

Developments of domestic government bond markets in EMEs and their implications

Aaron Mehrotra, Ken Miyajima and Agustín Villar¹

Abstract

During the past decade, domestic government bond markets in EMEs have developed further. Market depth has increased, maturities have lengthened and the investor base has generally broadened, although the degree of progress has varied across countries and several deficiencies remain. The expansion can be attributed to improvements in domestic policy management and a reduction in external financing needs.

The commensurate reduction in currency mismatches has increased the scope for countercyclical monetary policy. Financial stability has broadly benefited from this development, but the volatility stemming from derivatives markets and greater foreign holding of domestic currency debt present some additional risks.

Keywords: Financial markets and the macroeconomy, international lending and debt problems, financial aspects of economic integration

JEL classification: E44, F34, F36

¹ The authors thank Philip Turner and Madhusudan Mohanty for comments and Tracy Chan, Emese Kuruc, Marjorie Santos and Agne Subelyte for valuable assistance.

1. Introduction

Since this topic was first discussed at the Deputy Governors' Meeting a decade ago, domestic government bond markets in EMEs have developed further.² Market depth has increased, maturities have lengthened and the investor base has generally broadened, although the degree of progress has varied across countries and several deficiencies remain.

In this paper we address three interrelated questions. First, what are the factors promoting these developments and how much further is it possible for these markets to evolve? Second, what are the implications for monetary policy? In particular, has the development of domestic government bond markets reduced the potential for currency mismatches and enhanced monetary policy effectiveness? In the 1990s, for example, when foreign currency debt remained high, many EM central banks had to raise interest rates in the midst of a recession. The experience during the 2008–09 global recession appears to be quite different.

Third, how have the domestic bond markets influenced financial stability? In principle, a better developed yield curve for domestic government bonds and improved market infrastructure should help the corporate sector issue more bonds in domestic markets and diversify funding risks, increasing the economy's resilience to external shocks. In practice, however, the record has not been straightforward, although substantial progress can be seen in some countries. Also, recent bouts of market volatility have highlighted potential new risks as the investor base for domestic bonds becomes more global. These risks need to be managed.

The rest of the paper is organised as follows. Section 2 documents the development of domestic government bond markets (excluding central bank issuance) in EMEs. Section 3 discusses potential reasons for these developments. Section 4 addresses the implications for monetary policy. Finally, Section 5 discusses the impact on financial stability.

2. How far have domestic government bond markets developed in EMEs?

Over the past decade, domestic government bond markets have expanded in EMEs. To gauge how far these markets have developed and deepened, we focus on the following aspects: (i) size; (ii) composition in terms of maturities, type of instrument, and investor base diversity; and (iii) market liquidity.

(i) Size

As Graph 1 shows, the stock of domestic bonds as a percentage of GDP has increased in all regions between 2000 and 2010. And this has happened as overall government debt levels have declined or stabilised, suggesting a shift away from foreign currency debt.

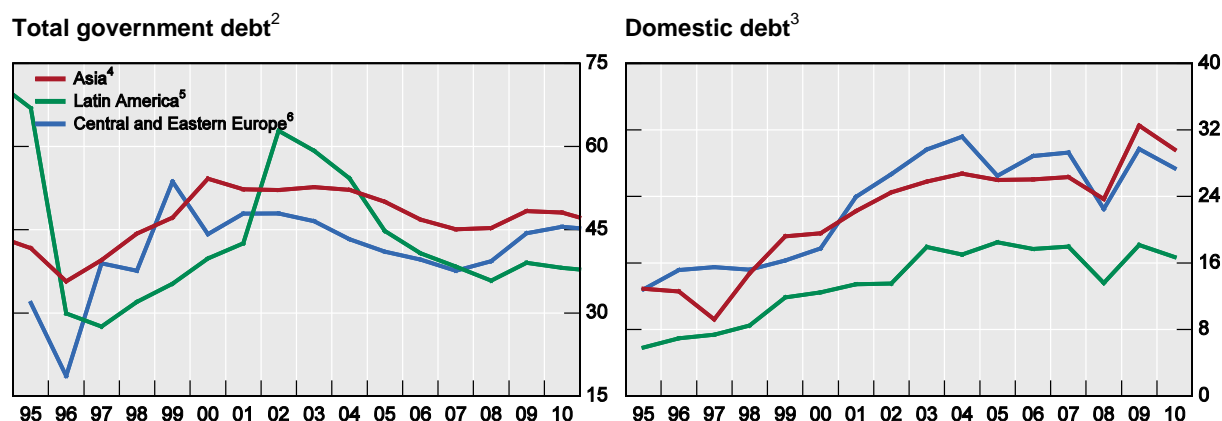
Domestic currency bonds have grown by about 10 percentage points of GDP to some 30% of GDP in Asia and central and eastern Europe (CEE), and by a few percentage points to some 15% of GDP in Latin America (Graph 1, right-hand panel). In absolute terms, the dollar value of these debts in EMEs as a whole has quadrupled from \$1 trillion in 2000 to more than \$4 trillion in 2010. Table A1 provides country details, along with evidence that the amount of tradable bonds is, in many cases, typically smaller than the total amount of outstanding domestic debt.

