

3 May 2007

**Local currency bond markets in emerging market economies:
notes on trends, measurement and policy challenges**

A paper prepared for the G7 Workshop 2007:
Developing bond markets in emerging market economies

9-10 May 2007 in Frankfurt am Main

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* This paper reflects my own views, and not necessarily those of the BIS.

Bond markets play a central role in financial markets because they generate market interest rates that tell investors the opportunity cost of funds at different points in time. This is essential for any capital market development. It is hardly surprising that the Bank for International Settlements (BIS) and the central bank committees that meet at the BIS have done much analysis on the working of bond markets. A major focus has been on the implications for monetary policy and financial stability.¹ At present, the financial stability aspects are being reviewed by a Working Group of central banks under the chairmanship of David Margolin of the Bank of Mexico. This note draws on some of the work done over the years at the BIS; but all opinions reflect my own views.

After a brief summary of how such markets can help macroeconomic and financial stability (Section 1), the successful development of local currency bond markets over the past decade is briefly summarised. The “original sin” view that EMEs with a record of macroeconomic instability could not develop such markets has been discredited (Section 2). Section 3 argues that inflation-linked debt can play a very useful role in such circumstances. Attention is then drawn to some significant statistical lacunae (Section 4). Section 5 argues that it would be useful to develop some general indicators of risk exposures. Finally, three major shortcomings in the current operation of these markets are identified (Section 6). Continuing to address these shortcomings should be high on the policy agenda of those countries with comparatively new bond markets.

1. Policy relevance

Local currency bond markets are important not only for financial stability but also for effective macroeconomic policies.

Financial stability

Virtually every financial crisis in the EMEs over the past two decades was made worse by the fact that debts were denominated in dollars or other foreign currencies. In many cases, this choice of borrowing was dictated by the fact that there was no local currency bond market. Without a bond market, borrowers were forced into foreign currency debt (exposing them to currency mismatch risks) or into short-term debt (interest rate and refinancing risks).²

¹ For several analyses of EME local currency bond markets, see BIS (2002).

² In addition, the lack of long-term bond markets creates other risks: an inadequate range of assets forces local institutional investors into assets that are a poor match for their liabilities; credit and maturity risks concentrated in the banking system; foreign capital inflows funnelled into short term paper which aggravates vulnerabilities.

Because many EMEs shared the same balance sheet vulnerabilities and were hit by the same external shock, crises could reach systemic dimensions.

Effective macroeconomic policies

At a fundamental level, government bond markets help to fund budget deficits in a non-inflationary way and to preserve the independence of monetary policy. Successive crises have amply demonstrated that the lack of a local currency bond market can constrain macroeconomic policy choices at various stages of crisis. Some major complications are as follows:

- (i) If government debt is in foreign currencies, the fiscal deficit automatically rises when the exchange rate falls in a crisis – a circumstance that has often led governments to resist exchange rate adjustment.
- (ii) If government debt is mainly short-term or at floating rate, early attempts by the central bank to raise interest rates may be resisted because of the impact on the fiscal balance.
- (iii) Once crisis has broken, the central bank is forced to raise interest rates to restore confidence and prevent an overdepreciation of the exchange rate – even in a recession.

In addition, bond markets can be invaluable in sending a signal to governments or central banks that macroeconomic policies are becoming problematic – and can therefore contribute to a timely correction of such policies. Prospects of a major widening in budget deficits, for instance, can push up yields in the bond markets: as Sokoler (2001) put it, “the ‘bill’ to the government [of larger budget deficits] is presented immediately”. Equally, central banks can be given clear warnings about inflation expectations.

2. Local currency bond markets

Rapid growth

The force of these arguments was recognised by many policymakers after the EMEs crises of the 1980s and 1990s. As a result, governments in many countries moved from **opportunistic** debt management policies (eg issuing dollar debt just to minimise near-term coupon payments) to more **principles-based** policies. Explicit account was taken of risk exposures. A major objective of debt management policies became that of reducing

vulnerabilities.³ Two fundamental aims were to (a) reduce currency mismatches and (b) lengthen the duration of domestic currency debt.

Some economists, however, continued to sustain the pessimistic thesis that developing countries would not be able to borrow long-term in their own currencies – the “original sin” view of the world, to use the metaphor of Eichengreen and Hausmann. But this view found fewer and fewer adherents among policymakers. While local currency bond markets could not be developed overnight, they could be developed as part of a deliberate medium-term strategy.

The success in developing local currency bond markets over the past decade has surprised even the optimists. By end-2006, total domestic debt securities issued in EME countries – overwhelmingly denominated in local currency – had reached almost \$5,000 billion (Graph 1). This is an increase of a factor of four or five over the mid-1990s. Many aspects of this important trend have been well-summarised by the IMF paper for the G7 Deputies (IMF, 2007a) and need not be repeated here.⁴ The short verdict of the spread of local currency bond markets worldwide is simple: it has amounted to a major policy success that has made several crisis-prone countries much stronger.

