recent years. There is clear

[90] Tables 16A and 16B published on the BIS website (www.bis.org/statistics/secstats.htm) show amounts outstanding as well as changes in stocks for government, financial institutions and corporate issuers. Table 17A presents data for securities with a residual maturity of less than one year. These data cover issuance in almost all of the larger EMEs. The only exceptions are Israel and Saudi Arabia.

evidence of a deliberate and substantial reduction in borrowers' exposures to the risk of currency depreciation. Non-resident investment in local currency bonds has increased substantially. Many countries have therefore been able to overcome "original sin" (ie the supposed inability to borrow in local currency) by better policies.

Several countries have indeed succeeded in developing yield curves across the maturity spectrum. Supranational initiatives (including issuance by international financial institutions in local currencies) have in some cases also played a useful role, including in identifying regulatory impediments. The deepening of local currency bond markets across a range of maturities has encouraged increased participation by institutional investors such as insurance companies, pension funds and mutual funds (which in turn contributes to deeper markets). Local currency bond markets also help agents to price and to hedge maturity risks.

Bond markets can also serve as effective catalysts for better behaviour by both the private and the public sector. For instance, bond market reactions to prospective fiscal deficits and lax monetary policy can help to create a constituency for better policy. Market discipline on banks, other financial firms and non-financial corporations can also be strengthened significantly, thus reducing financial stability risks. In short, local currency bond markets have helped make the financial systems in the emerging markets more resilient to shocks.

Notwithstanding these substantial benefits, however, the shift in the composition of debt from external foreign currency bonds to domestic local currency bonds raises two possible issues that policies may need to address.

The first issue is that, because the maturity of domestic bonds is on average shorter than the maturity of external bonds, the exposures to interest rate and refinancing risks have increased. Yet the risks from such exposures are probably less serious than those from large currency mismatches. The risk to government finances from issuing foreign currency debt, in particular, has been greater historically than that from issuing short-term debt in local currency. Moreover, the sharp increase in the issuance of short-term domestic liabilities during the past few years has mainly involved the issuance of central bank securities to finance or sterilise short-term official foreign exchange assets, which have risen substantially. The Report finds that the average maturity of non-sterilisation-related domestic debt has generally increased during the past five years. Moreover, the authorities in many EMEs are continuing to actively lengthen the maturity structure of their local currency debt.

A second issue is that higher interest rates on domestic bonds than on external bonds (allowing for exchange rate changes) mean that debt servicing costs are increased. Governments in several countries which had faced major financial crises in the past have been prepared in the initial stages to pay higher interest rates in order to lengthen the maturity of their debt issuance. More effective domestic macroeconomic policies (which have lowered inflation) and a very favourable international environment, however, have contributed to a substantial reduction in medium and long-term interest rates across the EMEs. This narrowing of the gap between domestic and foreign interest rates has made local currency financing more attractive. Sustaining this virtuous circle requires continued fiscal and monetary discipline.

Policy challenges

The Working Group noted that operational risks inevitably arise in a transitional period when nascent markets still lack those features that help the more mature markets to work well even in volatile conditions. Therefore the Working Group reviewed three important challenges in ensuring that comparatively new bond markets function in ways that contribute best to financial stability. The first is liquidity: bond markets should be liquid enough for exposures to be managed and also to allow the rapid adjustment of portfolios without significant disruption to the market. The second is the fostering of local currency debt

issuance by the private sector, and not just by government. The third relates to the risks that could arise if exposures are unduly concentrated.

Liquidity

On **liquidity**, there is evidence that local currency bond markets have become more liquid and resilient as they have grown in size. Nevertheless, the Working Group found that government bond markets in many EMEs remain illiquid. The domestic investor base is often narrow, with some large investors (sometimes overly constrained by regulation) adopting buy-and-hold strategies that limit liquidity or even effective price discovery. Since repo and derivatives markets remain underdeveloped (often because of legal ambiguities, taxation arrangements and the prohibition of the short selling of securities), such investors are not able to lend securities, and so provide liquidity to those investors that do want to trade. Shortcomings in the local trading and settlement infrastructure also bear some responsibility.

As for policies to nurture liquidity, the five guiding principles of an earlier CGFS report[91] on developing deep and liquid bond markets bear repeating:

- A competitive market structure should be maintained.
- A market should have a low level of fragmentation.
- Transaction costs should be minimised.
- A sound, robust and safe market infrastructure should be ensured.
- Heterogeneity of market participants should be encouraged.

This Report notes that several countries have further work to do in one or more of these areas. The Report therefore contains some specific policy recommendations on such matters as taxation, issuance schedules, the transparency of trading information and the need to develop repo, futures and options markets.

Private sector issuance

Genuine **private sector issuance** has not developed as far as many had hoped. Corporate bond markets remain very shallow in most countries, with issuance concentrated in a few, highly rated firms. Securitisation generally remains limited. This means that the potential benefits of bond markets for the pricing of risk along the credit spectrum and for diversification have yet to be fully exploited. Nevertheless, the Report identifies some key elements of a few cases of more successful development of private debt markets. The Report also notes that the decline of sovereign international issuance has in the past couple of years been associated with increased international issuance by emerging market corporate entities.

Risk concentration

The picture on **risk concentrations** is more mixed. In several countries, domestic banks hold the bulk of bonds outstanding. In some cases, bank holdings are dominated by short-term sterilisation bonds, which limits banks' interest rate exposures. In others, however, significant credit and market risks remain concentrated in the banking system. As local currency markets deepen, however, banks (and others) find it easier to manage their interest exposures. The supervisory authorities in some countries, which closely monitor such

[91] CGFS (1999b).

exposures, report that the banks do indeed hedge their positions. In addition, banks can liquidate interest rate exposures held through bonds more readily than they could when such exposures were held through loans to corporations. Nevertheless, the Working Group underlined the need to carefully monitor such exposures.

Another important aspect of risk dispersion is the holding of bonds by non-residents. If non-residents hold a significant proportion of domestic bonds – as they typically do for international bonds – then risks are spread to international investors. By holding local bonds as part of a broadly diversified portfolio, foreign investors can have a higher tolerance and appetite for idiosyncratic risk. Other things equal, the default risk on sovereign credit in local currency is much lower than such risk in foreign currency. Most felt that the presence of foreign investors could well serve to stabilise the domestic market, but it was also recognised that greater openness in the capital account could accentuate the exchange rate and financial market responses to shocks. This was perhaps more likely when financial markets, at early stages of development, were thin.

The Working Group found clear signs that foreign investor interest in local currency markets has been rising in the past few years. Data from host countries on outright holdings, which suggest that non-residents generally own a very small share of local currency bonds (the main exceptions being central Europe, Mexico and Turkey), provide only a partial picture. Discussions with private investors and authorities in some countries indicate that the underlying exposures of non-residents are in some cases (including Brazil and Korea) considerably larger than the data on outright holdings would suggest. This is mainly due to the use of derivatives to gain synthetic exposure to local currency markets. There is also evidence that non-resident investors trade more actively than resident investors.

Because local currency bonds represent attractive yield enhancement and diversification vehicles for foreign investors, further substantial growth seems likely in the years ahead even if some cyclical reversals may occur. As the share of local currency bonds in global investor portfolios rises, those responsible for monitoring financial stability risks will have a greater need for reliable and internationally comparable data.

These challenges are formidable, and developing resilient local currency bond markets requires persistent effort over many years. Nevertheless, this Report documents that several countries, often starting in unfavourable circumstances, have been much more successful in developing such markets than many believed possible only a few years ago. This success should encourage other countries to redouble efforts to develop their own markets.

References

Acevedo, P, E Alberola and C Broto (2006): *Local debt expansion … vulnerability reduction? An assessment for six emerging markets*, Bank of Spain, November.

Allen, M, C Rosenberg, C Keller, B Setser and N Roubini (2002): "A balance sheet approach to financial crisis", *IMF Working Paper* 02/210.

Amante, A, M Araujo and S Jeanneau (2007): "The search for liquidity in the Brazilian domestic government bond market", *BIS Quarterly Review*, June (forthcoming).

Anderson, P (1999): *Sovereign debt management in an asset-liability management framework*, paper presented to 2nd Sovereign Debt Management Forum, World Bank, Washington DC, 1–3 November.

Armas, A, A Ize and E Levy-Yeyati (2006): *Financial dollarization: the policy agenda*, Palgrave Macmillan.

Asian Development Bank (2006): *Asia Bond Monitor 2006*, November.

Bank for International Settlements (2000): "Managing foreign debt and liquidity risks", *BIS Policy Papers*, no 8, September.

——— (2002): "The development of bond markets in emerging economies", *BIS Papers*, no 11, June–July.

——— (2006a): "Developing corporate bond markets in Asia", *BIS Papers*, no 26, August.

——— (2006b): "The banking system in emerging economies: how much progress has been made?", *BIS Papers*, no 28, August.

——— (2006c): "Asian bond markets: issues and prospects", *BIS Papers*, no 30, November.

Bank of Japan (2006): "Changes in hedge fund investment behavior and the impact on financial markets", *Bank of Japan Review*, December.

Battelino, R (2005): "Recent developments in Asian bond markets", address to 17th Australasian Finance & Banking Conference, Sydney, 15 December 2004, *Reserve Bank of Australia Bulletin*, January, pp 8–16.

Bayliss, J (2004): "Emerging markets' external debt as an asset class", *JPMorgan Emerging Markets Research*.

Bleakey, H and K Cowan (2005): "Corporate dollar debt and devaluations: much ado about nothing?", mimeo.

Bordo, M, C Meissner and A Redish (2002): *How "original sin" was overcome: the evolution of external debt denominated in domestic currencies in the United States and the British Dominions 1800–2000*, mimeo.

Burger, J and F Warnock (2003): "Diversification, original sin and international bond portfolios", *International Finance Discussion Papers*, no 755, Federal Reserve Board, April.

——— (2004): "Foreign participation in local-currency bond markets", *International Finance Discussion Papers*, no 794, Federal Reserve Board, February.

Caprio, G and A Demirgüç-Kunt (1998): "The role of long-term finance: theory and evidence", *Policy Research Working Paper*, no 1746, April 1997, *World Bank Research Observer*, May 1998.

Ciarlone, A, P Piselli and G Trebeschi (2006): *Demand and supply of local bonds: preliminary evidence from a new dataset*, Bank of Italy, October 2006.

Cifuentes, R, J Desormeaux and C Gonzalez (2002): "Capital markets in Chile: from financial repression to financial deepening", in *BIS Papers*, no 11, "The development of bond markets in emerging economies", Bank for International Settlements, Basel, June, pp 86–102.

Claessens, S, D Klingebiel and S Schmukler (2003): "Government bonds in domestic and foreign currency: the role of macroeconomic and institutional factors". CEPR Working Paper no 3789

Committee on the Global Financial System (1999a): "A review of financial market events in autumn 1998", *CGFS Papers*, no 12, October.

——— (1999b): "CGFS issues recommendations for the design of liquid markets", *CGFS Papers*, no 13, October.

——— (2000): "Stress testing by large financial institutions: current practice and aggregation issues", *CGFS Papers*, no 14, April.

——— (2007): "Institutional investors, global savings and asset allocation", *CGFS Papers*, no 27, February.

Cowan, K, E Hansen and L Herrera (2005): "Currency mismatches, balance sheet effects, and hedging in non-financial corporations", *Central Bank of Chile Working Paper*, no 346, December.

Credit Suisse (2006): "Emerging markets sovereign strategy focus, portfolio allocation trends in EM pension funds: lessons for Mexico", *Fixed Income Research*, October 2006.

CSFB (2006): *Mexican exchange warrants update*, July.

Dalla, I (2003): *Harmonization of bond market rules and regulations*, Asian Development Bank, August 2003.

Deutsche Bank (2005): Valuing Mexico's offer of exchange warrants, Deutsche Bank, November 2005.

Deutsche Bundesbank (1997): "The securitised money market in Germany", *Monthly Bulletin*, October.

Drudi, F and R Giordano (2000): *Default risk and optimal debt management*. Journal of Banking and Finance 24, pp 861–891.

Eichengreen, B, E Borensztein and U Panizza (2006): *Building bond markets in Latin America*, unpublished manuscript, University of California.

Financial Stability Forum (2000): *Report of the Working Group on capital flows*, Financial Stability Forum, Basel, April.

Financial Stability Institute (2006): *Implementation of the new capital adequacy framework in non-Basel Committee member countries by FSI staff*, publication no 6, September.

Fleming, M and A Sarkar (1999): "Liquidity in US Treasury spot and futures markets", in *Market Liquidity: research findings and selected policy implications, Report of a study group established by the CGFS of the central banks of the Group of Ten countries*.

Fritsch, W (2004): *Building strong local securities markets*, Bank of Canada Review, Autumn, summary of the G20 Workshop on Developing Strong Domestic Financial Markets, 26–27 April 2004.

G8 (2007): "G8 action plan for developing local bond markets in emerging market economies and developing countries", Potsdam, 19 May 2007.

Giacomelli, D and F Pianetti (2005): "Expanding the efficient frontier", *JPMorgan Emerging Markets Research*.

Goldfajn, I (1998): "Public debt indexation and denomination: the case of Brazil", *IMF Working Paper* 98/18.

Goldstein, M and P Turner (2004): *Controlling currency mismatches in emerging markets*, Institute for International Economics, Washington DC.

Goldstein, M and A Wong (2005): "What might the next emerging-market financial crisis look like?", in Caprio, G, J A Hanson and R E Litan (2005): *Financial crises: lessons from the past, preparation for the future*, Brookings Institution Press and the World Bank Group.

Grandes, M and M Peter (2005): "How important is sovereign risk in determining corporate default premia? The case of South Africa", *IMF Working Paper* 05/217, November, Washington DC.

Greenspan, A (1999a): "Currency reserves and debt", speech before the World Bank conference on recent trends in reserves management, April 29, 1999.

——— (1999b): "Lessons from the Global Crises", World Bank Group and International Monetary Fund, Program of Seminars, September 27, Washington, DC.

Guidotti, P (1999): Remarks at G33 seminar in Bonn, April.

Hail, L and C Leuz (2005): "International differences in the cost of equity capital: do legal institutions and securities regulation matter?", Rodney L White Center for Financial Research, *Working Paper* no 17–04.

Hawkins, J (2002): "Bond markets and banks in emerging economies", *BIS Papers*, no 11, Bank for International Settlements.

Häusler, G (2007): "Developing bond markets in emerging market economies", G8 High-level Workshop, May, Frankfurt am Main, (www.bundesbank.de).

Ibrahim, M and A Wong (2006): *The corporate bond market in Malaysia*, *BIS Papers*, no 26, February.