² See BIS Papers, no 11, 2002.

Graph 1

Government debt securities outstanding in EMEs¹

As a percentage of nominal GDP



¹ Simple averages across the countries listed. ² General government gross debt. ³ Domestic debt securities issued by government; central bank issues are excluded. ⁴ China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. ⁵ Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. ⁶ Czech Republic, Hungary, Poland, Russia and Turkey.

Sources: IMF, *World Economic Outlook*; BIS securities statistics.

(ii) Composition

Maturity

A second dimension of market development is the maturity. The remaining maturity of general government local currency debt in EMEs as a whole has increased on average by more than three years, from 3.5 years in 2000 to seven years in 2010. This was partly due to the extension of the longest maturity, which has increased by 14 years to 28 years on average, led by a 30-year extension in Latin America (to 40 years). Table A2 shows country details. This has happened at a time when average maturities of government debt have declined in advanced economies. That said, the maturities of domestic currency government bonds are considerably shorter than those of foreign currency bonds in many EMEs, as highlighted by central bank papers from Colombia, Mexico and Turkey.

Type

A third dimension is a move away from types of debt that would increase interest rate and currency risks. *Fixed rate issues* have become increasingly important, representing around 90% or more of total in Asia in 2010 (Table 1). Despite steady increases, the share of fixed rate issues remains at around 40% of total in Latin America. *Inflation-indexed bonds* remain important in some Latin American economies. The Central Bank of Chile's contribution mentions that a long history of inflation explains the prevalence of indexation in the sovereign's long-term issuance. Inflation-indexed bonds also constitute a large share of total domestic debt in Israel.

In contrast, the share of *floating rate bonds* issued by governments (which exposes them to interest rate risks) has declined over the past decade. However, floating rate government bonds remain relatively common in Latin America, particularly in Brazil and Mexico (30% and 29% of total, respectively). More importantly, the share of *domestic foreign currency bonds* has fallen notably and is no longer significant in Russia and Brazil, which relied on them heavily in the 1990s. However, in some Latin American economies, part of domestic debt

remains either denominated in or linked to foreign currencies (eg Argentina, Peru and Venezuela). Tables A3 and A4 report similar data for a larger number of issuers.

Table 1
Instrument and maturity structure of general government
debt outstanding in 2010 (in local currency)¹

	Overall				Long-term (more than one year)				Short-term debt ³
	Floating rate	Fixed rate	Inflation-indexed ²	Foreign currency	Floating rate	Fixed rate	Inflation-indexed ²	Foreign currency	
Asia⁴	7	87	1	5	6	88	0	5	18
China	1	99	0	0	0	100	0	0	16
Indonesia	18	57	4	21	19	58	0	23	9
Korea	0	97	1	2	0	97	1	2	0
Singapore	0	100	0	0	0	100	0	0	52
Thailand	15	84	0	2	13	86	0	2	14
Latin America⁴	14	39	19	28	15	34	21	30	17
Argentina	10	8	24	57	11	0	27	61	16
Brazil	30	36	26	8	32	30	28	9	20
Colombia	0	65	21	13	0	64	22	15	13
Mexico	29	51	13	6	31	43	17	9	26
Peru	0	34	11	55	0	31	12	57	9
CEE⁴	7	74	0	19	9	69	0	23	17
Czech Republic	7	74	0	19	9	69	0	23	17
Other EMEs⁴	14	54	25	7	12	57	25	8	18
Israel	7	29	50	14	7	29	50	15	9
Saudi Arabia	21	79	0	0	16	84	0	0	26
Total of above⁴	11	63	12	15	11	61	12	17	17

¹ As a percentage share; the total of the shares may fall below or exceed 100% due to rounding. For Indonesia, zero-coupon bonds. ³ As a percentage share of the overall debt outstanding. ⁴ Simple averages across listed countries.