Strong foreign interest

Of equal relevance for policymakers is the fact that foreign investors’ demand is large and growing.⁵ The analysis of returns earned over the past few years – average returns, volatility and correlations with other assets – suggests that the potential demand of foreign investors is large and likely to grow. Perhaps the most important finding from studies of actual returns over recent years is that the covariance of returns from EME local currency bonds with returns on a traditional portfolio of government bonds from developed countries is quite low. Even more significant is the observation that covariances have remained comparatively low even in recent periods of market turbulence. The upshot is that local currency bonds from emerging markets seem very likely to provide good diversification vehicles for international investors over a medium-term horizon. How well the markets for these bonds function is therefore of great interest to the international financial community.

³ An excellent summary of principles-based debt management based on World Bank experience is Wheeler (2004).

⁴ International Monetary Fund (2007a). See also Samans et al (2007) and Turnbull (2006). The BIS has also prepared several analyses of these markets (BIS, 2002).

⁵ A good recent analysis of the international investor base is IMF (2007b).

3. Inflation-linked bonds

One strategy followed by some countries with a history of macroeconomic instability was to issue inflation-linked bonds. In the past, it was indeed the rise in inflation that led to the virtual elimination of long-term, fixed-rate local currency debt in several countries. Today many governments in countries that do not have bond markets still feel that the main impediment is inflation. Even in countries which have reduced inflation substantially, there is sometimes a feeling that a lack of credibility in the commitment to keep inflation low over the next decade may hinder the development of a market for fixed-rate nominal debt at long maturities.

The answer in such circumstances is to issue inflation-linked bonds. Such bonds share many of the financial stability advantages of classical nominal bonds. 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 real interest rate or refinancing risks are reduced. Because tax revenues are linked to inflation, it seems natural for governments to issue inflation-linked debt. At the same time institutional investors that have to finance future real claims (eg pension funds) find inflation-linked debt an attractive asset.

Proposals to develop other state-contingent bonds (eg GNP-indexed bonds, bonds linked to commodity prices etc) also sound attractive in theory. Such bonds could provide a useful sharing of the risks from cyclical movements in GNP, swings in commodity prices and so on. There is, however, a big practical problem. Having many different types of bond risks fragmenting issuance and so undermine liquidity. This can be a fatal drawback in small markets.

4. The information gap

Given the very rapidity of the development of these new markets, it is perhaps not surprising that information about them has not quite kept pace.

Inadequate data

The data on **international** bonds are comprehensive, giving a large amount of information that help the quantification of risk exposures for all countries. The BIS's *Quarterly* data, for instance, give detailed information on: the time profile of debt repayment schedules; average remaining maturity for total outstanding; and currency composition.

None of these dimensions is covered by the regular BIS statistics on **domestic** bonds. There is no information about currency of denomination, about maturity or about fixed- versus

floating-rate. The fact that statistical reporting systems have yet to catch up with this new important market segment has been a matter of concern for some time.⁶

At the BIS, we have on two occasions surveyed central banks for key aspects of their government bond markets – first, in 2001, to provide the background material for a meeting of Deputy Governors and, secondly, in 2006, to support the Margolin CGFS Working Group. Although this information is publicly available at a national level, it took some effort to put the data together in a way that gave a reliable picture of potential vulnerabilities. Table 1 summarises our findings about the instrument composition of domestic bonds in four major EMEs that have suffered major crises. The main findings are two: the proportion of domestic securities instruments denominated in foreign currency has declined; the proportion of fixed rate debt has increased, but the share of floating rate debt is still large in some countries.

It is very useful that session V of this Workshop takes up the important issue of statistical gaps.

5. Indicators of exposures

In addition to these data gaps, the lack of good, simple indicators of exposures to exchange rate and interest rate risks also impedes effective monitoring. Investors look at many countries and need simple measures of exposures. The following explore some issues of measuring exposures to (a) currency depreciation and (b) the short duration of debt. There is, of course, no one single, ideal summary measure of these risk exposures. In many cases, it will be useful to develop a few different indicators. The financial soundness indicators regularly published by the IMF illustrate the usefulness of summary indicators. They do not provide the complete picture, but they do bring to attention developments that require a closer look.

Currency mismatches

On **currency mismatches**, Morris Goldstein and I proposed a few years ago a simple measure that could be constructed using mainly data that are readily available in international sources.⁷ It had essentially two elements. One was the country's net asset position in foreign currencies vis-à-vis non-residents (expressed as a percentage of GDP –

⁶ The Financial Stability Forum, for instance, drew attention to serious statistical shortcomings in 2000. 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" (FSF, 2000, paragraph 159).

⁷ See Goldstein and Turner (2004), pp 42-56 for a fuller exposition of this measure, estimates for the larger EME economies and a discussion of data needs.

NFCA/Y). The second element has been used less frequently: it is the percentage of aggregate debt denominated in foreign currency. It is called aggregate because it includes not only external debt but also domestic debt: it requires a quantification of the currency denomination of debts between residents.⁸ Combining this with a proxy for the share of tradables in GDP yields a pure mismatch ratio:

$$\text{MISM} = \frac{\text{FC\%TD}}{\text{X/Y}}$$

where FC%TD = Foreign currency share of aggregate debt (internal as well as external)
 X = Exports of goods and services
 Y = GDP

The simple logic of this ratio is that countries with high export/GDP ratios can sustain higher foreign currency shares in total debt than countries with low export/GDP ratios. If this ratio is greater than one – more foreign currency debt than foreign currency earnings to finance – then the country has a problem.