Inter-American Development Bank (2006): *Living with debt*.

International Monetary Fund (2005): "Are emerging market countries learning to float?", *IMF Working paper* 05/98, May.

International Monetary Fund and World Bank (2003): *Guidelines for Public Debt Management*, December 2003, Washington DC.

International Monetary Fund (2006): Global financial stability report, Market developments and issues, September 2006.

——— (2007): "Changes in the international investor base and implications for financial stability", Global Financial Stability Report, April.

Ize, A and E Levy-Yeyati (2003): "Financial dollarization", *Journal of International Economics*, Elsevier, vol 59(2), pp 323–47, March.

——— (2005): "Financial de-dollarization: is it for real?", *IMF Working Paper* 05/187, September.

Jeanne, O and A Guscina (2006): "Government debt in emerging market countries; a new data set", *IMF Working Paper* 06/98.

Jeanneau, S and C Pérez Verdia (2005): "Reducing financial vulnerability: the development of the domestic government bond market in Mexico", *BIS Quarterly Review*, December, pp 95–107.

Jeanneau, S and C Tovar (2006): "Domestic bond markets in Latin America: achievements and challenges", BIS Quarterly Review, June.

JPMorgan Chase (2005): *Mexico exchange warrants*, November.

JP Morgan Securities Ltd (2007): “Emerging markets evolve as an asset class”, *Emerging Markets Research*, February.

Kamil, H (2004): “A new database on the currency composition and maturity structure of firms’ balance sheets in Latin America, 1990–2002”, Inter-American Development Bank, mimeo.

Kotlikoff, L (1999): *The World Bank’s approach and the right approach to pension reform*, World Bank, mimeo.

Lee, M-J and S-H Kim (2006): “Developing the corporate bond market: the Korean experience”, in *BIS Papers*, no 26, “Developing corporate bond markets in Asia”, February, pp 96–113.

Levy-Yeyati, E (2006): “Financial dollarization”, *Economic Policy*, January, pp 61–118.

Library of Congress (2004): Today in History: January 4, at http://memory.loc.gov/ammem/today/jan04.html.

Martinez, L and A Werner (2002): “The exchange rate regime and the currency composition of corporate debt: the Mexican experience”, *Journal of Development Economics*, 69, pp 315–34.

McCauley, R and E Remolona (2000): “Size and liquidity of government bond markets”, *BIS Quarterly Review*, November, pp 52–60.

Mexican Federal Government (2006): 2007 Annual Financing Programme, Ministry of Finance and Public Credit.

Mehl, A and J Reynaud (2005): “The determinants of ‘domestic’ original sin in emerging market economies”, *ECB Working Paper*, no 560.

Michie, R (1999): *The London Stock Exchange: a history*, Oxford University Press, 1999.

Mishkin, F (2006): *The next great globalization: how disadvantaged nations can harness their financial systems to get rich*, Princeton University Press, Princeton NJ.

Mohanty, M (2002): “Improving liquidity in government bond markets: what can be done?”, in *BIS Papers*, no 11, “The development of bond markets in emerging economies”, Bank for International Settlements, Basel, June, pp 49–80.

Mohanty, M and P Turner (2006): “Foreign exchange reserve accumulation in emerging markets: what are the domestic implications?”, *BIS Quarterly Review*, Bank for International Settlements, Basel, September.

Moreno, R (2006): “*The changing nature of risks facing banks*”, in *BIS Papers*, no 28, August.

Muranaga, J and T Shimizu (1999): “Market microstructure and market liquidity”, *Bank of Japan Institute for Monetary and Economic Studies Discussion Paper Series*.

Price, R (1997): "The Rationale and Design of Inflation-Indexed Bonds", IMF Working Paper no. 97/12, January 1997.

Reddy, Y (1997): “Exchange rate management: dilemmas”, inaugural address at the XIIth National Assembly of the Forex Association of India, Goa, 15 August, reprinted in Y Reddy, *Monetary and financial sector reforms in India: a central banker’s perspective*, UBS Publishers’ Distributors, New Delhi, 1999, pp 202–14.

——— (2002): “Issues and challenges in the development of the debt market in India”, in BIS Papers no 11.

Redrado, H, J Carrera, D Bastourre and J Ibarlucia (2006): “The economic policy of foreign reserve accumulation: new international evidence”, *Working Paper*, no 13, Central Bank of Argentina, 2006.

Reserve Bank of India (2004): *Report on trend and progress of banking in India 2003–04*, Chapter VII, Financial Stability.

Rosenberg, C, I Halikias, B House, C Keller and J Nystedt (2005): "Debt-related vulnerabilities and financial crises", *IMF Occasional Paper*, no 240, Washington DC.

Samans, R, M Uzan and A Lopez-Carlos (2007): *The International monetary system, The IMF, and the G20: a great transformation in the making?* World Economic Forum.

Schulte, W and R Violi (2001): "Interactions between cash and derivatives bond markets: some evidence for the euro area", in *BIS Papers*, no 5, "The changing shape of fixed income markets: a collection of studies by central bank economists", Basel, October, pp 67–112.

Sokoler, M (2002): "The importance of a well developed bond market – an Israeli perspective", in *BIS Papers*, no 11, Bank for International Settlements.

Tovar, C (2005): "International government debt denominated in local currency: recent development in Latin America", BIS Quarterly Review, December 2005.

Turnbull, J (2006): *Financial stability: a global public good*, International Task Force on Global Public Goods: Financial Stability 2006.

——— (2007): *Turnover in emerging bond markets*, Bank for International Settlements, Basel, January.

Turner, P (2003): "Bond market development: what are the policy issues?", in R Litan, M Pomerleano and V Sundarajan (eds), *The future of domestic capital markets in developing countries*, Brookings Institution Press, Washington DC.

Wheeler, G (2004): Sound practice in government debt management, World Bank, April 2004.

Wolff-Hamacher, S (2006): "Local currency bond issues by international financial institutions", background paper for the Working Group on financial stability and local currency bond markets, Committee on the Global Financial System, December.

World Bank (2001): *Developing government bond markets: a handbook*, Washington DC.

——— (2006a): "*East Asian finance – the road to robust markets*", Washington DC.

——— (2006b): *Pension reform and the development of pension systems*, Washington DC.

——— (2006c): Unlocking Indonesia's Domestic Financial Resources for Development: The Role of Non-Bank Financial Institutions, The World Bank.

World Economic Outlook (2005): "Does inflation targeting work in emerging markets?" September 2005, Chapter IV, p 162.

Annex 1:
Mandate

Balance sheet weaknesses due to currency mismatches have played a key role in financial crises in emerging market economies. In recent years, however, the reliance on foreign currency debt has been reduced and local bond markets have deepened. Nevertheless, many markets are still at an early stage of development: liquidity remains limited and private sector debt issuance has often been underdeveloped. Moreover, there is a lack of consistent information across countries – especially at the sectoral level. Finally, several financial stability issues have arisen. New risks and exposures for both borrowers and investors (resident and non-resident) have emerged and the spread of new financial instruments may have made risk monitoring more challenging. To promote a better understanding of these issues, the CGFS Working Group on *Financial stability and local currency bond markets* would primarily:

(i) Provide an overview of work done in other forums on analysis/measurement, especially relating to the special financial stability challenges of "young" bond markets and the availability of standardised information about sectoral balance sheet positions.

(ii) Review how far the issuance of local currency debt improves domestic financial intermediation (eg by reducing capital flight, channelling saving into domestic instruments, helping banks and others to hedge maturity risks, and so on).

(iii) Consider the international dimension of these developments, especially regarding the exposures of non-residents to local bond markets, and of residents to externally issued debt. What determines the forms that non-residents choose to take on exposure in local currency markets and what motivates the issuance by large global firms in these markets? To what degree have local fixed income markets become internationalised? Have cross-border flows into debt securities become more opaque?

(iv) Assess how sectoral risk exposures arising from indebtedness might be quantified (eg currency mismatches, changes in debt duration and interest rate exposures). What can be done to facilitate the monitoring of exposures to credit and market risk?

(v) Analyse the financial stability impact of these developments, especially the impetus given to local currency derivative instruments, the role played by offshore markets and the growing importance of local investment funds. What are the consequences for market volatility, concentration and liquidity in conditions of stress? How could certain macroeconomic policy choices (especially exchange rate policy) interact with the development of local bond markets, and what might be the implications for financial stability?

Annex 2:
De-dollarisation

An important challenge for policymakers in some Latin American and central European countries has been the high degree of dollarisation: the use of the US dollar or another currency as a substitute for the national currency in transactions and in financial contracts and as a store of value.[92] During periods of economic turmoil, dollarisation has been seen as a valuable second best solution when there is little confidence in the domestic economy: it keeps economic activity going by providing predictable prices and helping to stabilise the creditworthiness of financial institutions.

A degree of financial dollarisation is common in many emerging market systems, particularly for longer term loans. In Latin America, Peru is the most dollarised economy, with 70% of domestic bank loans denominated in foreign currency in 2005. In Asia in 2005, 28% of domestic bank loans in the Philippines were denominated in foreign currency, while in central Europe 47% of domestic bank loans in Hungary were denominated in foreign exchange (Annex 2 Table 1).

The dollarisation process (or "euroisation" in the case of central Europe, to be more accurate) seems to have increased in central Europe (to 27% in 2005), but to have declined slightly in Latin America. The credibility of macroeconomic policy and the quality of institutions are both key determinants of cross country variations in dollarisation. As expected, dollarised economies have a higher proportion of government debt denominated in foreign currency. In Latin America, 36% of Peru's total domestic debt securities was denominated in foreign currency in 2005. In Asia, 41% of Philippine debt was denominated in foreign currency, and in central Europe, 27% of Hungary's debt was denominated in foreign exchange.

But it is a second best solution. Dollarised financial systems tend to be shallower, and partially dollarised systems tend to be more fragile. Establishing an effective framework for monetary policy can develop confidence in the local currency. Greater confidence in the local currency helps to create the conditions for a deeper, more stable financial system. Hence de-dollarisation has become a major policy objective of partially dollarised countries. De-dollarisation gives the domestic central bank more ability to shape monetary policy according to domestic objectives: it strengthens the links between domestic interest rates and aggregate demand and allows exchange rate movement, which can improve the transmission of monetary policy. De-dollarisation can also strengthen the ability of the central bank to act as lender of last resort. Finally, de-dollarisation generates greater seigniorage from the increased demand for domestic money, which could be an important source of revenue for some low-income countries.

[92] This discussion focuses on partial dollarisation, in which a foreign currency circulates concurrently with a domestic currency and may be used to denominate banking accounts or other financial assets. Full or de jure dollarisation refers to the official adoption of another country's currency, as seen in Ecuador, El Salvador and Panama. Argentina considered dollarisation in the late 1990s as a replacement for its currency board system but decided against it, as issues of seigniorage were important.

Annex 2 Table 1

Bank deposits and loans in foreign currency

As a percentage of total deposits and loans

	2000		2005	
	Deposits	**Loans**	**Deposits**	**Loans**
Latin America	**21**	**45**	**6**	**17**
Colombia	...	8	...	6
Mexico	7	32	8	16
Peru	74	82	65	70
Asia, larger economies	**7**	**7**	**5**	**5**
Korea	5	10	4	4
Taiwan, China	9	4	8	3
Other Asia	**14**	**12**	**12**	**10**
Malaysia	2	2	3	2
Philippines	62	18	56	28
Central Europe	**19**	**24**	**17**	**29**
Czech Republic	15	21	12	13
Hungary	34	39	28	47
Poland	17	21	16	26
Turkey	45	33	35	16
South Africa	5	9	3	1

Note: Deposits of non-banks and loans to non-banks as reported in Table 5b of the Working Group survey (see Annex Table 12 for more details).

Sources: Working Group survey; BIS.

Forced de-dollarisations (Bolivia in 1982, Peru in 1985, and recently in Argentina) are likely to fail unless accompanied by a radical reorientation of macroeconomic policies. Residents can easily evade de-dollarisation rules by moving financial resources offshore and driving the dollarised economy underground. Hence recent policies have sought to encourage voluntary de-dollarisation by making the local currency alternatives more attractive.[93]

[93] For a comprehensive review of these issues, see Armas, Ize and Levy-Yeyati (2006) and particularly Ize and Levy-Yeyati (2005).

Annex 2 Box 1

De-dollarisation of the banking system in Peru

The rapid growth in nominal domestic currency government bonds – more than 73% over the period 2002–05 – permitted the creation of a yield curve. The growth in the domestic currency government bond market encouraged corporations and financial institutions to issue bonds in domestic currency and helped to lengthen the maturity of local currency denominated bonds; at the same time, the issuance of inflation-linked bonds and foreign currency denominated bonds declined. Several benefits have been achieved:

- Loans denominated in dollars are declining: institutional investors prefer domestic currency bonds, and deposits are increasing rapidly.
- Because of new opportunities in the domestic currency bond market, pension funds are keeping more of their contributions in local currencies rather than swapping them into dollars.
- Banks have stopped focusing on large corporate customers and begun targeting small and medium-sized enterprises and consumers.
- As a result of the lower rates on domestic loans than on foreign currency loans, corporations are shifting their demand from foreign currency loans to domestic currency loans.

The development of the domestic currency bond market and the de-dollarisation of the banking system have been made possible by the stable macro environment. The Central Reserve Bank of Peru is conscious of the exchange rate and liquidity risks related to financial dollarisation and is working to ensure monetary stability. In 2002, it adopted an inflation targeting approach, with a goal of inflation of 2.5% +/− 1 percentage point and the overnight interest rate as its operational target. To deal with these risks, it is attempting to reduce exchange rate volatility, requiring banks to maintain large reserves on their foreign currency liabilities, and keeping a high level of central bank international reserves.

The development of local currency bond markets can play a role in voluntary de-dollarisation. Annex 2 Box 1 describes Peru's recent approach of raising the cost of dollar intermediation, while expanding the menu of local currency substitutes and enhancing their attractiveness. Discussion at the workshop in Latin America concluded that widening the range of domestic currency assets in Peru (including an extension of the yield curve to 20 years) has indeed helped to reduce dollarisation and the associated currency and maturity mismatches.

Annex 3:
Local currency bonds: returns and correlations with global markets

The strong foreign investor interest presumably means that local currency bonds issued by the emerging market entities have offered foreign investors attractive returns in recent years. Three dimensions of returns on investment in local currency bonds are of interest: the mean return, the variance of returns, and the covariance of such returns with other assets in a global portfolio. The following paragraphs examine these three aspects.[94]

Portfolios based on indices

Annex 3 Table 1 summarises some statistics on the performance of local currency bonds over the period January 2002 to December 2006. This was an exceptionally good period for emerging markets, so the results discussed below should be viewed in this light.