Source: Central bank responses to the BIS questionnaire.

Investor base

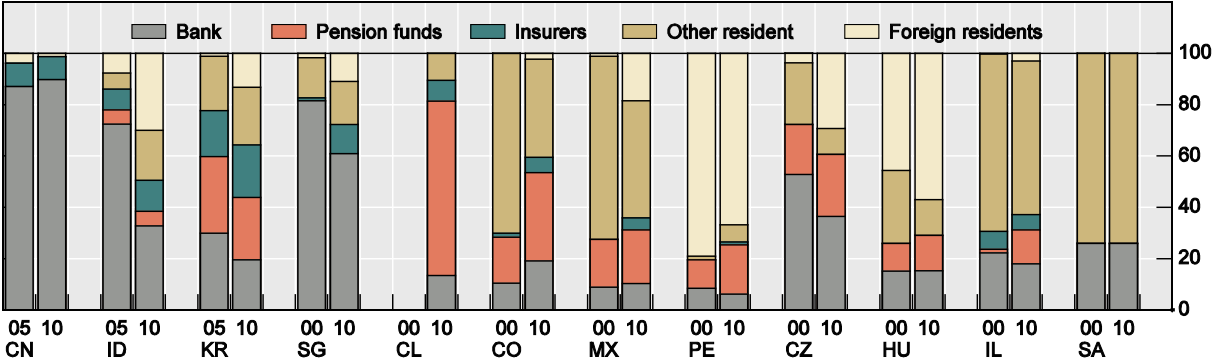
A fourth and welcome development is that the investor base for domestic government bond markets in EMEs is now more diversified than it was five to 10 years ago. As Graph 2 shows, the share of pension funds and insurers has risen as the gradual development of funded pension systems has helped stimulate demand for domestic bonds. The share of pension funds in 2010 exceeded one fifth of total in Chile, Colombia, the Czech Republic, Korea and Mexico, although even at that level it remains lower than in industrial countries. And, the share of foreign holdings has generally increased, including in Indonesia, Korea and Mexico. Foreign holdings remain generally high in CEE (eg the Czech Republic and Hungary), reflecting the region's increasing financial integration with the rest of Europe.

Despite these developments, banks are reported as the remaining key holders of domestic government bonds in EM Asia. In China, banks are almost the sole investor in government bonds and this has not changed over the past five years. The share of bank holdings exceeds 60% in Singapore. Elsewhere, the reported share of bank holdings is typically smaller. However, in some cases, the data may require careful interpretation. For instance, in

Colombia and Mexico, part of “other residents” may represent brokers, which are typically owned by banks.

Such shifts in investor composition should change the mix of maturities in demand, which could in turn affect the maturity structure of government debt, the shape of the yield curve, and interest rate level.³

Graph 2
Investor base for general government debt¹
 In percent



¹ The shares are based on the data reported in local currencies.

Source: Central bank responses to the BIS questionnaire.

(iii) Market liquidity

A final dimension is liquidity. Trading of domestic government bonds in EMEs has become more active. According to the Emerging Markets Trade Association, in the past decade, trading of these securities surged fivefold in EMEs, reaching some \$4.7 trillion in 2010. As a result, trading volume of domestic debt securities as a share of total debt securities doubled during the same period, reaching 70% of total debt traded.