The aggregate ‘effective’ currency mismatch (termed AECM) was then defined as the product of MISM and net foreign currency assets (NFCA) as a percentage of GDP viz:

$$\text{AECM} = \frac{\text{NFCA} \cdot \text{MISM}}{\text{Y}}$$

If foreign currency assets are exactly equal to foreign currency liabilities, then both NFCA and AECM are zero – that is, there is no aggregate effective currency mismatch. A country which has a foreign currency liability position (NFCA < 0) is exposed to the risk of currency depreciation. The magnitude of this exposure depends on MISM.

Table 2 illustrates the application of this measure to Brazil. In 2002, the net foreign currency liabilities of Brazil amounted to 25% of GDP; by 2005, this had been reduced to only 8.3% of GDP. In 2002, the foreign currency share of debt was 1.95 times larger than the share of exports in GDP, largely because of the effective dollar denomination of a significant proportion of government domestic debt. By 2005, this “pure” mismatch ratio had been reduced to 0.71. The aggregate effective currency mismatch was thus reduced substantially.

⁸ Including debt contracts (eg bank accounts, government bonds etc) between residents is essential for ensuring that **sectoral** mismatches are covered. The logic of this is that 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. Foreign currency debts between residents may “cancel out” in normal times, but do not do so in a crisis when borrowers risk insolvency. Government deficits and debt could explode; banks, corporations and households may face bankruptcy.

BIS calculations show that there have also been substantial reductions in the foreign currency share of total debt in Indonesia, Korea, Mexico, Thailand and Turkey (Graph 2). This ratio has, however, increased in the case of Hungary and the Philippines. At the same time, foreign currency liability positions have been reduced. As a result, most EMEs have reduced and even eliminated their exposure to the risk of currency depreciation.

The duration of domestic debt

Empirical assessments of the **duration** of domestic debt face two challenges. The first difficulty is that there is no international source of reliable data – even for central government debt – on the maturity or nature of interest payments on domestic bonds. Debt labelled as long-term but with a coupon that is linked to short-term rates (floating rates) creates a similar interest rate exposure as short-dated bonds. A special survey of central banks by a BIS Working Group concluded that the maturity of non-sterilisation debt issued by major EME governments has indeed lengthened during the past five years or so: see Graph 3. However, maturities are still much lower than seen in industrial countries.

The second challenge is to allow for the increase in short-term central bank or government debt to sterilise the massive accumulation of foreign exchange reserves. The implications for interest rate exposure of this sort of debt issuance are quite different from the issuance of short-term debt to finance government consumption or investment in long-lived infrastructure.

Graph 4 provides one summary indicator of the sterilisation challenge faced at present by EME central banks. 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 reserves holdings. As reserves have risen substantially above the value of currency in circulation over the past decade, however, the monetary authorities in a large number of EMEs have had to issue local currency debt paper to finance the acquisition of reserves. The indicator shown in Graph 4 suggests that domestic securities issuance to finance reserves accumulation is currently around \$1.6 to \$1.8 trillion, compared with less than \$200 billion in 1995.⁹

One consequence of this is that much of the large rise in short-term gross debt in the past five years has been matched by a very similar rise in short-term forex assets. Hence interest rate exposures are smaller on a net basis that is apparent when only gross debt is

⁹ There are, of course, alternatives to issuing debt. One is to increase the reserve requirements imposed on banks: see Mohanty and Turner (2006) for a fuller explanation of the sterilisation issue.

considered. Table 3 provides a partial illustration of this effect: note the reliance by China on issuance of short-dated debt (money market instruments).

It would be useful to consider the development of simple indicators of the duration of local debt that incorporate at least those two elements. One possibility would be the sensitivity of average interest rates on existing debt (net and gross) to a 100 basis points rise in the central bank policy rate. Such indicators would be a great aid to monitoring risks.

6. Three policy challenges

Recent surveys of key structural features of these new EME local currency bond markets reveal that the stage of development of particular markets varies widely. In most cases, these are still comparatively new markets that still require nurturing. Some features of the domestic bond market (eg taxes, shortcomings in the local market infrastructure, a lack of liquidity etc) continue to discourage direct holdings by foreigners. This reluctance to hold such bonds outright means that foreign investors tend to take their exposures via derivatives markets (sometimes offshore). Surveys of central banks by the BIS have also identified certain shortcomings in the structure of these markets. Three deserve particular attention: the narrowness of the domestic investor base; the domination of issuance by government; and liquidity. These shortcomings are considered in turn.

The domestic investor base is narrow

The investor base for local bond markets in industrial countries is rather broad – banks, pension funds, insurance companies, mutual funds and so on are all active players. In the EMEs, however, a major challenge is to widen a rather narrow investor base. At present, the main holders of local currency bonds are domestic banks (Graph 5) and public financial institutions. The implication of this is that the dispersal of risk outside the banking system has been less than hoped.

As discussed above, one explanation for this concentration has been the need to sterilise reserves accumulation. Sterilisation operations have put large amounts of government or central bank paper on the balance sheets of local commercial banks (raising worries that are beyond the scope of this Workshop). Much of this paper is short-dated instruments, making the banking system very liquid. When banks have acquired long-dated paper, bank supervisors need to watch the interest rate exposures of their banks that arise.