The **average annual return** of an unhedged portfolio modelled on JPMorgan Chase's Government Bond Index of emerging market bonds (GBI EM) was 17.1% in dollar terms. Hedging the exchange rate risk, however, would have produced a much lower average return – only 6.1%. This unhedged return is still higher than a global government bond benchmark of developed countries (GBI G in Annex 3 Table 1). The size of this hedged/unhedged difference shows that exchange rate movements have played a crucial role. In particular, the interest rate parity condition has been violated – that is, the rate of nominal depreciation of EM currencies proved to be less than the initial interest rate differential vis-à-vis US dollar rates. This is partly because of the risk premium earned from holding a more volatile currency. But a large part of this excess return is unlikely to be replicated because it reflects the fact that fundamentals in several emerging market countries have improved much more during the past two to three years than markets expected in 2002.

A second important dimension is the **variance of the returns**. The volatility of EM bonds is significantly higher than that of portfolios of bonds of the major industrial countries.[95] Nevertheless, calculations show that the Sharpe ratio – the mean return divided by the variance – of portfolios of emerging market bonds has in recent years been well above that for classical dollar, euro and yen government benchmarks.[96] As Sharpe ratios are normally around 0.5, these ratios have encouraged global investors to include local currency debt in their portfolios. Nevertheless, estimates of the average variance of returns to EM debt paper over long periods are not necessarily a good guide to the variance when volatility in international capital markets rises.[97] The evidence from shorter periods of observation suggests that volatility in the local currency bond market has a tendency to rise more sharply than volatility in developed bond markets during periods of market stress (Annex 3 Graph 1, left hand panel).

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[94] A caveat is that return distributions are typically both skewed and have "fat tails", which cannot be identified simply by the mean and variance of returns.

[95] However, statistical estimates of volatility have a downward bias for securities that do not trade frequently.

[96] Sharpe ratios for portfolios of developed country bonds and equities are generally below 0.5 – compared with Sharpe ratios above 1, shown in Annex 3 Table 1.

[97] The IMF (2006) advances the interesting argument that conditions in global financial markets primarily affect the variance of emerging market asset prices rather than the mean prices.

Annex 3 Table 1

Risk return characteristics and diversification benefits versus other fixed income assets

January 2002 to December 2006

Description	Annual return	Annual volatility	Sharpe ratio[1]	Correlation vs GBI G[2]	Correlation vs US HY[3]	Correlation vs LEHAG[4]	Correlation vs EMBI+[5]
GBI EM, unhedged	17.1%	9.5%	1.53	0.25	0.37	0.37	0.41
Hedged into USD	6.1%	3.3%	1.05	0.57	0.27	0.59	0.39
Asia, unhedged	7.9%	5.4%	0.98	0.45	0.11	0.44	0.31
Hedged into USD	5.2%	4.0%	0.63	0.52	0.09	0.46	0.23
Europe, unhedged	16.7%	12.2%	1.16	0.34	0.27	0.35	0.36
Hedged into USD	5.0%	3.6%	0.66	0.49	0.10	0.47	0.32
Latin America, unhedged	8.9%	9.6%	0.66	0.17	0.45	0.19	0.52
Hedged into USD	7.9%	4.8%	1.09	0.27	0.55	0.38	0.63
GBI G, unhedged	8.4%	7.8%	0.27	–	0.09	0.66	0.29
Hedged into USD	7.9%	4.8%	1.09	–	0.00	0.87	0.32

[1] Ratio of the excess return of the index to the risk free return in US dollars and the index return volatility. [2] Total return correlation versus global government benchmark of developed countries hedged into US dollars. [3] Total return correlation versus US high-yield benchmark. [4] Total return correlation versus Lehman Aggregate benchmark. [5] EMBI+ comprises US dollar-denominated bonds and traded loans issued by sovereign entities rated BBB+ or lower.

Sources: JPMorgan Chase; Lehman Brothers; BIS calculations.

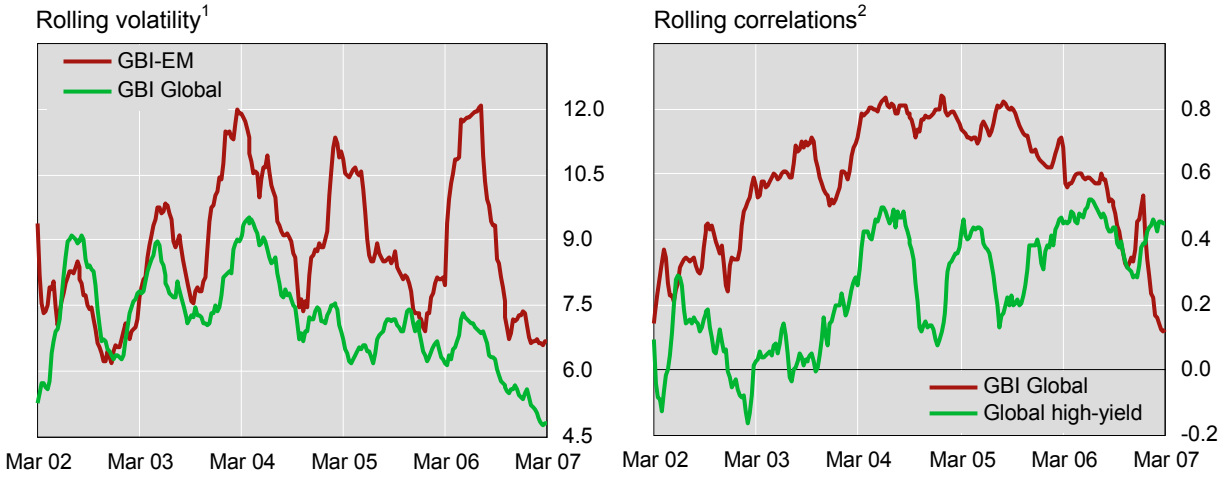
A final key feature is the **covariance** of the returns on a portfolio of emerging market local currency bonds with returns on traditional portfolios of government bonds from developed countries. The average correlation with GBI G over the whole period is rather low (0.25 in Annex 3 Table 1).[98] Over shorter periods, however, observed correlations have been higher (Annex 3 Graph 1, right hand panel). Hence local currency bonds from emerging markets appear to be good diversification vehicles for international investors over a medium-term horizon. Among the local bond markets, there is some evidence that the Asian bond markets show greater co-movement with government bonds of developed countries than with high yield corporate bonds (see Annex 3 Table 1). This behaviour might simply reflect the investment grade quality of Asian local currency bonds as compared with the non-investment-grade quality of many Latin American local currency bonds. From a financial stability point of view, one could interpret this to mean that increased concern about credit quality could have a greater effect on Latin American bond markets than on the Asian bond markets.

[98] See, for instance, "Emerging markets evolve as an asset class", JPMorgan Emerging Markets Research (2007), Giacomelli and Pianetti (2005) and Jeanneau and Tovar (2006).

Annex 3 Graph 1

Correlations and volatility of returns

Based on unhedged daily returns in US dollar terms; weekly averages



Note: GBI = government bond index.

[1] Standard deviation of daily percentage changes over a centred 90-day moving window, annualised. [2] Correlations with GBI-EM (emerging market local currency government bond index) over a centred 90-day moving window.

Source: JPMorgan Chase.

Preliminary work at the BIS has shown that covariances have remained comparatively low even in recent periods of market stress. The resurgence of turbulence that hit global financial markets during May 2006 seems to have confirmed this reassuring conclusion. The sell off was much heavier in local currency bond markets than in the markets for comparable international bonds. Although liquidity dried up in several markets, there was a significant rise in long-term bond rates only in a few markets. However, in a few countries, large outflows by foreign investors from local currency markets did lead to sharp depreciations in several emerging market currencies as non-residents were net sellers of forex exposure.

Specific benchmark bonds

The performance of certain individual (benchmark) bonds is also of considerable interest. Annex 3 Table 2 examines month on month changes in the yield of such bonds over the period 2003 to 2006. It is clear that the yields on government bonds in euros and sterling as well as the Australian and Hong Kong dollars – all markets where foreign investors are very active – are very responsive to month-to-month changes in US government bonds (see the *t* statistics, shown in the final column). Coefficients of correlation are relatively high.

But the yields on many emerging market bonds are much less responsive to changes in US rates. This may reflect a lack of integration with international capital markets (because capital controls are in place or because "captive" local investors are not sensitive to conditions in global markets). They may also reflect the influence of sharp changes in perceived creditworthiness (eg Brazil, Turkey); this would explain why the US non-investment-grade index is not closely correlated with that of the 10 year US government bond. It was clear in discussions with market participants in the regional workshops and the major financial centres that foreign investor interest in local currency bonds is increasing and is spreading across a broader range of financial intermediaries. There is, in short, a growing appreciation that adding local currency debt exposure can lift the yields of an optimally constructed portfolio for any given level of volatility.

Annex 3 Table 2

Yields on local currency government bonds with maturities close to 10 years,[1] 2003–2006

	Average yield	Standard deviation	Coefficient of correlation with US bonds[2]	Coefficient estimate[3]	*t*-statistic
Latin America	**...**	**...**	**...**	**...**	**...**
Argentina (03/2003–)	6.9	1.1	0.33	1.04	2.26
Brazil (12/2003–10/2006)	16.4	1.2	0.16	0.45	0.91
Chile	5.4	0.6	0.18	0.24	1.25
Colombia (–09/2006)	12.2	2.5	0.29	0.71	1.99
Mexico	10.4	2.7	0.44	1.46	3.33
Asia	**...**	**...**	**...**	**...**	**...**
India	6.5	0.9	–0.05	–0.06	–0.36
Indonesia (07/2003–)	11.9	1.2	0.04	0.13	0.25
Korea	5.0	0.4	0.43	0.52	3.26
Malaysia	2.8	0.5	0.09	0.08	0.63
Thailand	4.6	0.9	0.44	0.66	3.36
Taiwan, China	2.2	0.4	0.54	0.51	4.41
Central Europe	**...**	**...**	**...**	**...**	**...**
Czech Republic	4.0	0.5	0.67	0.52	5.82
Hungary	7.2	0.8	0.29	0.45	2.06
Poland	5.8	0.8	0.43	0.52	3.30
Other	**...**	**...**	**...**	**...**	**...**
Israel	5.1	1.6	0.04	0.04	0.24
Russia (04/2003–)	7.6	0.7	0.50	0.56	3.75
South Africa	8.7	0.9	0.35	0.57	2.40
Turkey (12/2004–)	15.7	2.4	–0.03	–0.24	–0.15
Memo:					
Australia	*5.5*	*0.3*	*0.86*	*0.70*	*11.76*
Euro area	*3.8*	*0.4*	*0.82*	*0.59*	*9.78*
Hong Kong SAR	*4.2*	*0.4*	*0.87*	*1.08*	*12.34*
United Kingdom	*4.6*	*0.3*	*0.77*	*0.51*	*8.23*
United States	*4.3*	*0.4*	*...*	*...*	*...*
US BB corporate bonds	*7.0*	*0.7*	*0.56*	*0.73*	*4.58*

[1] Ten year generic Bloomberg interest rates; for Brazil, 10 year NTN F issues; for Colombia, 10 year TES issued in pesos; for Israel, central bank headline interest rate; for Russia, government bond issued on 2 May 2003 and maturing on 8 August 2012; for Turkey, Merrill Lynch government index; for US BB corporate bonds, yields on BB rated Merrill Lynch US corporate bonds. Data not covering the horizon January 2003 to December 2006 are indicated in parentheses. [2] First differences, based on monthly averages. [3] Value of b in the following equation: $(IR_t - IR_{t-1}) = a + b\,(IRUS_t - IRUS_{t-1}) + error$.

Sources: Bloomberg; national data; BIS calculations.

Annex 4:
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Appendix 1:
Introductory notes to the statistical part of the report

1. Background on the questionnaire

The Working Group invited central banks to complete a statistical questionnaire. The structure and content of the questionnaire, which followed a similar exercise carried out in 2001,[99] was designed by a team composed of the CGFS secretariat staff, the International Financial Statistics (IFS) unit at the BIS and the Banco de Mexico.

This questionnaire supplements the BIS's quarterly statistics on international and domestic debt securities which are published regularly in the Quarterly Review and posted on its website (http://www.bis.org/statistics/secstats.htm). The questionnaire is reproduced in Annex 1.

Thirty three (33) countries completed the questionnaire. In order to handle the quantitative part of the CGFS questionnaire in an efficient way, the IFS section of the BIS developed a computer application, flexible enough to accept in an automated manner the responses to the questionnaire. The participants' contributions have therefore been imported, coded and saved in a relational database. Reports presenting the data expressed in local currency and in US dollars have been produced; 120 variables are captured in the database, covering annual data from 1995 to 2005. Please email Denis.Petre@bis.org in IFS with questions regarding the time series.

2. BIS staff involved

International Financial Statistics (IFS): Denis Pêtre and Carlos Mallo designed and maintained the computer application, conducted extensive quality control and managed the relations with the central banks contributing data to the survey. They produced the annex tables, aggregating and relating the data to macro economic indicators. Karsten von Kleist processed and analysed the qualitative part of the questionnaire and contributed to the drafting of the report. Swapan Pradhan provided research assistance to the CGFS Secretariat, and Thomas Jans, who prepares the regular quarterly statistics, provided advice in the preparatory process of the questionnaire. The IFS team worked under the general guidance of Philippe Mesny, Head of IFS.

Departmental Research Assistance (DRA): The contribution of DRA to the Working Group Survey included the production of tables and graphs for the report and some annex tables. DRA used data from the BIS/IFS relational database, from the IMF/DBS database for macroeconomic series, from the Emerging Market Traders' Association (EMTA) for trading volumes, from the BIS databank for securities data and from external data providers (eg JPMorgan Chase, Markit, Moody's). The contributors from the DRA section were Anna Cobau, San Sau Fung, Clara Garcia, Philippe Hainaut, Marjorie Santos and Jhuvesh Sobrun under the supervision of Marc Klau, Head of DRA.

[99] See BIS (2002).