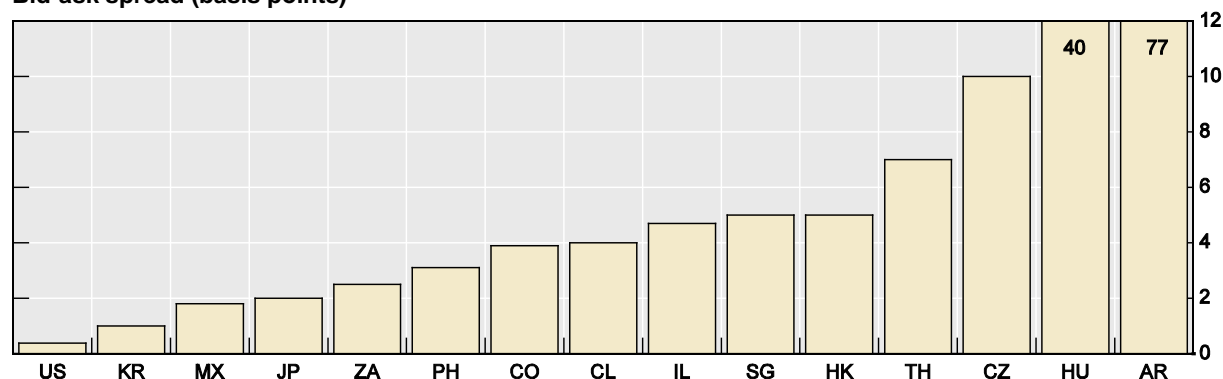
However, liquidity remains an issue for many EME bond markets. Graph 3, which summarises data provided by central banks to the meeting, indicates that bid-ask spreads are often in single-digit basis points, especially in Asia and Latin America, suggesting that the costs of executing trades are not elevated. However, even for the most liquid maturities, turnover remains low relative to the average amount outstanding in many EMEs. The turnover ratios, computed as the ratio of the amount traded to the amount outstanding, are relatively high in Hong Kong SAR (29), Mexico (20) and South Africa (15). Market liquidity data from the recent Bond Market Liquidity Survey for Asian economies, and JP Morgan’s Local Markets Guide for a larger number of EMEs, broadly confirm the observations, despite differing in several details.

³ The issue is explored in the background paper “Central bank government bond markets: issues for monetary policy and coordination”.

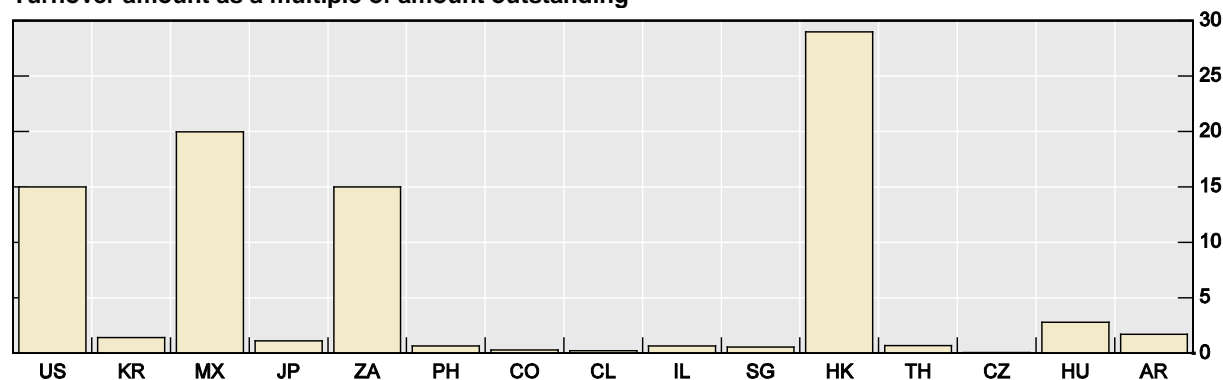
Graph 3

Indicators of liquidity in government bond markets in 2010

Bid-ask spread (basis points)^{1,2}



Turnover amount as a multiple of amount outstanding¹



¹ For the most liquid issue. See Table A5 for the underlying data. ² Bid-ask spreads are expressed in basis points. For Japan, the United Kingdom and United States, average bid-ask spreads of generic 10-year government bonds in 2010.

Sources: Bloomberg; central bank responses to the BIS questionnaire.

3. What factors have contributed to bond market development?

The expansion of domestic government bond markets over the past 10 years can be attributed to improvements in domestic policy management and a reduction in external financing needs. Questions, nevertheless, arise about the sustainability of debt levels and whether EMEs have grown out of “original sin”.

Many central banks have been able to keep inflation at low levels. As a result, nominal interest rates have fallen and become more stable. Over the last decade, yields on domestic government bonds have declined by some 4 percentage points to 6.5%, and their volatility has declined by two thirds (Table 2). In Brazil, domestic government bond yields came down from 26.1% to 11.8%, and, more impressively, their volatility fell from 11.2% to 0.9% during the same period. In Turkey, yields fell from 23.8% to 8.7% and their volatility from 7.7% to 1.1% during the same period.