A recent survey by the Asian Development Bank found that local market-makers in Asian bond markets felt that a diversified investor base was the single most important requirement for improving the liquidity of local bond markets (ADB, 2006). The development of funded pension systems can create internal non-bank demand for local currency bonds. But forcing

local institutional investors to hold most of their assets in domestic government bonds would be a major error. Doing this would mean that new issues would not be priced to correctly reflect market conditions. A high proportion of such paper would not subsequently trade in secondary markets, but would be held to satisfy regulatory requirements. Such a “captive” market therefore works **against** the creation of a true market and keeps out other investors.¹⁰

Issuance too dominated by government

The ultimate purpose of capital markets is to improve access for **all** borrowers, not just government. Yet the public sector continues to dominate issuance to a much greater extent than in industrial countries (Graph 6). Corporate bond markets in EMEs remain underdeveloped. This is often a reflection of deeper weaknesses in corporate governance which limit capital market access. Such weaknesses need to be addressed even in bank-centred financial systems.

Equally important, the development of securitisation has also been poor. Securitisation transforms long-term assets subject to credit and liquidity risks (eg leases, mortgages or small enterprise loans) into tradable instruments with much lower credit risk. It can enable banks to reduce excessive exposures to particular credit risks. The possibilities of securitisation in EMEs therefore deserve more attention from policymakers. The Danish mortgage market is an excellent example showing that mortgage-based bond markets can develop even in a small country. The German Pfandbrief model is well-suited for a bank-centred financial system – and has been copied in central Europe (Fritsch, 2004). Governments in EMEs seeking to stimulate securitisation can learn from such examples how to ensure securitised markets are soundly based and properly regulated. The World Bank’s expertise can also help here.

The further development of securitisation should, in time, improve the terms on which households and small firms (SMEs) can borrow from banks. This would improve the efficiency of financial intermediation. It is important to understand why this could also have important macroeconomic consequences, both at home and internationally. Better policies in many EMEs have raised the future path of potential GDP substantially. But in many countries household expenditure has not risen as much as **future** incomes would justify. And SMEs find it difficult to get funds to expand. A financial system that works well would allow both firms and households to borrow against this increase in permanent income. By increasing the marginal propensity to spend permanent income, it would provide an early stimulus to

¹⁰ Cifuentes et al (2002) discuss the links between pension funds and local currency bond market development in the case of Chile.

domestic demand. But when financial intermediation remains underdeveloped, demand is held back – leading perhaps to an overdependence on external demand. Mishkin (2006) makes a convincing case why financial system reform is so important for development.

Liquidity is inadequate

Although liquidity has improved, many local currency bond markets remain rather illiquid. Although measuring the various dimensions of liquidity is difficult, the two standard measures shown in Graph 7 – suggest large variation across countries in the degree of liquidity. These markets are still in very early stages of development – and we cannot be sure how well they would function in volatile conditions.

Some large local investors (sometimes too constrained by regulation) adopt very simple 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 which do want to trade.

A CGFS report of the major central banks some years ago outlined some simple principles for developing liquid government bond markets.¹¹ Drawing on these principles, five practical policy recommendations were underlined. The following notes summarise these recommendations:

- (i) *Maturities and issue frequency should be arranged so that large benchmark issues at key maturities are established.*

One way of doing this is to conduct regular reopenings, whereby the identical security is offered in several consecutive auctions. This allows issuers to create a large issue while lowering the risk premia paid to dealers – because they do not have to subscribe to large amounts of securities at once.

- (ii) *The liquidity-impairing effect of taxes should be minimised.*

Direct taxes on market transactions create a wedge between the supply price and the demand price of a traded instrument and so constitute an impediment to a deep and liquid market. Ideally taxes on financial transactions should be abolished; if they cannot be abolished, active market participants should be exempt from them.

¹¹ Committee on the Global Financial System (1999). The chairman of this group was Masaaki Shirakawa of the Bank of Japan.

(iii) Transparency of issuance schedules and trading information should be encouraged.

Sovereign issuers should seek to maintain a regular issuance cycle and issue dates should be pre-announced insofar as this is possible given fluctuations in cash management needs. Facilitating “when issued” trading (ie trading in the days immediately preceding the auction) can help market liquidity. It can make it easier for market-makers to provide tight bid-ask quotations when the true values of securities have been well tested in the market before the auction takes place. Some countries have found that electronic bond platforms or dedicated pricing agencies can foster the real-time diffusion of information on market prices that helps to reduce transaction costs.

(iv) Safety and standardisation in trading and settlement practices should be ensured.

Shortcomings in the local trading and settlement infrastructure, which will be addressed in Session VI of this Workshop, deserve particular attention. In the light of the discussion above, it should also be noted that standardisation generally encourages participation by non-residents, thereby adding to the heterogeneity of market participants that helps market liquidity. A third aspect the CGFS report drew attention to was that short sales should be allowed to enable dealers to meet buy orders quickly and so ensure market liquidity.

(v) Repo, futures and options markets should be developed.

Central banks can enhance liquidity in secondary markets by using government securities as collateral for their lending operations. Moreover, re-purchase transactions (“repos”) are more market-neutral than outright transactions because they do not affect bond prices (except indirectly) and have only a temporary impact on liquidity.

In many countries, the operations of futures and options markets are often restricted because the authorities fear that such markets make speculative attacks on their currencies easier. In some countries, regulations and various market imperfections inhibit arbitrage between repo and derivatives markets, and this can compromise liquidity.