3. Classifications and definitions

- **Local debt securities:** are considered as local issues in this report the debt securities issued in the local market (ie securities normally issued under local law, cleared and settled locally). They include issuance by non-residents in the local market, as well as local issuance in foreign currencies. As a consequence, non-local issues comprise all foreign currency debt securities issued abroad by residents of a given country and all domestic currency issues by residents and non-residents which are governed by foreign law.
- **Resident/non-resident;** residence in the report follows the standard balance of payments (BOP) and international investment position (IIP) concept defined as follows: "The residence of an institutional unit is the economic territory with which it has the strongest connection, in other words its predominant centre of economic interest"(BPM6).
- **Debt securities.** Debt Securities exclude equities (shares). They comprise money market instruments (short-term instruments, ie with an **original** maturity of up to one year) and bonds and notes (long-term instruments, ie with an **original** maturity of more than one year).
- **Maturity:** the concepts used in BOP/IIP and monetary statistics have been proposed in the report, ie classification of the instruments on the basis of **original** maturity (contractual term at issuance). For instance, money market instruments are the debt securities having an original maturity of up to one year. Additional information on **residual** (ie, the time remaining until the payment of outstanding obligations) has also been requested. On this basis debt securities up to 1 year would also comprise the portion of bonds and notes falling due within 1 year.
- **Valuation:** Debt securities are measured at **nominal** (face) value in the report.
- **Repos** (repurchase agreements): these were not included originally in the questionnaire, but were dealt with on a case-by-case basis.

4. Participating countries

The following countries have reported data: Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Colombia, the Czech Republic, Germany, Hong Kong SAR, Hungary, India, Indonesia, Israel, Japan, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Spain, Taiwan China, Thailand, Turkey, the United Kingdom, the United States and Venezuela.

Notations used in the report tables:

… not available

0 negligible or nil

Whenever a series component is reported by a country while the other components of the same series are not, the percentage of total is calculated on the basis of the reported values.

If A = "…", B = 5, C = "…"

Then A = "…", B = 100% and C = "…"

Annex tables

Annex Table 1

Financial system assets

(as a percentage of GDP)

	1995			2000			2005		
	Deposit money banks' assets	Equity market capitali–sation	Total bonds[1]	Deposit money banks' assets	Equity market capitali–sation	Total bonds[1]	Deposit money banks' assets	Equity market capitali–sation	Total bonds[1]
Latin America	**37**	**24**	**32**	**42**	**33**	**46**	**42**	**43**	**58**
Argentina	26	15	27	33	58	49	30	34	73
Brazil	43	19	38	49	35	62	53	54	72
Chile	50	104	41	62	80	57	68	115	49
Colombia	20	19	9	24	11	30	32	37	45
Mexico	44	32	28	45	22	37	36	31	44
Peru	17	22	2	29	20	15	22	45	19
Venezuela	16	5	36	14	7	22	17	3	69
Asia, larger economies	**65**	**22**	**27**	**103**	**40**	**35**	**107**	**54**	**56**
China	89	6	8	133	48	18	126	35	41
India	34	36	21	45	32	26	61	71	37
Korea	52	35	58	83	29	83	99	91	117
Taiwan, China	...	68	29	...	77	40	...	140	62
Other Asia	**94**	**88**	**23**	**89**	**49**	**50**	**72**	**62**	**53**
Indonesia	56	30	3	52	16	34	38	28	21
Malaysia	130	251	78	141	129	99	124	139	113
Philippines	48	78	43	54	68	50	44	41	71
Thailand	146	84	12	124	24	35	106	70	51
Central Europe	**42**	**9**	**30**	**39**	**20**	**32**	**46**	**31**	**48**
Czech Republic	80	28	22	52	19	41	51	31	55
Hungary	37	5	62	41	25	56	63	29	60
Poland	28	3	22	34	18	22	37	31	41
Russia	18	...	6	22	15	17	30	72	9
Other	**43**	**95**	**44**	**68**	**75**	**33**	**64**	**143**	**34**
Israel	90	...	1	88	53	6	103	93	10
Turkey	23	12	20	52	35	38	53	45	60
Saudi Arabia	37	...	0	42	36	0	51	208	0
South Africa	64	186	69	75	154	49	78	234	50
TOTAL EMERGING MARKETS	**55**	**36**	**30**	**74**	**40**	**40**	**77**	**61**	**53**
Hong Kong SAR	155	211	28	168	369	43	165	593	56
Singapore	106	179	28	121	167	55	120	178	93
INDUSTRIAL COUNTRIES[2]	**82**	**75**	**120**	**82**	**139**	**143**	**95**	**119**	**166**

Note: Deposit money banks' assets refer (whenever available) to the claims on the private sector, non-financial public enterprises and central and local governments (lines 22a, 22b, 22c and 22d of the IMF's International Financial Statistics).

[1] Total bonds include domestic and international debt securities from the BIS database. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Datastream; IMF; Standard & Poor's; Working Group survey; World Bank; BIS.

Annex table 2

Total emerging markets debt outstanding[1]

(in billions of US dollars)

	1995				2000				2005			
	Total	**Internat.[2]**	**Domestic public sector[3]**	**Domestic private sector[4]**	**Total**	**Internat.[2]**	**Domestic public sector[3]**	**Domestic private sector[4]**	**Total**	**Internat.[2]**	**Domestic public sector[3]**	**Domestic private sector[4]**
Latin America	**430**	**186**	**221**	**24**	**806**	**299**	**432**	**74**	**1,282**	**272**	**797**	**212**
Argentina	...	44	23	...	...	91	42	...	...	60	81	...
Brazil	233	61	149	23	374	85	262	27	572	82	419	71
Chile	18	1	17	0	33	8	21	4	52	15	24	14
Colombia	8	2	7	0	32	9	17	7	64	15	41	8
Mexico	77	60	17	0	197	86	77	34	330	66	151	113
Peru	0	0	0	0	11	4	4	2	22	8	9	6
Venezuela	27	19	9	0	25	16	8	1	100	26	74	0
Asia, larger economies	**198**	**45**	**94**	**59**	**962**	**70**	**505**	**387**	**2,426**	**122**	**1,532**	**772**
China	...	12	1	...	239	13	135	92	936	17	636	283
India	64	4	58	2	102	4	96	1	238	9	223	6
Korea	...	27	...	...	477	47	210	220	987	75	516	395
Taiwan, China	95	3	36	57	144	6	64	73	266	21	157	87
Other Asia	**124**	**23**	**75**	**26**	**229**	**47**	**128**	**55**	**359**	**70**	**209**	**80**
Indonesia	16	4	7	5	55	3	51	2	60	7	47	6
Malaysia	54	7	31	16	86	15	30	41	136	24	55	56
Philippines	32	7	25	0	38	17	21	0	70	29	40	1
Thailand	22	5	12	5	50	12	26	12	93	11	66	16
Central Europe	**56**	**23**	**31**	**1**	**98**	**17**	**73**	**8**	**277**	**54**	**203**	**20**
Czech Republic	...	1	...	...	24	1	18	4	70	6	55	8
Hungary	30	16	13	1	29	10	17	1	69	19	43	7
Poland	...	6	19	...	46	6	37	3	138	29	105	5
Russia	...	1	...	...	...	38	7	...	...	43	26	...
Other	**193**	**17**	**171**	**4**	**325**	**34**	**286**	**6**	**514**	**60**	**428**	**26**
Israel	...	1	10	...	...	7	17	...	...	13	24	...
Turkey	...	13	...	...	85	21	64	0	234	34	200	0
Saudi Arabia	71	0	71	0	145	0	145	0	119	1	117	1
South Africa	98	3	91	4	71	6	59	6	125	12	87	25
TOTAL EMERGING MARKETS	**1,002**	**294**	**593**	**114**	**2,463**	**504**	**1,430**	**530**	**4,927**	**621**	**3,196**	**1,110**
Hong Kong SAR	...	16	8	...	...	28	14	...	...	50	20	...
Singapore	...	1	...	...	...	9	...	...	...	40	...	21
INDUSTRIAL COUNTRIES[5]	**15,471**	**985**	**6,743**	**7,743**	**22,059**	**3,461**	**6,344**	**12,255**	**35,851**	**8,267**	**9,270**	**18,314**

[1] Includes bonds, notes and money-market instruments. Regional aggregates based on the countries listed in the table. [2] International bonds, notes and money market instruments (all sectors) from the BIS database. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [4] Sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector other than quasi-government and other non-resident issuers reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 2A

Total emerging markets money-market instruments outstanding[1]

(in billions of US dollars)

	1995				2000				2005			
	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]
Latin America	**23**	**5**	**9**	**9**	**81**	**4**	**38**	**39**	**138**	**1**	**74**	**64**
Argentina	…	1	0	…	…	1	14	…	…	0	7	…
Brazil	…	2	…	9	…	2	…	13	64	1	29	34
Chile	0	0	0	0	3	0	3	0	4	0	4	0
Colombia	1	0	1	0	1	0	0	1	2	0	1	1
Mexico	7	1	7	0	44	1	19	24	56	0	28	27
Peru	0	0	0	0	0	0	0	0	1	0	1	0
Venezuela	2	0	2	0	2	0	2	1	4	0	3	0
Asia, larger economies	**69**	**2**	**14**	**53**	**132**	**1**	**20**	**110**	**516**	**2**	**351**	**163**
China	…	0	…	…	…	0	1	…	292	0	275	17
India	14	0	12	2	5	0	3	1	13	0	7	6
Korea	…	2	…	…	60	1	2	57	126	2	18	106
Taiwan, China	53	0	3	50	65	0	13	52	84	0	51	34
Other Asia	**15**	**0**	**9**	**5**	**15**	**1**	**10**	**4**	**33**	**0**	**30**	**2**
Indonesia	7	0	5	2	6	0	6	0	7	0	6	1
Malaysia	7	0	4	3	7	0	3	4	7	0	6	2
Philippines	…	0	…	…	0	0	0	0	0	0	0	0
Thailand	0	0	0	0	2	0	1	0	18	0	18	0
Central Europe	**18**	**0**	**17**	**0**	**35**	**0**	**32**	**3**	**61**	**0**	**58**	**2**
Czech Republic	…	0	…	…	16	0	16	0	34	0	34	0
Hungary	4	0	4	0	6	0	6	0	10	0	10	0
Poland	…	0	14	…	13	0	11	3	17	0	15	2
Russia	…	0	…	…	…	0	0	…	…	0	1	…
Other	**14**	**0**	**10**	**4**	**20**	**0**	**17**	**4**	**45**	**0**	**42**	**3**
Israel	…	0	6	…	…	0	11	…	…	0	18	…
Turkey	…	0	…	…	1	0	1	0	15	0	15	0
Saudi Arabia	2	0	2	0	0	0	0	0	2	0	2	0
South Africa	7	0	2	4	9	0	5	4	10	0	7	3
TOTAL EMERGING MARKETS	**139**	**7**	**60**	**72**	**283**	**6**	**118**	**160**	**794**	**3**	**556**	**235**
Hong Kong SAR	…	0	6	…	…	3	9	…	…	2	9	…
Singapore	…	0	…	…	…	0	…	…	…	3	…	1
INDUSTRIAL COUNTRIES[5]	**2,348**	**86**	**1,053**	**1,209**	**3,944**	**308**	**802**	**2,834**	**5,126**	**354**	**1,251**	**3,522**

[1] Includes only money-market instruments, excludes bonds and notes. Regional aggregates based on the countries listed in the table. [2] International money-market instruments (all sectors) from the BIS database. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Table 2a (money-market instruments) of the Working Group survey. [4] Sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector other than quasi-government and other non-resident issuers reported in Table 2a (money-market instruments) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 2B

Total emerging markets bonds outstanding[1]

(in billions of US dollars)

	1995				2000				2005			
	Total	Internat.[2]	Domestic public [3]	Domestic private [4]	Total	Internat.[2]	Domestic public [3]	Domestic private [4]	Total	Internat.[2]	Domestic public [3]	Domestic private [4]
Latin America	**407**	**181**	**212**	**14**	**724**	**295**	**394**	**35**	**1,143**	**271**	**724**	**148**
Argentina	…	43	23	…	…	90	28	…	…	60	74	…
Brazil	221	58	149	14	359	83	262	13	508	82	390	36
Chile	…	1	17	…	30	8	19	4	49	15	20	14
Colombia	…	2	6	…	31	9	17	6	62	15	40	7
Mexico	69	59	10	0	153	85	58	10	274	66	122	86
Peru	0	0	0	0	10	4	4	2	21	8	7	5
Venezuela	26	19	7	0	23	16	6	0	96	26	70	0
Asia, larger economies	**129**	**43**	**80**	**6**	**830**	**69**	**485**	**277**	**1,911**	**121**	**1,181**	**609**
China	…	12	1	…	238	13	134	92	644	17	361	266
India	…	4	46	…	…	4	92	…	…	9	216	…
Korea	…	25	…	…	417	46	208	163	861	74	499	289
Taiwan, China	42	3	33	6	78	6	51	22	181	21	106	54
Other Asia	**110**	**23**	**66**	**21**	**215**	**46**	**118**	**51**	**326**	**70**	**179**	**77**
Indonesia	9	4	2	3	49	3	45	2	53	7	41	5
Malaysia	47	7	27	13	79	15	27	37	128	24	50	55
Philippines	32	7	25	0	38	17	21	0	70	29	40	1
Thailand	22	5	12	5	48	12	25	12	75	10	48	16
Central Europe	**38**	**23**	**14**	**1**	**62**	**17**	**40**	**6**	**216**	**54**	**145**	**17**
Czech Republic	…	1	…	…	8	1	3	4	36	6	22	8
Hungary	26	16	9	1	22	10	11	1	58	19	34	6
Poland	…	6	5	…	32	6	26	1	121	29	90	3
Russia	…	1	…	…	…	38	6	…	…	43	25	…
Other	**179**	**17**	**162**	**0**	**304**	34	**269**	**2**	**469**	**60**	**386**	**23**
Israel	…	1	4	…	…	7	6	…	…	13	5	…
Turkey	…	13	…	…	84	21	63	0	219	34	185	0
Saudi Arabia	69	0	69	0	145	0	145	0	117	1	115	1
South Africa	91	3	88	0	62	6	54	2	114	12	80	22
TOTAL EMERGING MARKETS	**864**	**287**	**534**	**43**	**2,180**	**498**	**1,312**	**369**	**4,133**	**618**	**2,640**	**875**
Hong Kong SAR	…	16	2	…	…	25	5	…	…	48	11	…
Singapore	…	1	…	…	…	9	…	…	…	37	…	20
INDUSTRIAL COUNTRIES[5]	**13,123**	**899**	**5,690**	**6,534**	**18,115**	**3,153**	**5,542**	**9,420**	**30,725**	**7,913**	**8,019**	**14,793**

[1] Includes only bonds and notes, excludes money-market instruments. Regional aggregates based on the countries listed in the table. [2] International bonds (all sectors) from the BIS database. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Table 2b (bonds and notes) of the Working Group survey. [4] Sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector Other than quasi-government and other non-resident issuers reported in Table 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 3

Total emerging markets debt outstanding[1]

(as a percentage of GDP)