Low and stable inflation has helped to reduce the need for foreign currency borrowing. In the past, investors often preferred foreign over local currency debt to hedge themselves against inflation risks, as they feared that governments would generate surprise inflation to reduce the value of debt.

Public debt sustainability has improved considerably owing to sounder fiscal policy, increasing the attractiveness of domestic currency bonds (see the background paper “Is monetary policy constrained by fiscal policy?”). Several EMEs have also taken advantage of these favourable developments to bring onto the government balance sheet some (non-marketable) debt that was previously concealed in various ways. In addition, vulnerabilities associated with foreign currency funding may have prompted several governments to consciously switch to domestic funding. Several EMEs have sought to avoid the consequences of sudden interruptions in capital flows as experienced during the 1990s, which led to major macroeconomic adjustments and episodes of financial crisis.

Table 2
Domestic government bond yields¹

	Average			Standard deviation		
	2002 ²	2005	2010	2002 ²	2005	2010
Asia³	6.5	6.0	5.3	1.0	0.8	0.6
China	4.7	3.5	3.3	1.9	0.7	0.4
India	7.4	7.1	7.9	0.9	0.5	0.4
Indonesia	12.2	12.1	8.9	1.2	1.9	1.3
Korea	6.2	4.6	4.4	0.9	0.9	0.8
Malaysia	4.0	4.1	3.7	0.5	0.3	0.2
Thailand	4.3	4.8	3.4	0.5	0.7	0.6
Latin America³	16.4	12.1	8.6	4.9	1.6	0.8
Brazil	26.1	17.5	11.8	11.2	2.0	0.9
Colombia	13.5	9.7	7.2	1.7	1.8	0.8
Mexico	9.6	9.1	6.9	1.7	1.0	0.7
Central Europe³	6.8	5.1	5.3	1.0	1.8	0.9
Czech Republic	4.6	3.3	3.5	0.7	3.3	0.5
Hungary	8.0	6.7	7.0	1.3	1.1	1.6
Poland	7.8	5.2	5.3	0.9	0.9	0.6
Other EMEs³	17.7	11.7	8.5	4.8	1.9	1.0
South Africa	11.5	7.8	8.3	1.9	1.0	0.9
Turkey	23.8	15.6	8.7	7.7	2.8	1.1
Total of above³	10.3	7.9	6.5	2.4	1.4	0.8

¹ GBI EM Broad Diverse, or GBI all maturities. Based on daily data. Standard deviation of daily percentage point change, annualised. ² 2003 for Indonesia and Colombia, 2004 for China and Turkey. ³ Simple averages across listed countries.

Source: Datastream.

Increased domestic saving has boosted the pool of resources for investment in domestic capital markets and reduced the need for external borrowing.⁴ IMF data suggest that gross national savings as a percentage of GDP increased by 9 percentage points in EMEs as a whole (to 34%) during 2000–11. The increase was most pronounced in Asia where the average saving rate reached 46% in 2011.

⁴ Central banks have accumulated foreign exchange reserves, part of which has been financed by issuing their own securities. Table A6 shows that, in a number of countries, central bank debt securities now account for large shares of GDP.

The growth of government bond markets raises two interrelated issues: how far domestic bond markets can or should expand? Have EMEs grown out of so-called “original sin”? As for the first question, Reinhart, Rogoff and Savastano (2003) argue that many EMEs experience extreme duress with overall debt levels that may be considered low by the standard of advanced economies. In their view, EMEs face “debt intolerance”, and can accumulate only a relatively small amount of debt, be it external or domestic. Countries can improve their creditworthiness, but the process is typically arduous and slow. In countries suffering debt intolerance, the threshold for domestic government debt would be low, and any attempt to breach it would expose the economy to considerable risks. In addition, domestic government borrowing could crowd out private sector borrowing. As a result, governments would end up borrowing in domestic bond markets, forcing the private sector to access external markets.

Evidence over the past decade has not been quite consistent with this prediction. Many EMEs now have public debt ratios above the 40% mark that was once considered unsustainable. This is because these EMEs have improved the health of their banking system, strengthened their fiscal positions, and accumulated large foreign currency reserves, which have improved their sovereign credit ratings.