A final important consideration is that accounting rules can inhibit active trading by institutional investors. As more countries begin to adopt international accounting standards that entail a shift from historic cost to fair value accounting, this issue will get much more attention than it has to date. At present, pension funds and insurance companies in many countries are still allowed to carry bonds on their balance sheet at historic cost irrespective of market price developments. Because historic cost accounting means that losses or gains are registered only on trading, trading tends to be avoided because it makes the reported income and balance sheet more volatile. The absence of mark-to-market accounting therefore tends

to inhibit trading in many markets.¹² This is a major loss. Because long-term investors such as pension funds and insurance companies do not have the same need for liquidity as many other participants in financial markets, they would be particularly well placed to trade by buying illiquid bonds that have become relatively cheap (so earning the liquidity premium) and selling highly liquid issues.

In many countries, the operations of futures and options markets are often restricted because the authorities fear making speculative attacks on their currencies easier. But such markets have the virtue of making bond markets as a whole more liquid: as liquidity premia fall, governments find it cheaper to borrow. The experience of several countries was that commercial banks became much more active traders once they were required to mark at least parts of their portfolio to market. Institutional investors are very likely to respond in much the same way. Such restrictions divert such pressure into other markets (eg offshore) and hurt the liquidity of local bond markets.

7. Conclusion

The main conclusion of this note is that the development of local currency bond markets has improved the macroeconomic and financial stability of countries that were heavily dependent on foreign currency debt. This represents a major policy success that other countries could emulate. Even countries which have not yet established a credible low-inflation environment can get many of the benefits of bond markets by issuing inflation-linked debt.

The next main conclusion is that statistical information on these markets needs to be put in forms that international investors can easily access. In addition, the monitoring of key risk exposures – by market participants and the official sector – could be improved by the development of a few simple indicators that could be applied to a large number of countries and regularly updated.

The final conclusion is that these nascent markets require continued nurturing. Three aspects are discussed in this paper: (i) the domestic investor base needs to be widened; at present, the proportion of bonds held by banks in many EMEs is too high. (ii) bond markets should provide finance more widely than just to governments. Increased corporate bond issuance and more extensive securitisation are desirable. (iii) Finally, improving the liquidity of government bond markets remains a major objective in most countries, and the experiences of industrial countries provide some very specific lessons about how to achieve this.

¹² For a summary of mark-to-market practices in different countries, see Table 7 in Mohanty (2002).

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Table 1
Domestic bonds by instrument¹
(As a percentage outstanding)

	Peak year	Exchange rate linked		Floating rate		Inflation indexed		Straight fixed rate	
		Peak	2005	Peak	2005	Peak	2005	Peak	2005
Argentina	2001	96.8	20.0	1.6	1.5	0.0	74.3	1.6	1.5
Brazil	1998	16.6	2.9	64.9	60.1	1.4	16.3	2.7	20.6
Mexico	1994	71.8	0.0	2.6	46.7	7.6	12.9	18.0	27.6
Turkey	2004	18.5	15.3	25.3	31.2	15.0	11.1	41.2	42.5

¹ Includes bonds and notes. The 1994 figures for Mexico are based on end-1994 data provided by Banco de Mexico on floating rate (bondes), fixed-rate short-term (cetes), inflation-linked (ajustabonos), dollar-linked short-term (tesobonos) and hybrid domestic issues.

Note: Hybrid instruments are not shown so totals may not sum to 100.

Sources: Central banks and BIS

Table 2
Aggregate effective currency mismatch in Brazil

			2002	2005
1.	Foreign currency share of total debt	FC%TD	30.3	12.0
2.	Exports/GDP	X/Y	15.5	16.8
3.	“Pure” mismatch (= 1 ÷ 2)	MISM	1.95	0.71
4.	Net foreign currency assets as % of GDP	NFCA/Y	-25.2	-8.3
5.	Aggregate effective currency mismatch (= 3 x 4)	AECM	-49.2	-5.9

Source: Goldstein and Turner (2004), updated.

Table 3

Central bank domestic debt securities outstanding and foreign exchange reserves

(In billions of US dollars)

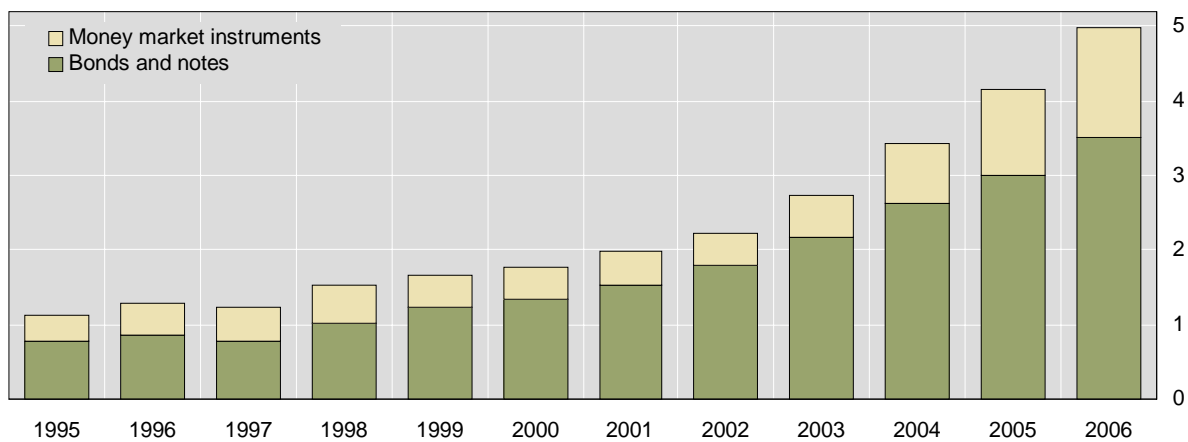
	2000		2005		Change (2005-2000)		Memo (2005-2000)
	Money market instruments	Bonds and notes	Money market instruments	Bonds and notes	Money market instruments	Bonds and notes	Change in FX reserves less currency in circulation
China	1	...	275	...	274	...	537
Other EMEs	53	120	134	269	78	140	547