	1995				2000				2005			
	Total	Internat.[2]	Domestic public [3]	Domestic private [4]	Total	Internat.[2]	Domestic public [3]	Domestic private [4]	Total	Internat.[2]	Domestic public [3]	Domestic private [4]
Latin America												
Argentina	...	17	9	...	...	32	15	...	...	33	45	...
Brazil	33	9	21	3	62	14	44	4	72	10	53	9
Chile	25	1	24	0	44	10	29	5	45	13	21	12
Colombia	9	2	7	0	38	10	20	8	52	12	33	7
Mexico	27	21	6	0	34	15	13	6	43	9	20	15
Peru	1	0	0	0	20	8	7	4	28	10	11	7
Venezuela	36	24	11	0	22	14	7	1	75	19	55	0
Asia, larger economies												
China	...	2	0	...	20	1	11	8	42	1	28	13
India	18	1	16	1	22	1	21	0	31	1	29	1
Korea	...	5	...	...	93	9	41	43	125	10	66	50
Taiwan, China	35	1	13	21	45	2	20	23	77	6	45	25
Other Asia												
Indonesia	7	2	3	2	33	2	31	1	21	2	17	2
Malaysia	61	8	35	18	95	17	33	46	104	18	42	43
Philippines	43	9	33	0	50	23	27	0	71	30	41	1
Thailand	13	3	7	3	41	10	21	9	54	6	38	9
Central Europe												
Czech Republic	...	2	...	...	41	1	32	8	56	5	44	7
Hungary	67	35	28	3	61	22	37	2	63	17	40	6
Poland	...	4	14	...	27	3	21	2	46	9	35	2
Russia	...	0	...	...	...	14	3	...	...	6	3	...
Other												
Israel	...	1	11	...	...	6	14	...	...	10	18	...
Turkey	...	8	...	...	43	10	32	0	64	9	55	0
Saudi Arabia	50	0	50	0	77	0	77	0	39	0	38	0
South Africa	65	2	60	3	53	5	44	4	52	5	36	11
TOTAL EMERGING MARKETS												
Hong Kong SAR	...	11	5	...	...	16	8	...	...	28	11	...
Singapore	...	1	...	...	...	10	...	...	...	34	...	18
INDUSTRIAL COUNTRIES[5]												

[1] Includes bonds, notes and money-market instruments. [2] International bonds, notes and money market instruments (all sectors) from the BIS database. [3] Numerator calculated as the sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [4] Numerator calculated as the sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector other than quasi-government and other non-resident issuers reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; IMF; BIS.

Annex table 3A

Total emerging markets money-market instruments outstanding[1]

(as a percentage of GDP)

	1995				2000				2005			
	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]
Latin America												
Argentina	…	1	0	…	…	0	5	…	…	0	4	…
Brazil	…	0	…	1	…	0	…	2	8	0	4	4
Chile	0	0	0	0	4	0	4	0	3	0	3	0
Colombia	1	0	1	0	1	0	0	1	2	0	1	1
Mexico	3	0	2	0	8	0	3	4	7	0	4	4
Peru	0	0	0	0	1	0	1	0	2	0	1	0
Venezuela	2	0	2	0	2	0	2	0	3	0	3	0
Asia, larger economies												
China	…	0	…	…	…	0	0	…	13	0	12	1
India	4	0	3	1	1	0	1	0	2	0	1	1
Korea	…	0	…	…	12	0	0	11	16	0	2	14
Taiwan, China	19	0	1	18	20	0	4	16	24	0	15	10
Other Asia												
Indonesia	3	0	2	1	4	0	4	0	2	0	2	0
Malaysia	8	0	5	4	8	0	3	4	6	0	4	1
Philippines	…	0	…	…	0	0	0	0	0	0	0	0
Thailand	0	0	0	0	1	0	1	0	11	0	10	0
Central Europe												
Czech Republic	…	0	…	…	28	0	28	0	27	0	27	0
Hungary	9	0	8	1	14	0	13	0	9	0	9	0
Poland	…	0	10	…	8	0	6	2	6	0	5	1
Russia	…	0	…	…	…	0	0	…	…	0	0	…
Other												
Israel	…	0	6	…	…	0	9	…	…	0	14	…
Turkey	…	0	…	…	1	0	1	0	4	0	4	0
Saudi Arabia	1	0	1	0	0	0	0	0	1	0	1	0
South Africa	5	0	2	3	7	0	4	3	4	0	3	1
TOTAL EMERGING MARKETS												
Hong Kong SAR	…	0	4	…	…	2	6	…	…	1	5	…
Singapore	…	0	…	…	…	0	…	…	…	3	…	1
INDUSTRIAL COUNTRIES[5]	**…**	**0**	**…**	**…**	**…**	**0**	**…**	**…**	**…**	**0**	**…**	**…**

[1] Includes only money-market instruments, excludes bonds and notes. [2] International money-market instruments (all sectors) from the BIS database. [3] Numerator calculated as the sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Table 2a (money-market instruments) of the Working Group survey. [4] Numerator calculated as the sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector other than quasi-government and other non-resident issuers reported in Table 2a (money-market instruments) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; IMF; BIS.

Annex table 3B

Total emerging markets bonds outstanding[1]

(as a percentage of GDP)

	1995				2000				2005			
	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]	Total	Internat.[2]	Domestic public[3]	Domestic private[4]
Latin America												
Argentina	…	17	9	…	…	32	10	…	…	33	41	…
Brazil	31	8	21	2	60	14	44	2	64	10	49	5
Chile	…	1	24	…	40	10	25	5	42	13	17	12
Colombia	…	2	6	…	37	10	20	7	50	12	32	6
Mexico	24	21	4	0	26	15	10	2	36	9	16	11
Peru	0	0	0	0	19	8	7	4	26	10	9	7
Venezuela	33	24	9	0	20	14	5	0	72	19	53	0
Asia, larger economies												
China	…	2	0	…	20	1	11	8	29	1	16	12
India	…	1	13	…	…	1	20	…	…	1	28	…
Korea	…	5	…	…	81	9	41	32	109	9	63	37
Taiwan, China	15	1	12	2	24	2	16	7	52	6	31	16
Other Asia												
Indonesia	4	2	1	1	30	2	27	1	19	2	15	2
Malaysia	53	8	31	14	88	16	30	41	98	18	38	42
Philippines	43	9	33	0	50	23	27	0	71	30	41	1
Thailand	13	3	7	3	39	9	20	9	43	6	28	9
Central Europe												
Czech Republic	…	2	…	…	14	1	5	8	29	5	17	7
Hungary	58	35	20	3	47	22	24	1	54	17	31	6
Poland	…	4	4	…	19	3	15	0	40	9	30	1
Russia	…	0	…	…	…	14	2	…	…	6	3	…
Other												
Israel	…	1	5	…	…	6	5	…	…	10	4	…
Turkey	…	8	…	…	42	10	32	0	60	9	51	0
Saudi Arabia	48	0	48	0	77	0	77	0	38	0	37	0
South Africa	61	2	58	0	47	5	41	1	48	5	33	9
TOTAL EMERGING MARKETS												
Hong Kong SAR	…	11	1	…	…	15	3	…	…	27	6	…
Singapore	…	1	…	…	…	9	…	…	…	31	…	17
INDUSTRIAL COUNTRIES[5]	**…**	**0**	**…**	**…**	**…**	**0**	**…**	**…**	**…**	**0**	**…**	**…**

[1] Includes only bonds and notes, excludes money-market instruments. [2] International bonds (all sectors) from the BIS database. [3] Numerator calculated as the sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident official issuers reported in Table 2b (bonds and notes) of the Working Group survey. [4] Numerator calculated as the sum of: Banking sector, Non-bank financial institutions, Non-financial corporate sector other than quasi-government and other non-resident issuers reported in Table 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; IMF; BIS.

Annex table 4

Structure of debt securities outstanding[1]

(as a percentage of total debt securities outstanding)

	1995		2000		2005	
	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]
Latin America	**57**	**87**	**63**	**83**	**79**	**79**
Argentina	…	…	…	…	…	…
Brazil	74	85	77	88	86	85
Chile	96	98	76	68	72	58
Colombia	80	97	73	78	77	85
Mexico	22	84	56	74	80	61
Peru	69	69	59	75	64	73
Venezuela	32	98	35	94	74	98
Asia, larger economies	**77**	**62**	**93**	**57**	**95**	**66**
China	…	…	95	62	98	70
India	94	94	96	95	96	94
Korea	…	…	90	50	92	57
Taiwan, China	97	38	96	45	92	59
Other Asia	**82**	**71**	**80**	**67**	**80**	**71**
Indonesia	76	56	95	95	89	88
Malaysia	87	66	83	45	82	49
Philippines	79	96	55	87	59	92
Thailand	75	61	76	61	88	77
Central Europe	**59**	**97**	**83**	**91**	**81**	**91**
Czech Republic	…	…	97	80	91	85
Hungary	47	95	64	96	73	88
Poland	…	…	88	93	79	96
Russia	…	…	…	…	…	…
Other	**91**	**97**	**90**	**97**	**88**	**93**
Israel	…	…	…	…	…	…
Turkey	…	…	76	99	86	98
Saudi Arabia	100	100	100	100	99	98
South Africa	97	95	91	90	90	77
TOTAL EMERGING MARKETS	**71**	**82**	**80**	**74**	**87**	**74**
Hong Kong SAR	…	…	…	…	…	…
Singapore	…	…	…	…	…	…
INDUSTRIAL COUNTRIES[4]	**94**	**46**	**84**	**31**	**77**	**30**

[1] Includes bonds, notes and money-market instruments. Regional aggregates based on the countries listed in the table. [2] Domestic issues as reported in Table 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident as reported in Table 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey, plus international bonds, notes and money-market instruments issued by the public sector from the BIS database. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 4A

Structure of money-market instruments outstanding[1]

(as a percentage of total money-market instruments outstanding)

	1995		2000		2005	
	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]
Latin America	**80**	**44**	**95**	**48**	**99**	**53**
Argentina	…	…	…	…	…	…
Brazil	…	…	…	…	99	45
Chile	100	100	100	100	100	100
Colombia	94	94	100	0	100	42
Mexico	90	95	99	43	100	51
Peru	97	97	100	84	100	78
Venezuela	100	85	100	78	100	90
Asia, larger economies	**97**	**21**	**99**	**16**	**100**	**68**
China	…	…	…	…	100	94
India	100	82	100	70	100	56
Korea	…	…	98	4	99	15
Taiwan, China	100	5	100	21	100	60
Other Asia	**97**	**64**	**97**	**72**	**99**	**93**
Indonesia	100	74	100	100	100	90
Malaysia	100	56	97	41	100	77
Philippines	…	…	100	2	100	11
Thailand	0	26	81	100	98	100
Central Europe	**100**	**99**	**100**	**92**	**100**	**96**
Czech Republic	…	…	100	100	100	100
Hungary	100	94	100	97	100	96
Poland	…	…	100	80	100	88
Russia	…	…	…	…	…	…
Other	**99**	**68**	**100**	**81**	**100**	**93**
Israel	…	…	…	…	…	…
Turkey	…	…	100	100	100	100
Saudi Arabia	100	100	0	0	100	100
South Africa	98	34	100	55	100	68
TOTAL EMERGING MARKETS	**95**	**44**	**98**	**42**	**100**	**70**
Hong Kong SAR	…	…	…	…	…	…
Singapore	…	…	…	…	…	…
INDUSTRIAL COUNTRIES[4]	**96**	**45**	**92**	**22**	**93**	**25**

[1] Includes only money-market instruments, excludes bonds and notes. Regional aggregates based on the countries listed in the table. [2] Domestic issues as reported in Table 2a (money-market instruments) of the Working Group survey. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident as reported in Table 2a (money-market instruments) of the Working Group survey, plus international money-market instruments issued by the public sector from the BIS database. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 4B

Structure of bonds outstanding

(as a percentage of total bonds outstanding)

	1995		2000		2005	
	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]	Domestic issues[2]	Public sector issues[3]
Latin America	**56**	**89**	**59**	**87**	**76**	**83**
Argentina	…	…	…	…	…	…
Brazil	74	89	77	91	84	90
Chile	…	…	74	65	69	54
Colombia	…	…	72	80	76	87
Mexico	15	83	44	83	76	63
Peru	0	0	57	75	61	73
Venezuela	27	99	29	95	73	99
Asia, larger economies	**67**	**84**	**92**	**64**	**94**	**65**
China	…	…	95	61	97	59
India	…	…	…	…	…	…
Korea	…	…	89	57	91	63
Taiwan, China	94	79	92	65	88	59
Other Asia	**80**	**72**	**78**	**67**	**79**	**69**
Indonesia	57	42	94	94	88	88
Malaysia	85	67	81	46	81	47
Philippines	79	96	55	87	59	92
Thailand	77	61	76	59	86	71
Central Europe	**40**	**96**	**73**	**90**	**75**	**90**
Czech Republic	…	…	91	41	83	72
Hungary	40	95	53	96	68	86
Poland	…	…	82	98	76	97
Russia	…	…	…	…	…	…
Other	**91**	**99**	**89**	**98**	**87**	**93**
Israel	…	…	…	…	…	…
Turkey	…	…	75	99	85	98
Saudi Arabia	100	100	100	100	99	98
South Africa	97	99	90	95	90	78
TOTAL EMERGING MARKETS	**67**	**89**	**77**	**78**	**85**	**75**
Hong Kong SAR	…	…	…	…	…	…
Singapore	…	…	…	…	…	…
INDUSTRIAL COUNTRIES[4]	**93**	**46**	**83**	**33**	**74**	**30**

[1] Includes only bonds and notes, excludes money-market instruments. Regional aggregates based on the countries listed in the table. [2] Domestic issues as reported in Table 2b (bonds and notes) of the Working Group survey. [3] Sum of: Central Government, Other Government, Central Bank, Quasi-government and Non-resident as reported in Table 2b (bonds and notes) of the Working Group survey, plus international bonds and notes issued by the public sector from the BIS database. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 5

Issuers of domestic debt securities[1]

(as a percentage of total domestic debt securities outstanding)