Turning to the second question, the proponents of original sin held the view that EMEs cannot borrow abroad in their own currencies (Eichengreen, Hausmann and Panizza (2005)). However, the increased take-up by global investors of domestic government bonds appears to have made this proposition less relevant today. For most EMEs, the share is in the range of 10–30% of total government debt, which remains low relative to the 50–70% range for major industrial countries.^{5,6} Foreign participation in domestic bond markets could accelerate in future as more EMEs have been included in a benchmark local currency government bond index for international investors, and as global investors reassess credit risk in favour of EMEs more generally.^{7,8}

4. Implications for the conduct of monetary policy

In the past, heavy burdens of foreign currency debt have limited the use of countercyclical monetary policy. As currency depreciation increased the liabilities of residents with large amounts of foreign currency debt, monetary policy had to focus on propping up the exchange rate rather than stabilising the economy. This was done by raising the policy rate, often very sharply. Matters were often made worse by debt with short maturities or floating rates.

The growth in domestic government bond markets and the changes in their composition have contributed to a reduction in currency mismatches within the broader economies of many, if not all, countries. Table 3 reports three sets of indicators to help assess currency mismatches for 18 selected EMEs:

⁵ The shares are larger for some EMEs, as they are based on the amount of bonds included in the benchmark index or tradable debt, which is smaller than the total domestic government debt outstanding.

⁶ See “Global fixed income strategy”, 11 January 2012, JP Morgan Securities.

⁷ The Czech Republic, Hungary, Israel, Korea, Mexico, Poland and South Africa have been included in the JP Morgan GBI Broad Index.

⁸ However, the tendency of the price volatility on EM local debt to surge during times of stress could discourage foreign participation. This is partly because such characteristics reduce so-called collateral capacity – the scope for the underlying securities to be pledged as collateral for financing. Turner (2012) reports that the Sharpe ratios of EM government bonds have been higher than those of developed economies in relatively calm periods (such as 2002–06), but that they tend to fall sharply during periods of global financial stress.

- The first four columns show the share of foreign currency debt in total outstanding debt. The ratio fell for 13 EMEs during the last decade, reflecting the increased importance of local currency government debt.
- As the extent of risk stemming from foreign currency debt depends in part on the country's net foreign currency liability position (that is, foreign currency liabilities minus foreign currency assets), the middle four columns show this measure as a share of exports. A country with a significant net positive position suffers a balance sheet loss when its currency depreciates. During the last decade, 15 EMEs either reduced net foreign currency liabilities or turned to holders of net foreign assets.
- Finally, the net international investment position (NIIP) as a share of GDP, reported in the last column, represents a measure of an economy's balance sheet. The sign is reversed such that, consistent with the first two indicators, positive values signify net liabilities. In 2011, only six EMEs had either net assets or small net liabilities. The rather noticeable discrepancy with the first two measures may stem partly from the fact that, in NIIP, the share of net non-financial and/or non-debt positions could be relatively large.

Table 3
Measuring currency mismatches¹

	Foreign currency share of total debt outstanding ²				Net foreign currency liabilities as a percentage of exports ^{2,3}				Net IIP as a percentage of GDP ³
	2000	2005	2010	2011	2000	2005	2010	2011	2011 ⁴
Asia									
China	4.2	2.7	2.5	2.9	-81.1	-110.7	-196.0	-189.5	-27.2
India	6.3	6.6	8.9	10.2	-46.5	-80.7	-57.1	-43.3	13.4
Indonesia	23.9	16.8	17.2	18.0	9.7	-11.2	-30.1	-20.9	40.8
Korea	9.7	7.8	9.8	10.1	-19.5	-31.3	-9.7	-7.5	8.7
Malaysia	15.2	16.2	9.0	9.5	-11.8	-15.5	-25.9	-29.8	-1.8
Philippines	34.3	34.9	26.9	25.2	36.6	30.1	-30.8	-46.4	5.3
Thailand	15.7	10.4	6.4	5.9	-5.7	-36.9	-66.9	-61.7	11.4
Latin America									
Argentina	46.5	34.4	27.2	25.2	275.3	80.2	-8.1	3.9	-12.5
Brazil	18.1	11.0	7.1	8.3	159.3	49.8	-33.7	-27.8	29.5
Chile	22.1	20.1	20.9	21.5	10.5	14.2	15.2	8.3	4.4
Colombia	29.2	19.6	14.5	15.4	29.9	-7.5	-18.9	-7.6	23.9
Mexico	26.5	17.0	17.0	18.8	...	4.9	-0.2	-3.4	28.5
Peru	34.1	34.9	35.3	35.7	-28.1	-33.1	-45.5	-35.9	20.0
Central Europe									
Hungary	33.5	30.5	34.3	34.9	43.5	38.0	46.2	30.9	85.5
Poland	15.2	20.0	20.5	21.0	-41.8	-1.0	32.0	24.6	55.1
Other EMEs									
Russia	45.3	41.3	21.4	18.9	18.9	-32.1	-90.1	-76.6	-1.1
Turkey	30.9	19.7	17.5	20.2	72.2	45.2	54.0	51.9	41.9
South Africa	10.2	6.9	7.2	8.8	16.1	-33.9	-34.5	-32.4	19.4