Note: The exchange rate with the US dollar at end-2005 is used to convert the figures to US dollars so that the changes do not include valuation effects.

Source: Central banks; IMF; BIS.

Graph 1: Emerging market domestic debt securities outstanding

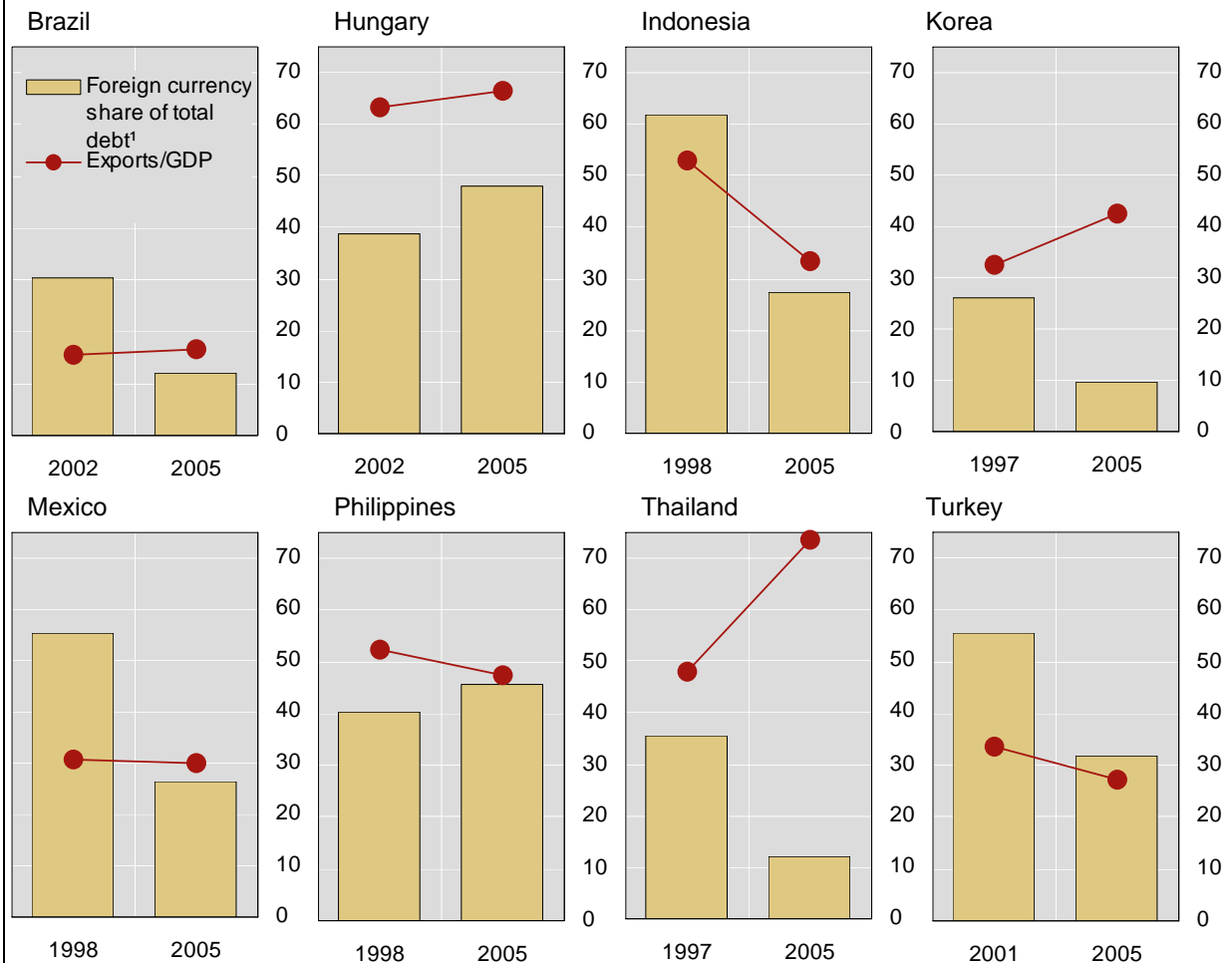
In trillions of US dollars



Source: BIS.