	1995				2000				2005			
	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]
Latin America	**4**	**32**	**58**	**6**	**11**	**15**	**70**	**4**	**14**	**12**	**67**	**7**
Argentina	...	0	100	...	...	22	78	...	...	13	87	...
Brazil	5	31	55	8	5	15	76	5	7	1	85	7
Chile	0	100	0	0	0	85	1	14	0	52	11	37
Colombia	0	3	97	...	28	0	72	...	17	0	83	...
Mexico	0	0	100	...	31	2	67	...	37	9	48	6
Peru	0	100	0	...	19	6	57	18	19	18	43	20
Venezuela	...	77	19	4	...	0	92	8	...	84	16	1
Asia, larger economies	**15**	**1**	**60**	**23**	**21**	**7**	**49**	**23**	**22**	**21**	**45**	**12**
China	...	...	100	...	39	1	59	2	27	30	39	4
India	4	0	96	0	0	0	98	1	1	0	97	1
Korea	…	…	…	…	18	13	36	33	24	19	38	19
Taiwan, China	23	2	37	38	13	8	39	41	15	20	44	21
Other Asia	**4**	**7**	**68**	**22**	**0**	**1**	**69**	**30**	**1**	**7**	**65**	**27**
Indonesia	33	34	26	7	1	1	95	2	5	2	87	7
Malaysia	0	5	62	33	0	2	40	58	0	4	46	50
Philippines	0	0	99	0	0	0	99	1	0	0	98	2
Thailand	0	2	66	31	0	0	69	31	0	19	61	20
Central Europe	**1**	**6**	**89**	**3**	**6**	**25**	**65**	**4**	**8**	**17**	**74**	**1**
Czech Republic	…	…	…	…	19	46	34	0	13	45	42	0
Hungary	2	0	90	8	2	9	87	2	13	0	86	1
Poland	...	11	89	...	1	20	72	7	2	9	87	2
Russia	…	…	…	…	...	0	100	...	...	4	96	...
Other	**3**	**3**	**94**	**0**	**2**	**4**	**94**	**0**	**5**	**4**	**90**	**1**
Israel	...	56	44	...	...	62	38	...	...	77	23	...
Turkey	…	…	…	…	0	0	100	0	0	0	100	0
Saudi Arabia	0	0	100	0	0	0	100	0	1	0	99	0
South Africa	5	0	95	0	7	1	91	2	18	1	77	4
TOTAL EMERGING MARKETS	**6**	**13**	**70**	**10**	**13**	**9**	**64**	**14**	**16**	**16**	**58**	**10**
Hong Kong SAR	...	...	100	...	...	...	100	...	...	...	100	...
Singapore	…	…	…	…	…	…	…	…	...	...	...	100
INDUSTRIAL COUNTRIES[5]	**41**	**0**	**47**	**12**	**52**	**0**	**34**	**14**	**55**	**0**	**34**	**11**

[1] Includes bonds, notes and money-market instruments. Regional aggregates based on the countries listed in the table. [2] Sum of: Banking sector, non-bank financial institutions and other non-resident issuers as reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [3] Sum of: Central Government, other governments, quasi-government and non-resident official issuers as reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [4] Non-financial, corporate sector other than quasi-government as reported in Tables 2a (money-market instruments) and 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

Annex table 5A

Issuers of domestic money-market instruments[1]

(as a percentage of total domestic money market instruments outstanding)

	1995				2000				2005			
	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]
Latin America	**49**	**2**	**48**	**1**	**50**	**16**	**33**	**1**	**44**	**8**	**45**	**2**
Argentina	...	0	100	...	...	65	35	...	...	100	0	...
Brazil	100	...	...	0	100	...	...	0	54	0	46	0
Chile	0	100	0	0	0	100	0	0	0	100	0	0
Colombia	0	33	67	...	100	0	0	...	58	0	42	...
Mexico	0	0	100	...	56	0	44	...	44	0	51	5
Peru	0	100	0	...	3	84	0	13	8	78	0	14
Venezuela	...	...	85	15	...	...	78	22	...	...	90	10
Asia, larger economies	**30**	**2**	**19**	**49**	**27**	**11**	**4**	**58**	**18**	**66**	**2**	**14**
China	…	…	…	…	...	100	...	...	...	94	...	6
India	16	0	82	1	5	0	70	25	20	0	56	24
Korea	…	…	…	…	34	3	0	63	64	14	0	22
Taiwan, China	33	3	2	62	23	17	4	57	13	58	2	26
Other Asia	**13**	**45**	**20**	**22**	**0**	**17**	**55**	**28**	**1**	**57**	**36**	**7**
Indonesia	26	58	16	0	0	12	88	0	3	14	76	7
Malaysia	0	33	24	44	0	26	16	58	0	61	16	23
Philippines	…	…	…	…	98	2	...	...	89	11	...	...
Thailand	0	0	0	0	0	0	100	0	0	72	28	0
Central Europe	**0**	**12**	**87**	**1**	**1**	**49**	**43**	**7**	**2**	**59**	**37**	**2**
Czech Republic	…	…	…	…	0	68	32	0	0	85	15	0
Hungary	1	0	94	5	2	25	72	1	3	0	96	1
Poland	...	15	85	...	3	37	43	17	7	42	46	5
Russia	…	…	…	…	...	...	100	...	...	100	0	...
Other	**32**	**41**	**28**	**0**	**19**	**54**	**27**	**0**	**7**	**42**	**50**	**0**
Israel	...	100	...	...	...	100	...	...	...	100	...	...
Turkey	…	…	…	…	0	0	100	0	0	0	100	0
Saudi Arabia	0	0	100	0	0	0	0	0	0	0	100	0
South Africa	66	0	34	0	45	5	50	0	32	8	60	0
TOTAL EMERGING MARKETS	**27**	**12**	**33**	**28**	**28**	**21**	**22**	**30**	**20**	**54**	**16**	**10**
Hong Kong SAR	...	...	100	...	...	...	100	...	...	...	100	...
Singapore	…	…	…	…	...	...	...	...	...	...	...	100
INDUSTRIAL COUNTRIES[5]	**44**	**0**	**46**	**9**	**68**	**0**	**22**	**10**	**70**	**0**	**26**	**4**

[1] Includes only money-market instruments, excludes bonds and notes. Regional aggregates based on the countries listed in the table. [2] Sum of: Banking sector, non-bank financial institutions and other non-resident issuers as reported in Table 2a (money-market instruments) of the Working Group survey. [3] Sum of: Central Government, other governments, quasi-government and non-resident official issuers as reported in Table 2a (money-market instruments) of the Working Group survey. [4] Non-financial corporate sector other than quasi-government as reported in Table 2a (money-market instruments) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

Annex table 5B

Issuers of domestic bonds[1]

(as a percentage of total domestic bonds outstanding)

	1995				2000				2005			
	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]	Financial Institutions[2]	Central bank	Public sector[3]	Corporate[4]
Latin America	**0**	**34**	**59**	**6**	**4**	**15**	**77**	**4**	**10**	**13**	**70**	**7**
Argentina	...	0	100	...	...	0	100	...	...	5	95	...
Brazil	0	33	58	9	0	16	79	5	0	1	91	9
Chile	...	100	...	...	...	84	1	16	...	47	13	41
Colombia	...	...	100	...	26	0	74	...	15	0	85	...
Mexico	0	...	100	...	14	3	82	...	35	12	47	6
Peru	0	0	0	...	21	0	61	18	20	11	48	21
Venezuela	...	97	2	1	...	0	97	3	...	88	12	0
Asia, larger economies	**4**	**0**	**93**	**3**	**20**	**7**	**57**	**17**	**23**	**9**	**57**	**11**
China	...	...	100	...	39	...	59	2	39	...	58	4
India	...	0	100	...	...	0	100	...	...	0	100	...
Korea	...	...	...	...	16	14	42	28	18	19	44	18
Taiwan, China	9	...	84	7	4	...	70	26	15	...	66	18
Other Asia	**3**	**0**	**75**	**22**	**0**	**0**	**70**	**30**	**1**	**1**	**69**	**29**
Indonesia	43	0	40	17	1	0	96	2	5	0	88	7
Malaysia	0	0	69	31	0	0	42	58	0	0	48	52
Philippines	0	0	99	0	0	0	99	1	0	0	98	2
Thailand	...	2	66	31	...	0	68	32	...	4	70	25
Central Europe	**2**	**0**	**92**	**6**	**10**	**7**	**81**	**2**	**10**	**2**	**88**	**1**
Czech Republic	...	...	...	...	61	0	39	...	28	0	72	...
Hungary	3	0	88	8	2	0	95	3	15	0	84	0
Poland	...	0	100	...	1	12	86	2	1	3	95	1
Russia	...	...	...	...	...	0	100	...	...	0	100	...
Other	**0**	**0**	**100**	**0**	**0**	**0**	**99**	**0**	**5**	**0**	**94**	**1**
Israel	...	...	100	...	...	...	100	...	...	...	100	...
Turkey	...	...	...	...	0	0	100	0	0	0	100	0
Saudi Arabia	0	0	100	0	0	0	100	0	1	0	99	0
South Africa	0	0	100	0	1	0	97	2	17	0	78	5
TOTAL EMERGING MARKETS	**1**	**14**	**79**	**6**	**10**	**7**	**71**	**12**	**15**	**8**	**67**	**10**
Hong Kong SAR	...	...	100	...	...	...	100	...	...	...	100	...
Singapore	...	...	...	...	...	...	...	...	...	...	...	100
INDUSTRIAL COUNTRIES[5]	**40**	**0**	**47**	**13**	**48**	**0**	**37**	**15**	**52**	**0**	**35**	**13**

[1] Includes only bonds and notes, excludes money-market instruments. Regional aggregates based on the countries listed in the table. [2] Sum of: Banking sector, non-bank financial institutions and other non-resident issuers as reported in Table 2b (bonds and notes) of the Working Group survey. [3] Sum of: Central Government, other governments, quasi-government and non-resident official issuers as reported in Table 2b (bonds and notes) of the Working Group survey. [4] Non-financial corporate sector other than quasi-government as reported in Table 2b (bonds and notes) of the Working Group survey. [5] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

Annex table 6

Share of short-term debt securities[1]

(as a percentage of total debt securities outstanding)

	1995		2000		2005	
	Domestic securities[2]	International securities[3]	Domestic securities[2]	International securities[3]	Domestic securities[2]	International securities[3]
Latin America	**6**	**2**	**10**	**1**	**14**	**0**
Argentina	0	3	13	1	7	0
Brazil	5	4	5	2	13	1
Chile	...	0	...	0	...	0
Colombia	11	3	0	0	3	0
Mexico	39	1	25	1	21	0
Peru	...	6	7	0	10	0
Venezuela	100	0	100	0	100	0
Asia, larger economies	**46**	**5**	**33**	**2**	**34**	**1**
China	100	0	98	0	73	0
India	24	0	4	0	4	0
Korea	...	8	1	3	0	2
Taiwan, China	58	0	47	0	34	0
Other Asia	**8**	**2**	**6**	**1**	**11**	**0**
Indonesia	22	0	12	0	14	0
Malaysia	11	0	7	1	3	0
Philippines	...	1	...	0	...	0
Thailand	0	6	4	3	22	3
Central Europe	**50**	**0**	**25**	**0**	**12**	**0**
Czech Republic	...	0	22	0	8	0
Hungary	27	0	35	0	20	0
Poland	70	0	20	0	10	0
Russia	...	3	1	0	0	0
Other	**2**	**1**	**1**	**0**	**5**	**0**
Israel	...	0	...	0	...	0
Turkey	...	0	2	0	7	0
Saudi Arabia	2	0	0	0	2	0
South Africa	...	3	...	0	...	0
TOTAL EMERGING MARKETS	**18**	**2**	**21**	**1**	**24**	**0**
Hong Kong SAR	75	2	67	11	46	3
Singapore	31	0	31	5	27	8
INDUSTRIAL COUNTRIES[4]	**16**	**9**	**19**	**9**	**17**	**4**

[1] Includes bonds, notes and money-market instruments. Regional totals based on the countries listed in the table. Original maturity. [2] Sum of central government and all other issuers as reported in table 2e of the Working Group survey. [3] International bonds, notes and money-market instruments from the BIS database. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 7

Maturity of domestic central government debt securities outstanding[1]

(average original and remaining maturity in years)

	1995		2000		2005	
	Original	**Remaining**	**Original**	**Remaining**	**Original**	**Remaining**
Latin America	**3.1**	**0.7**	**5.1**	**2.4**	**6.8**	**3.9**
Argentina	…	…	…	…	…	12.0
Brazil	…	0.7	…	2.7	…	2.3
Chile	…	…	…	…	…	…
Colombia	3.1	…	5.1	3.6	6.8	3.8
Mexico	…	0.8	…	1.4	…	3.4
Peru	…	…	…	…	…	…
Venezuela	…	2.9	…	2.5	…	10.1
Asia, larger economies	**7.2**	**2.6**	**9.6**	**2.7**	**9.8**	**6.1**
China	…	…	…	…	…	…
India	…	…	13.0	…	14.0	10.0
Korea	…	…	4.0	2.4	6.1	4.1
Taiwan, China	7.2	2.6	10.6	3.2	10.8	3.4
Other Asia	**…**	**…**	**13.0**	**5.0**	**10.7**	**5.0**
Indonesia	…	…	10.0	6.0	10.0	7.0
Malaysia	…	…	13.0	5.0	12.0	5.0
Philippines	…	…	…	…	…	…
Thailand	…	…	…	…	9.0	…
Central Europe	**1.7**	**1.2**	**4.2**	**2.6**	**6.2**	**3.6**
Czech Republic	…	…	…	…	…	…
Hungary	…	…	…	…	…	…
Poland	1.7	1.2	4.2	2.6	6.2	3.6
Russia	...	…	4.0	1.7	11.1	8.6
Other	**8.5**	**6.5**	**2.1**	**4.5**	**4.4**	**3.2**
Israel	8.5	…	8.5	…	9.7	…
Turkey	…	…	1.5	1.1	4.3	2.1
Saudi Arabia	…	6.5	…	6.0	…	5.0
South Africa	…	…	…	…	…	…
TOTAL EMERGING MARKETS	**5.3**	**3.2**	**7.5**	**3.2**	**8.3**	**4.5**
Hong Kong SAR	…	…	…	…	…	…
Singapore	1.6	1.0	4.1	2.7	5.1	3.6
INDUSTRIAL COUNTRIES[4]	**6.7**	**5.3**	**9.5**	**6.4**	**10.3**	**5.7**

[1] Includes bonds, notes and money-market instruments. Regional totals based on the countries listed in the table and weighted by the corresponding amounts outstanding. Average original and remaining maturities of central government amounts outstanding reported in Table 2e of the Working Group survey. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Source: Working Group survey.