¹ Using estimates of the currency of denomination of aggregate debt liabilities and assets (domestic as well as foreign). The net international investment position includes non-debt variables as well. Data in other columns represent mainly bonds, deposits and bank loans, but may include non-debt variables as well. ² For detailed methodology, see *Controlling currency mismatches in emerging markets*, Goldstein and Turner (2004). ³ A negative sign indicates that international assets exceed liabilities. ⁴ For Argentina, Indonesia, Malaysia, the Philippines, Russia, South Africa and Thailand, 2010; for Chile, China, India and Peru, latest available quarter.

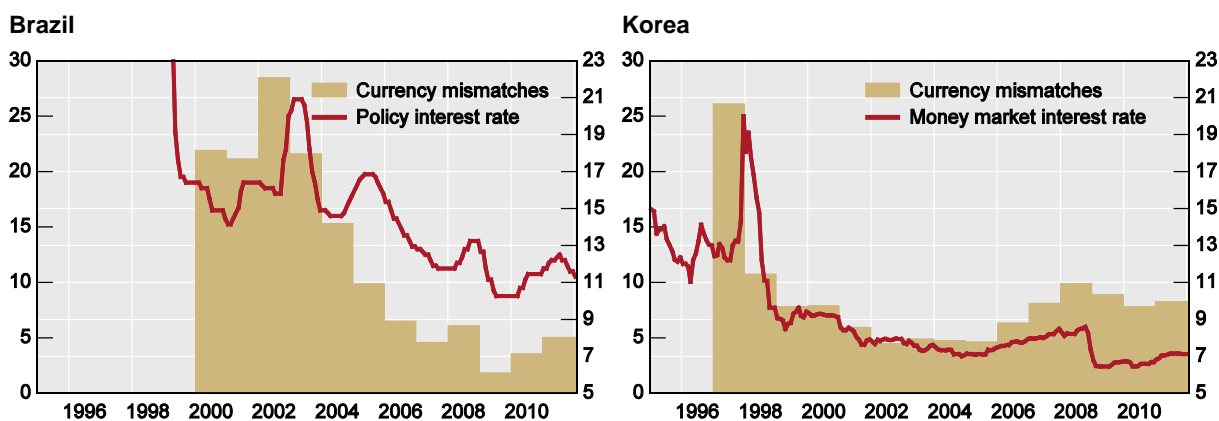
Sources: IMF; national data; BIS.

In sum, economy-level currency mismatches have broadly declined in most Asian, Latin American and other EMEs. This contrasts with central Europe (Hungary and Poland), where currency mismatches appear to have increased. Nevertheless, the actual degree of such mismatches could depend on how far these balance sheet exposures are hedged in derivatives markets.

Notwithstanding the reduction in currency mismatches, the choice of funding in local or foreign currency depends on several factors.⁹ The desirable level of foreign currency borrowing should be assessed against the country's foreign currency revenues and assets (Goldstein and Turner (2004)). Also, the relative costs of borrowing in different currencies matter. In addition, the issuance of long-dated local currency bonds could be very costly if investors charged higher interest rates to compensate for inflation, currency depreciation and default risks as well as broader macroeconomic volatility.

Graph 4

Currency mismatches and short-term domestic interest rates¹



Sources: Datastream and BIS estimates.

¹ Policy and money market interest rates are in percent, shown on the left-hand scale. Currency mismatches represent foreign currency debt as a percentage of total debt, shown on the right-hand scale.