Graph 2: The foreign currency share of total debt and the exports/GDP ratio

In per cent

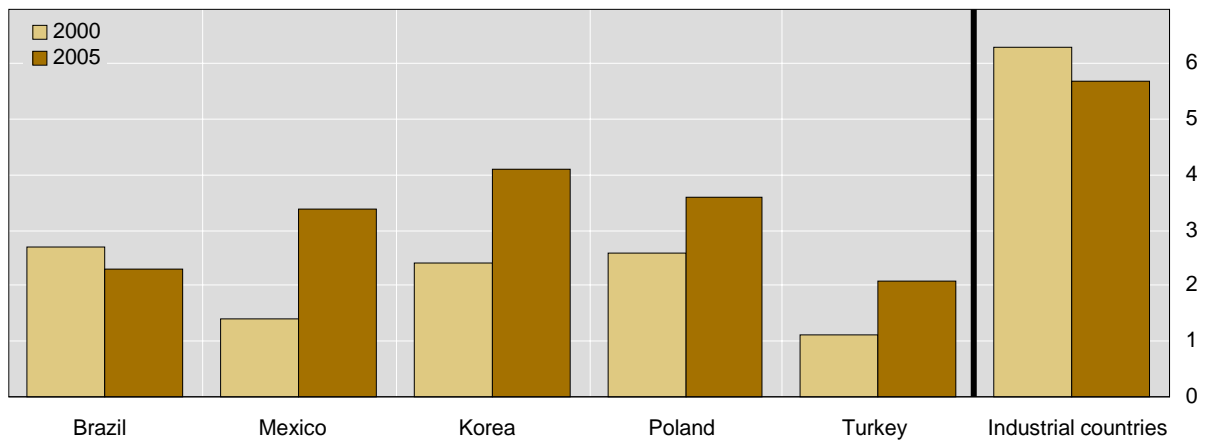


¹These estimates cover debt contracts between residents as well as debt vis-à-vis non residents. The earlier year was a year when the foreign currency share of debt peaked during the 1995-2005 period.

Sources: IMF; national data; BIS.

Graph 3: Maturity of domestic central government debt outstanding¹

Remaining maturity in years

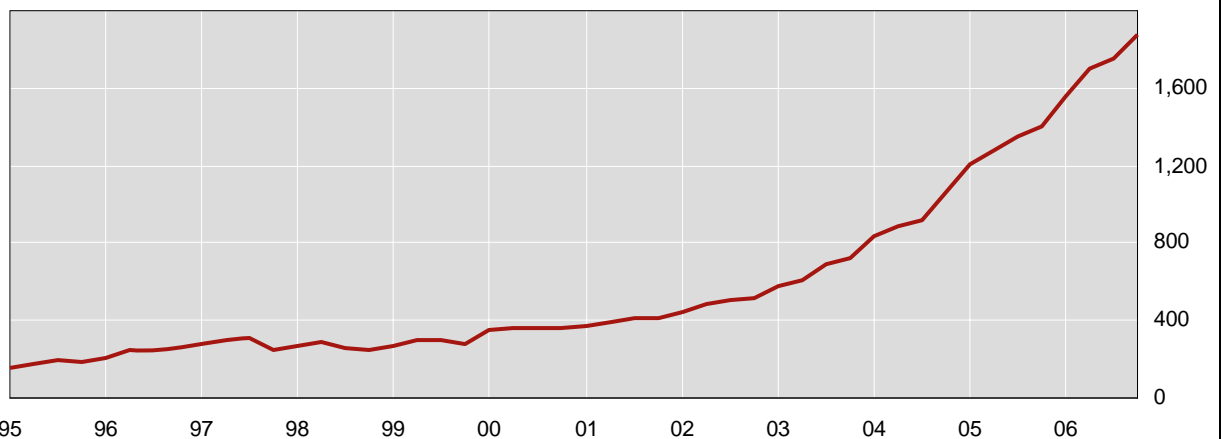


¹ Includes bonds, notes and money-market instruments.

Source: Central banks.

Graph 4: Emerging market net foreign assets less currency held outside banks

In billions of US dollars



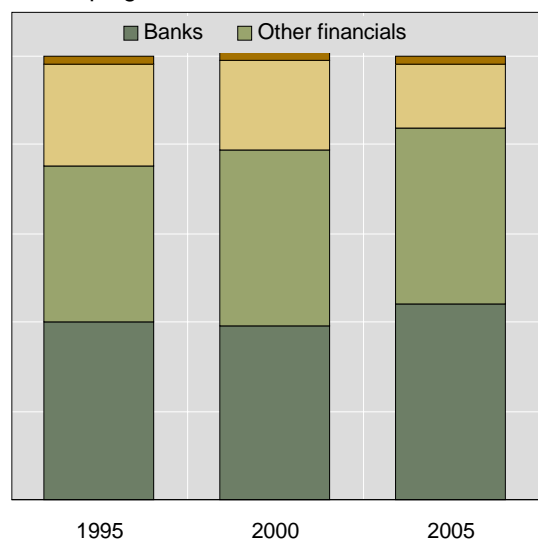
Note: the emerging market world is made up of Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Russia, South Africa, Taiwan (China), Thailand, Turkey and Venezuela.

Sources: International Monetary Fund; national data.