Annex table 8

Domestic bonds by instrument[1]

(as a percentage of total bonds outstanding)

	1995				2000				2005			
	Floating Rate	Straight fixed rate	Inflation indexed	Foreign currency denominated or linked	Floating Rate	Straight fixed rate	Inflation indexed	Foreign currency denominated or linked	Floating Rate	Straight fixed rate	Inflation indexed	Foreign currency denominated or linked
Latin America	**54**	**24**	**12**	**11**	**47**	**12**	**13**	**22**	**46**	**23**	**23**	**5**
Argentina	26	0	0	74	12	0	0	88	2	1	74	20
Brazil	64	32	0	3	58	15	6	21	60	21	16	3
Chile	0	0	100	0	0	0	92	8	0	18	64	18
Colombia	...	...	...	...	0	50	41	7	0	70	29	1
Mexico	45	0	52	2	35	6	16	0	47	28	13	0
Peru	...	...	23	77	17	0	54	29	3	35	36	25
Venezuela	100	...	...	...	100	...	...	...	44	...	...	56
Asia, larger economies	**0**	**100**	**0**	**0**	**19**	**81**	**0**	**0**	**9**	**91**	**0**	**0**
China	...	100	...	...	46	54	...	...	19	81	...	...
India	0	100	0	0	0	100	0	0	5	95	0	0
Korea			0	0	8	92	0	0	3	97	0	0
Taiwan, China	0	100	0	0	0	100	0	0	0	100	0	0
Other Asia	**8**	**92**	**0**	**0**	**15**	**83**	**0**	**2**	**9**	**91**	**0**	**0**
Indonesia	...	...	...	...	51	42	0	7	53	47	0	0
Malaysia	...	100	...	...	...	100	...	...	...	100	...	...
Philippines	26	74	...	...	8	92	...	...	4	96	...	...
Thailand	0	100	0	0	0	100	0	0	0	100	0	0
Central Europe	**54**	**46**	**0**	**0**	**18**	**82**	**1**	**0**	**12**	**87**	**1**	**0**
Czech Republic	...	...	...	...	0	95	5	0	0	100	0	0
Hungary	...	...	...	...	...	...	...	...	...	...	...	...
Poland	54	46	0	0	20	80	0	0	15	84	2	0
Russia	...	...	...	...	...	100	...	...	...	97	3	...
Other	**2**	**97**	**1**	**0**	**11**	**86**	**1**	**1**	**21**	**63**	**7**	**7**
Israel	37	28	29	6	23	53	22	1	10	78	12	...
Turkey	...	...	...	...	24	70	0	6	31	42	11	15
Saudi Arabia	0	100	0	0	9	91	0	0	17	83	0	0
South Africa	0	100	0	...	1	97	0	...	9	77	9	...
TOTAL EMERGING MARKETS	**22**	**69**	**5**	**4**	**24**	**65**	**3**	**6**	**19**	**71**	**6**	**2**
Hong Kong SAR	0	100	0	0	0	100	0	0	3	97	0	0
Singapore	...	100	...	...	...	100	...	...	...	100	...	...
INDUSTRIAL COUNTRIES[2]	**4**	**95**	**1**	**0**	**6**	**90**	**4**	**0**	**12**	**83**	**6**	**0**

[1] Includes only bonds and notes, excludes money-market instruments. Regional totals based on the countries listed in the table. Totals do not add up to 100% due to the exclusion of hybrid instruments. Ratio calculated taking the central government and all other issuers as reported in Table 2d of the Working Group survey. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey.

Annex table 9

Holders of domestic debt securities[1]

(as a percentage of total debt securities outstanding)

	1995				2000				2005			
	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents
Latin America	**39**	**13**	**16**	**...**	**27**	**32**	**30**	**1**	**28**	**47**	**13**	**2**
Argentina	…	…	…	…	…	…	…	…	…	…	…	…
Brazil	39	13	14	...	32	37	18	...	32	50	7	...
Chile	…	…	…	…	…	…	…	…	…	…	…	…
Colombia	29	7	65	...	33	14	53	...	36	18	46	...
Mexico	…	…	…	…	8	19	70	3	14	50	28	9
Peru	…	…	…	…	1	14	...	...	6	17	...	...
Venezuela	…	…	…	…	…	…	…	…	…	…	…	…
Asia, larger economies	**63**	**23**	**14**	**0**	**31**	**18**	**7**	**0**	**51**	**38**	**10**	**0**
China	...	...	100	...	65	24	10	...	69	27	4	0
India	72	22	6	0	68	18	14	0	58	21	21	0
Korea	…	…	…	…	2	9	3	0	30	56	13	0
Taiwan, China	58	24	18	...	43	45	12	...	…	…	…	…
Other Asia	**8**	**36**	**4**	**2**	**17**	**33**	**2**	**0**	**18**	**35**	**14**	**3**
Indonesia	…	…	…	…	…	…	…	…	…	…	…	…
Malaysia	16	70	8	3	17	75	4	0	16	70	8	5
Philippines	...	...	...	0	18	...	...	0	21	...	...	1
Thailand	…	…	…	…	…	…	…	…	17	42	39	3
Central Europe	**64**	**4**	**25**	**6**	**39**	**14**	**32**	**15**	**31**	**34**	**10**	**20**
Czech Republic	…	…	…	…	…	…	…	…	63	...	...	...
Hungary	58	10	28	4	31	27	27	15	26	33	14	27
Poland	70	...	23	7	44	6	35	15	24	44	10	22
Russia	…	…	…	…	…	…	…	…	...	...	...	3
Other	**17**	**49**	**30**	**4**	**21**	**60**	**16**	**3**	**33**	**32**	**30**	**5**
Israel	32	48	20	1	21	60	19	0	16	56	28	1
Turkey	…	…	…	…	…	…	…	…	53	2	34	11
Saudi Arabia	17	83	0	0	23	77	0	0	27	73	0	0
South Africa	12	25	56	8	15	20	51	13	17	23	55	6
TOTAL EMERGING MARKETS	**35**	**30**	**20**	**2**	**28**	**29**	**14**	**1**	**42**	**38**	**14**	**2**
Hong Kong SAR	…	…	…	…	...	...	...	...	…	…	…	…
Singapore	…	…	…	…	…	…	…	…	44	11	12	13
INDUSTRIAL COUNTRIES[2]	**15**	**43**	**24**	**17**	**13**	**46**	**18**	**22**	**11**	**46**	**17**	**26**

[1] Includes bonds, notes and money-market instruments. Regional totals based on the countries listed in the table. Ratio calculated taking the holders of central government and all other issuers securities reported in Tables 4a (money-market instruments) and 4b (bonds and notes) of the Working Group survey. Totals do not add up to 100% due to the presence of "unallocated holders" for some countries. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey.

Annex table 9A

Holders of domestic money-market instruments[1]

(as a percentage of total money-market instruments outstanding)

	1995				2000				2005			
	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents
Latin America	**...**	**...**	**...**	**...**	**10**	**4**	**80**	**6**	**37**	**50**	**12**	**1**
Argentina	…	…	…	…	…	…	…	…	…	…	…	…
Brazil	…	…	…	…	…	…	…	…	56	42	2	...
Chile	…	…	…	…	…	…	…	…	…	…	…	…
Colombia	…	…	…	…	…	…	…	…	…	…	…	…
Mexico	…	…	…	…	10	4	80	6	17	58	23	2
Peru	…	…	…	…	…	…	…	…	…	…	…	…
Venezuela	…	…	…	…	…	…	…	…	…	…	…	…
Asia, larger economies	**78**	**13**	**9**	**...**	**32**	**47**	**19**	**0**	**67**	**25**	**8**	**0**
China	…	…	…	…	...	...	...	...	87	13	0	0
India	…	…	…	…	…	…	…	…	…	…	…	…
Korea	…	…	…	…	15	64	21	0	12	59	29	0
Taiwan, China	78	13	9	...	60	24	16	...	…	…	…	…
Other Asia	**60**	**...**	**...**	**...**	**34**	**...**	**...**	**...**	**31**	**15**	**6**	**0**
Indonesia	…	…	…	…	…	…	…	…	…	…	…	…
Malaysia	60	...	...	...	96	...	...	...	44	...	...	...
Philippines	…	…	…	…	27	...	...	...	33	...	...	...
Thailand	…	…	…	…	…	…	…	…	24	53	21	1
Central Europe	**61**	**4**	**26**	**10**	**33**	**30**	**35**	**2**	**28**	**26**	**43**	**3**
Czech Republic	…	…	…	…	…	…	…	…	…	…	…	…
Hungary	28	14	50	7	17	29	53	1	21	30	46	3
Poland	71	...	18	11	51	31	16	3	35	23	41	2
Russia	…	…	…	…	…	…	…	…	…	…	…	…
Other	**47**	**18**	**35**	**0**	**24**	**24**	**52**	**0**	**25**	**23**	**50**	**2**
Israel	50	15	35	1	15	51	33	0	21	44	34	1
Turkey	…	…	…	…	…	…	…	…	18	1	75	6
Saudi Arabia	0	100	0	0	…	…	…	…	0	100	0	0
South Africa	57	...	43	...	32	...	68	...	46	...	54	...
TOTAL EMERGING MARKETS	**67**	**11**	**18**	**2**	**29**	**35**	**30**	**1**	**57**	**27**	**13**	**0**
Hong Kong SAR	…	…	…	…	…	…	…	…	…	…	…	…
Singapore	…	…	…	…	…	…	…	…	65	5	2	...
INDUSTRIAL COUNTRIES[2]	**26**	**31**	**11**	**20**	**16**	**38**	**8**	**23**	**19**	**39**	**7**	**18**

[1] Includes only money-market instruments, excludes bonds and notes. Regional totals based on the countries listed in the table. Ratio calculated taking the holders of central government and all other issuers securities as reported in Table 4a (money-market instruments) of the Working Group survey. Totals do not add up to 100% due to the presence of "unallocated holders" for some countries. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey.

Annex table 9B

Holders of domestic bonds[1]

(as a percentage of total bonds outstanding)

	1995				2000				2005			
	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents	Banks	Other financial	Other residents	Non-residents
Latin America	**39**	**13**	**16**	**...**	**28**	**33**	**27**	**0**	**27**	**47**	**13**	**2**
Argentina	…	…	…	…	…	…	…	…	…	…	…	…
Brazil	39	13	14	...	32	37	18	...	30	50	7	...
Chile	…	…	…	…	…	…	…	…	…	…	…	…
Colombia	29	7	65	...	33	14	53	...	36	18	46	...
Mexico	…	…	…	…	8	24	67	1	13	47	29	11
Peru	…	…	…	…	1	14	...	...	6	17	...	...
Venezuela	…	…	…	…	…	…	…	…	…	…	…	…
Asia, larger economies	**58**	**27**	**15**	**0**	**31**	**15**	**6**	**0**	**48**	**42**	**11**	**0**
China	...	...	100	...	65	24	10	...	61	33	6	0
India	72	22	6	0	68	18	14	0	58	21	21	0
Korea	…	…	…	…	...	...	...	0	33	55	11	0
Taiwan, China	41	34	25	...	34	56	9	...	…	…	…	...
Other Asia	**7**	**37**	**4**	**2**	**15**	**43**	**2**	**0**	**16**	**38**	**15**	**3**
Indonesia	…	…	…	…	…	…	…	…	…	…	…	…
Malaysia	13	75	8	3	14	81	5	0	15	71	9	5
Philippines	...	...	...	0	15	...	...	1	17	...	...	1
Thailand	…	…	…	…	…	…	…	…	16	40	41	3
Central Europe	**68**	**5**	**25**	**2**	**41**	**9**	**31**	**20**	**32**	**35**	**5**	**22**
Czech Republic	…	…	…	…	…	…	…	…	63	...	...	...
Hungary	69	8	20	3	38	26	13	22	28	34	6	32
Poland	66	...	34	0	42	...	40	18	23	46	7	24
Russia	…	…	…	…	…	…	…	…	...	...	...	3
Other	**15**	**51**	**29**	**4**	**20**	**62**	**14**	**3**	**33**	**32**	**27**	**6**
Israel	29	52	18	0	22	62	16	0	15	58	26	1
Turkey	…	…	…	…	…	…	…	…	56	2	31	11
Saudi Arabia	17	81	0	0	23	77	0	0	27	73	0	0
South Africa	8	27	57	8	13	24	49	15	12	23	50	6
TOTAL EMERGING MARKETS	**31**	**32**	**20**	**2**	**28**	**28**	**13**	**1**	**39**	**40**	**14**	**3**
Hong Kong SAR	…	…	…	…	…	…	…	…	…	…	…	…
Singapore	…	…	…	…	…	…	…	…	36	13	16	18
INDUSTRIAL COUNTRIES[2]	**15**	**44**	**25**	**17**	**13**	**47**	**19**	**21**	**10**	**46**	**17**	**26**

[1] Includes only bonds and notes, excludes money-market instruments. Regional totals based on the countries listed in the table. Ratio calculated taking the holders of central government and all other issuers securities as reported in Table 4b (bonds and notes) of the Working Group survey. Totals do not add up to 100% due to the presence of "unallocated holders" for some countries. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey.

Annex table 10

Turnover/outstanding plus bid/ask spreads

	1995			2000			2005		
	Bid-ask spreads [1]	Turnover [2]	Debt [3]	Bid-ask spreads [1]	Turnover [2]	Debt [3]	Bid-ask spreads [1]	Turnover [2]	Debt [3]
Latin America	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
Argentina	...	...	99.9	...	225.3	99.8	...	63.9	75.8
Brazil	...	658.5	96.2	4.5	423.5	97.5	2.0	369.6	99.6
Chile	...	...	...	...	...	...	2.0	...	...
Colombia	...	...	...	...	...	...	...	2458.7	...
Mexico	...	...	100.0	7.7	605.2	100.0	4.6	913.1	100.0
Peru	...	...	...	...	...	...	20.0	45.0	49.0
Venezuela	...	...	...	...	...	...	...	...	...
Asia, larger economies	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
China	...	...	...	...	6.2	82.8	...	48.9	93.1
India	...	...	...	2.0	319.7	...	1.0	327.9	...
Korea	...	...	...	1.0	939.4	4.5	1.0	874.5	1.6
Taiwan, China	...	124.4	...	...	685.5	...	...	3,971.8	...
Other Asia	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
Indonesia	...	...	...	100.0	29.0	45.0	60.0	99.0	41.0
Malaysia	...	5.5	100.0	...	110.3	100.0	2.5	136.2	100.0
Philippines	...	...	...	...	684.1	...	37.5	349.0	...
Thailand	...	...	100.0	...	175.1	100.0	5.0	60.1	100.0
Central Europe	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
Czech Republic	...	...	...	...	...	100.0	30.0	121.6	100.0
Hungary	...	...	...	...	...	...	...	...	...
Poland	...	...	...	9.0	...	...	2.5	3,675.6	97.0
Russia	...	...	...	...	80.1	...	22.8	50.5	...
Other	...	...	...	...	...	...	...	...	...
Israel	...	20.9	49.3	...	47.0	51.5	...	108.9	64.3
Turkey	...	...	...	...	725.7	26.6	...	259.5	40.5
Saudi Arabia	20.0	1.3	...	18.0	2.4	...	10.0	1.7	...
South Africa	...	...	94.6	...	2,963.8	99.8	...	1,836.9	99.5
TOTAL EMERGING MARKETS	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
Hong Kong SAR	...	11,229.4	...	...	840.6	...	...	454.7	...
Singapore	1.0	36.5	...	1.0	48.3	44.6	1.0	48.2	53.4
INDUSTRIAL COUNTRIES[4]	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**

Note: The data refer to the indicators of liquidity in central government local bond (and notes) markets (Table 3a of the Working Group survey).

[1] Most liquid issue, in basis points. [2] Turnover of central government bonds and notes as a percentage of the previous year's outstanding stock. [3] Tradeable debt as a percentage of total central government local bonds. [4] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex Table 11

Most liquid issue

	1995		2000		2005	
	Maturity [1]	Benchmark securities[2] (maturities)	Maturity [1]	Benchmark securities[2] (maturities)	Maturity [1]	Benchmark securities[2] (maturities)
Latin America	**...**	**...**	**...**	**...**	**...**	**...**
Argentina	...	...	...	...	10.0	...
Brazil	...	...	1.0	…	2.0	…
Chile	...	...	...	2	5.0	6
Colombia	...	...	2.0	…	9.0	6
Mexico	...	...	1.0	6	10.0	9
Peru	...	...	...	...	7.0	…
Venezuela	...	...	...	...	...	...
Asia, larger economies	**...**	**...**	**...**	**...**	**...**	**...**
China	...	...	7.5	…	6.8	…
India	...	...	...	...	10.0	15
Korea	...	...	3.0	1	5.0	2
Taiwan, China	10.0	…	10.0	…	10.0	…
Other Asia	**...**	**...**	**...**	**...**	**...**	**...**
Indonesia	...	...	5.0	8	5.0	10
Malaysia	...	...	...	3	3.0	3
Philippines	...	...	...	...	3.5	…
Thailand	...	...	...	4	5.0	4
Central Europe	**...**	**...**	**...**	**...**	**...**	**...**
Czech Republic	...	...	...	5	15.0	4
Hungary	...	...	...	7	...	7
Poland	...	...	5.0	3	5.0	3
Russia	...	...	3.0	…	11.6	…
Other	**...**	**...**	**...**	**...**	**...**	**...**
Israel	...	...	...	7	...	5
Turkey	...	...	...	...	...	4
Saudi Arabia	...	...	...	5	...	5
South Africa	...	...	16.0	4	21.0	6
TOTAL EMERGING MARKETS	**...**	**...**	**...**	**...**	**...**	**...**
Hong Kong SAR	...	...	...	...	...	15
Singapore	7.0	…	10.0	6	10.0	7
INDUSTRIAL COUNTRIES[3]	**...**	**...**	**...**	**...**	**...**	**...**

[1] Maturity traded, as defined at issuance, in years (Table 3a of the Working Group survey). [2] Number of benchmark securities (2007 BIS Deputy Governors' Note questionnaire (unpublished)). For Colombia, local currency only. COP: Apr-06, Apr-08, Jul-09, Feb-10, Apr-12, Sep-14; for Korea, treasury bond 3 year in 2000 and treasury bonds 3 and 5 year in 2005; for Malaysia, 3, 5 and 10 year bonds; for Thailand, 3, 5, 7 and 10 year bonds; for the Czech Republic, 3, 5, 7 and 10 year bonds in 2000 and 3, 5, 10 and 15 year bonds in 2005; for Poland, 2, 5 and 10 year bonds. [3] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; national data; BIS.

Annex Table 12

Bank deposits and loans in foreign currency[1]

	1995			2000			2005		
	Total deposits as a % of GDP	Deposits in foreign currency as a % of total deposits	Loans in foreign currency as a % of total loans	Total deposits as a % of GDP	Deposits in foreign currency as a % of total deposits	Loans in foreign currency as a % of total loans	Total deposits as a % of GDP	Deposits in foreign currency as a % of total deposits	Loans in foreign currency as a % of total loans
Latin America	**22**	**26**	**41**	**24**	**21**	**45**	**25**	**6**	**17**
Argentina	17	56	60	30	63	69	25	10	10
Brazil	21	...	...	20	0	...	25	0	...
Chile	44	...	...	59	...	...	64	...	...
Colombia	31	0	13	29	0	8	33	0	6
Mexico	22	5	39	20	7	32	20	8	16
Peru	...	...	...	23	74	82	20	65	70
Venezuela	...	...	...	...	...	...	...	...	...
Asia, larger economies	**75**	**5**	**10**	**98**	**7**	**7**	**128**	**5**	**5**
China	89	...	...	125	...	...	166	4	6
India	...	...	...	38	...	...	50	...	...
Korea	39	9	16	69	5	10	83	4	4
Taiwan, China	107	3	6	129	9	4	160	8	3
Other Asia	**67**	**9**	**19**	**75**	**14**	**12**	**71**	**12**	**10**
Indonesia	42	21	19	45	23	43	40	18	18
Malaysia	113	...	...	127	2	2	129	3	2
Philippines	...	...	...	53	62	18	56	56	28
Thailand	77	1	...	93	2	...	86	2	...
Central Europe	**36**	**29**	**24**	**42**	**19**	**24**	**44**	**17**	**29**
Czech Republic	61	...	...	58	15	21	67	12	13
Hungary	42	37	24	47	34	39	49	28	47
Poland	25	25	...	35	17	21	33	16	26
Russia	...	...	...	...	...	...	...	...	...
Other	**37**	**20**	**12**	**44**	**24**	**22**	**53**	**18**	**2**
Israel	...	...	...	...	...	...	...	...	...
Turkey	24	53	...	42	45	33	46	35	16
Saudi Arabia	37	23	32	38	18	31	42	16	11
South Africa	52	0	4	54	5	9	75	3	1
TOTAL EMERGING MARKETS	**49**	**12**	**17**	**65**	**14**	**17**	**84**	**7**	**5**
Hong Kong SAR	200	50	67	268	48	33	295	48	22
Singapore	139	34	53	152	30	25	166	30	28
INDUSTRIAL COUNTRIES[2]	**66**	**28**	**23**	**72**	**32**	**28**	**89**	**35**	**32**

[1] Deposits of non-banks and loans to non-banks as reported in Table 5b of the working Group survey. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex Table13

Resident pension funds: local vs foreign securities[1]

	1995			2000			2005		
	Total assets % of GDP	Local securities % of total assets	Foreign securities % of total assets	Total assets % of GDP	Local securities % of total assets	Foreign securities % of total assets	Total assets % of GDP	Local securities % of total assets	Foreign securities % of total assets
Latin America	**21**	**100**	**0**	**9**	**93**	**7**	**15**	**85**	**16**
Argentina	...	...	...	7	96	4	12	92	8
Brazil	...	...	...	11	...	...	16	85	...
Chile	36	100	0	48	89	11	63	70	30
Colombia	...	...	...	...	...	...	17	88	12
Mexico	...	...	...	3	100	0	7	98	1
Peru	1	100	0	5	93	7	12	90	10
Venezuela	...	...	...	...	...	...	...	...	...
Asia, larger economies	**5**	**64**	**...**	**7**	**59**	**...**	**18**	**90**	**6**
China	...	...	...	...	...	...	...	...	...
India	...	...	...	...	...	...	...	...	...
Korea	7	64	0	11	56	0	25	91	6
Taiwan, China	0	100	0	1	100	0	3	89	11
Other Asia	**43**	**...**	**0**	**52**	**...**	**0**	**25**	**91**	**1**
Indonesia	...	...	...	...	...	...	...	...	...
Malaysia	43	...	0	52	...	0	54	...	0
Philippines	...	...	...	...	...	...	...	...	...
Thailand	...	...	...	...	...	...	4	91	9
Central Europe	**0**	**76**	**...**	**2**	**93**	**2**	**8**	**96**	**2**
Czech Republic	...	...	...	...	...	...	...	...	...
Hungary	0	76	0	3	94	2	7	93	5
Poland	...	...	...	1	92	0	9	97	2
Russia	...	...	...	...	...	...	...	...	...
Other	**91**	**75**	**1**	**88**	**61**	**8**	**56**	**72**	**6**
Israel	23	...	...	23	3	0	31	23	1
Turkey	...	...	...	...	...	...	0	100	...
Saudi Arabia	...	...	...	...	...	...	...	...	...
South Africa	134	75	1	148	70	9	153	77	6
TOTAL EMERGING MARKETS	25	76	0	16	68	7	22	81	7
Hong Kong SAR	...	...	...	...	...	...	25	...	...
Singapore	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
INDUSTRIAL COUNTRIES[2]	**57**	**74**	**20**	**61**	**79**	**25**	**67**	**80**	**23**

[1] Assets and securities are taken from Table 5a of the Working Group survey. Local and foreign securities may not necessarily add up to equal total assets as there can be other types of assets which are not covered among local and foreign securities. [2] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; IMF; BIS.

Annex Table 14

Aggregate local currency value of asset-backed securities

	2000		2005	
	In billions of US dollars	**As a % of total local bonds and notes outstanding**	**In billions of US dollars**	**As a % of total local bonds and notes outstanding**
Latin America	**0.3**	**0.1**	**15.3**	**2.1**
Argentina	...	...	...	...
Brazil	0.1	0.0	6.2	1.5
Chile	...	...	1.1	3.2
Colombia	...	...	1.3	2.8
Mexico	...	...	6.0	2.9
Peru	0.2	2.8	0.7	5.7
Venezuela	...	...	...	...
Asia, larger economies	**42.2**	**11.3**	**94.8**	**5.3**
China	...	...	0.9	0.1
India	...	...	6.3	2.9
Korea	42.2	11.3	82.6	10.5
Taiwan, China	...	...	5.0	3.1
Other Asia	**...**	**...**	**3.3**	**1.9**
Indonesia	...	...	...	...
Malaysia	...	...	2.9	2.8
Philippines	...	...	...	...
Thailand	...	...	0.4	0.6
Central Europe	**0.6**	**8.2**	**4.4**	**14.6**
Czech Republic	0.6	8.2	4.4	14.6
Hungary	...	...	...	...
Poland	...	...	...	...
Russia	...	...	...	...
Other	**0.5**	**0.9**	**7.2**	**7.0**
Israel	...	...	...	...
Turkey	...	...	...	...
Saudi Arabia	...	...	...	...
South Africa	0.5	0.9	7.2	7.0
TOTAL EMERGING MARKETS	**43.5**	**6.1**	**124.9**	**4.4**
Hong Kong SAR	...	...	...	...
Singapore	...	...	1.2	1.8
INDUSTRIAL COUNTRIES[1]	**4,112.3**	**32.4**	**7,397.6**	**38.3**

Note: Asset-backed local debt securities are taken from Table 2c and local bonds and notes from Table 2b of the Working Group survey.

[1] Australia, Belgium, Canada, Germany, Spain, the United Kingdom and the United States.

Sources: Working Group survey; BIS.

Annex table 15

Foreign exchange derivatives turnover, by instrument[1]

(Daily averages in millions of US dollars)

	1998				2001				2004			
	Outright forwards	FX swaps	Currency swaps	Options	Outright forwards	FX swaps	Currency swaps	Options	Outright forwards	FX swaps	Currency swaps	Options
Latin America	**1,006**	**1,957**	**0**	**37**	**2,150**	**3,964**	**497**	**209**	**2,378**	**3,385**	**897**	**351**
Argentina	137	0	0	0	…	…	…	…	…	…	…	…
Brazil	…	…	…	…	986	210	492	192	366	380	386	105
Chile	466	…	…	…	635	…	…	…	709	201	32	…
Colombia	…	…	…	…	77	3	2	1	211	15	3	13
Mexico	403	1,957	0	37	417	3,750	3	16	1,055	2,784	472	233
Peru	…	…	…	…	35	1	…	…	37	4	4	…
Venezuela	…	…	…	…	…	…	…	…	…	…	…	…
Asia, larger economies	**1,275**	**2,360**	**24**	**200**	**2,094**	**4,640**	**78**	**655**	**6,009**	**10,206**	**460**	**1,687**
China	…	…	…	…	…	…	…	…	…	…	…	…
India	382	903	2	3	451	1,389	4	4	1,210	2,013	113	122
Korea	287	703	9	46	1,203	2,535	56	156	3,598	5,951	280	441
Taiwan, China	606	754	13	151	440	716	19	495	1,201	2,242	68	1,124
Other Asia	**506**	**3,655**	**48**	**257**	**685**	**2,514**	**35**	**115**	**924**	**3,272**	**277**	**53**
Indonesia	78	733	41	185	210	305	18	…	110	1,213	20	11
Malaysia	61	736	…	3	233	549	…	113	316	497	12	29
Philippines	178	224	0	0	112	491	3	…	102	229	5	2
Thailand	188	1,962	7	70	131	1,169	14	2	396	1,333	240	10
Central Europe	**205**	**3,665**	**29**	**103**	**546**	**4,194**	**6**	**66**	**524**	**7,363**	**4**	**284**
Czech Republic	…	2,897	…	101	42	1,138	6	60	70	1,297	1	61
Hungary	153	280	29	2	63	157	…	6	125	1,971	…	46
Poland	53	488	…	…	442	2,899	…	…	329	4,095	3	177
Russia	658	68	0	146	154	…	…	…	909	5,245	…	…
Other	**2,028**	**4,107**	**26**	**151**	**981**	**8,936**	**7**	**144**	**674**	**12,182**	**105**	**337**
Israel	…	…	…	…	…	677	…	…	…	2,084	…	190
Turkey	…	…	…	…	279	399	…	…	185	1,972	71	3
Saudi Arabia	409	604	…	91	215	583	…	57	73	613	1	73
South Africa	1,618	3,503	26	60	487	7,278	7	87	416	7,513	32	72
TOTAL EMERGING MARKETS	**5,678**	**15,813**	**126**	**894**	**6,611**	**24,248**	**622**	**1,189**	**11,418**	**41,652**	**1,742**	**2,711**
Hong Kong SAR	3,720	43,850	351	983	3,864	43,992	498	1,030	5,365	61,149	971	2,846
Singapore	4,408	74,706	1,340	4,610	8,489	57,687	263	2,765	10,612	72,127	346	8,011
INDUSTRIAL COUNTRIES[2]	**99,524**	**661,452**	**8,365**	**81,631**	**107,241**	**539,927**	**6,067**	**58,812**	**187,347**	**782,710**	**19,646**	**112,739**

[1] Regional totals based on the countries listed in the table. [2] Australia, Belgium, Canada, Germany, Spain, United Kingdom and United States.

Source: BIS Triennial Central Bank Surveys on Foreign Exchange and Derivatives Market Activity.