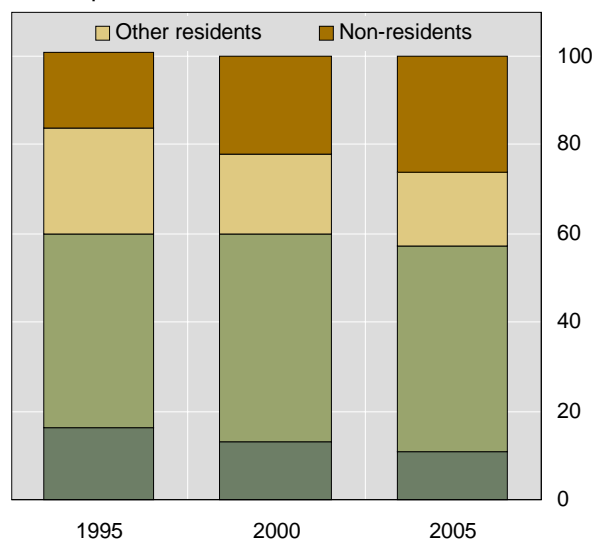
Graph 5: Holders of domestic securities¹

As a percentage of total outstanding

Developing markets



Developed markets



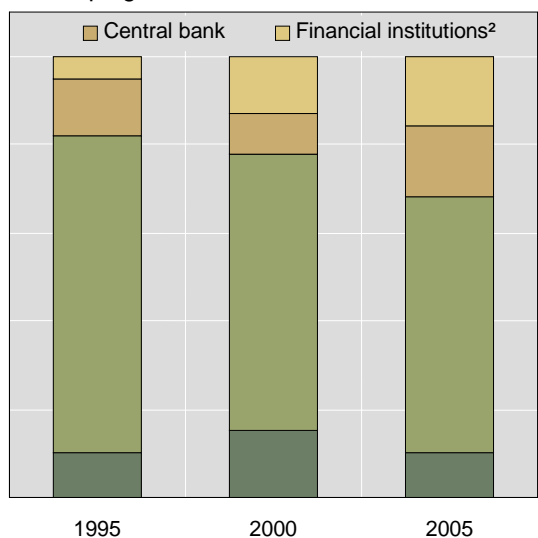
¹ Includes bonds, notes and money-market instruments.

Source: Central banks.

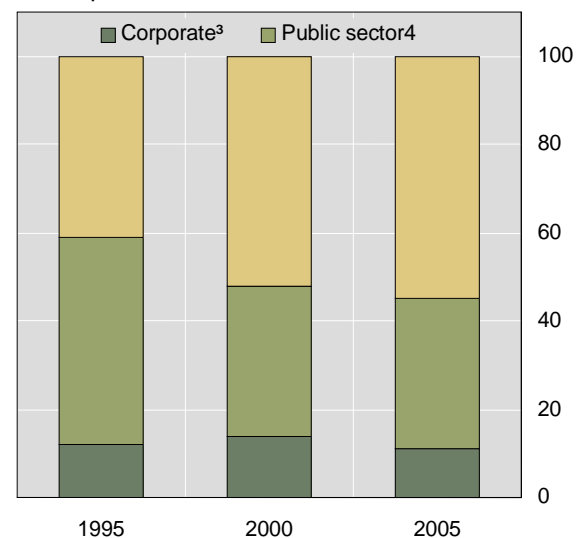
Graph 6: Issuers of domestic debt securities¹

As a percentage of total domestic debt outstanding

Developing markets



Developed markets

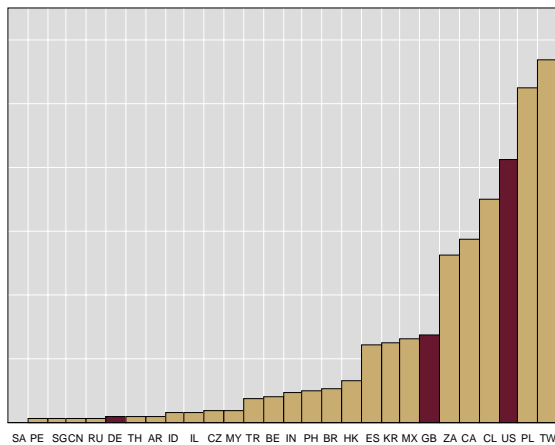


¹ Money-market instruments, bonds and notes. ² Sum of banking sector, non-bank financial institutions and other non-resident issuers. ³ Non-financial, corporate sector other than quasi-government. ⁴ Sum of central government, other governments, quasi-government.

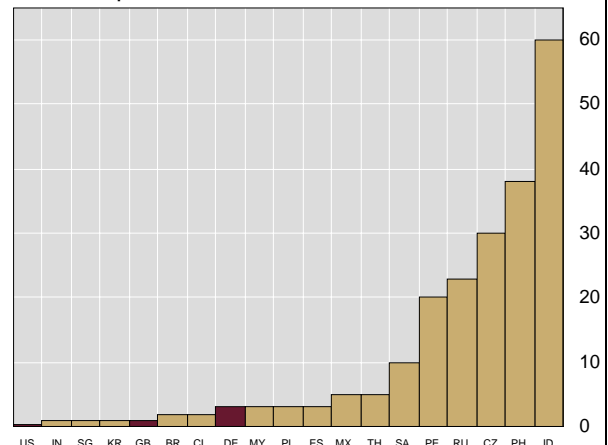
Source: Central banks.

Graph 7: Liquidity in the government bond market, 2005¹

Turnover ratio²



Bid-ask spreads³



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

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

Sources: Bloomberg; US Fed; BIS.