Has the broad reduction in currency mismatches increased the scope for countercyclical monetary policy? Many EMEs cut interest rates rather sharply during the 2008–09 global recession which may have been difficult without past declines in their foreign currency liabilities. Brazil is a case in point. While the central bank raised interest rates during the 2001 global recession, it cut rates during the 2008–09 recession (Graph 4, left-hand panel). Korea is a similar case, if one compares developments during the 1998 crises with the more recent external shocks (Graph 4, right-hand panel).

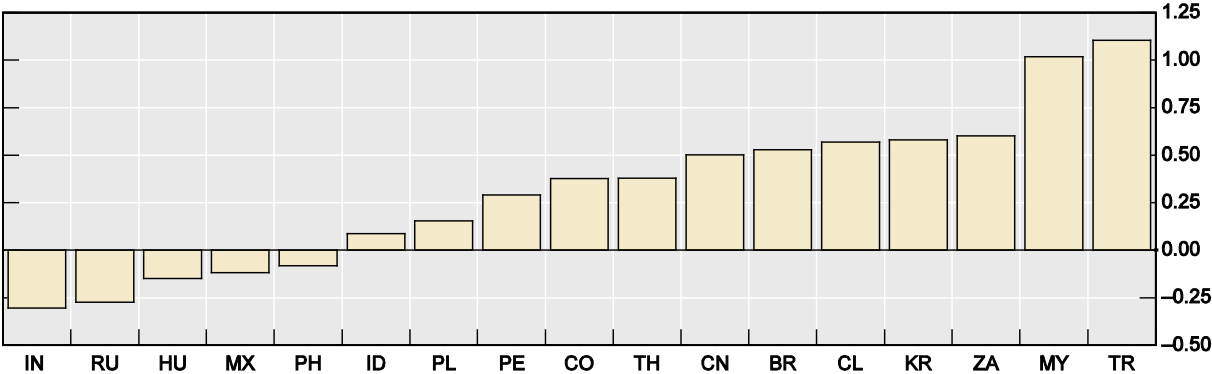
Indeed, our analysis suggests that monetary policy has become more countercyclical in many EMEs over the last decade. The cyclicity of monetary policy is gauged by the correlation coefficients between the cycle of the short-term interest rate around its trend and the output gap during 2000–11, in similar fashion to Vegh and Vuletin (2012). A positive correlation coefficient indicates that monetary policy is countercyclical: interest rates decline as growth slows.¹⁰ Graph 5 shows the change in the correlation coefficients from 2000–05 to

⁹ Panizza (2009) discusses such trade-offs.

¹⁰ The analysis uses quarterly data for interbank interest rates and real GDP. The interest rate cycles and the output gap are constructed by extracting the cyclical component of the interest rate and real GDP series, respectively, with a conventional Hodrick-Prescott filter and smoothing parameter of 1,600.

2006–11 for the various EMEs. In most economies, monetary policy has become more countercyclical over time, as the change in the correlation coefficients is positive for most economies, and highest for Malaysia and Turkey.

Graph 5
Changes in countercyclical of monetary policy from 2000–05 to 2006–11



Note: Countercyclical of monetary policy is proxied by the correlation coefficient between short-term interest rate cycle and output gap. A positive value indicates that monetary policy became more countercyclical from 2000–05 to 2006–11.

Sources: IMF; national data; BIS calculations.

5. Impact on financial stability

Financial stability should have benefited from the development of domestic government bond markets described above – longer maturities, larger shares of fixed-rate issues, lower currency mismatches and greater market liquidity. It will also be affected by the two additional factors highlighted in this section, namely credit market diversification and the volatility related to greater foreign holding of domestic currency debt and derivatives markets – the former reducing risks and the latter presenting some additional risks.

Diversification of credit risk

A developed government yield curve allows the private sector to issue its own debt in the market, making the financial system and the broader economy more resilient to shocks. This is because domestic corporate bond markets help diversify credit risks away from banks and serve as an alternative form of intermediation to short-term credit markets.

Such diversification has become increasingly apparent in EMEs. The outstanding stock of corporate bonds in most regions has increased since the mid-1990s, thus reinforcing their ability to serve as spare tyres (Graph 6). For instance, when banks in advanced economies tightened lending standards following the 2008 collapse of Lehman Brothers, non-financial corporate borrowers in EMEs turned to domestic markets for funding, taking the amount of domestic bonds outstanding to record levels. The Bank of Mexico notes in its paper that corporate domestic issuance has surged, and that mortgage-backed securities have particularly benefited from longer risk-free reference rates.¹¹

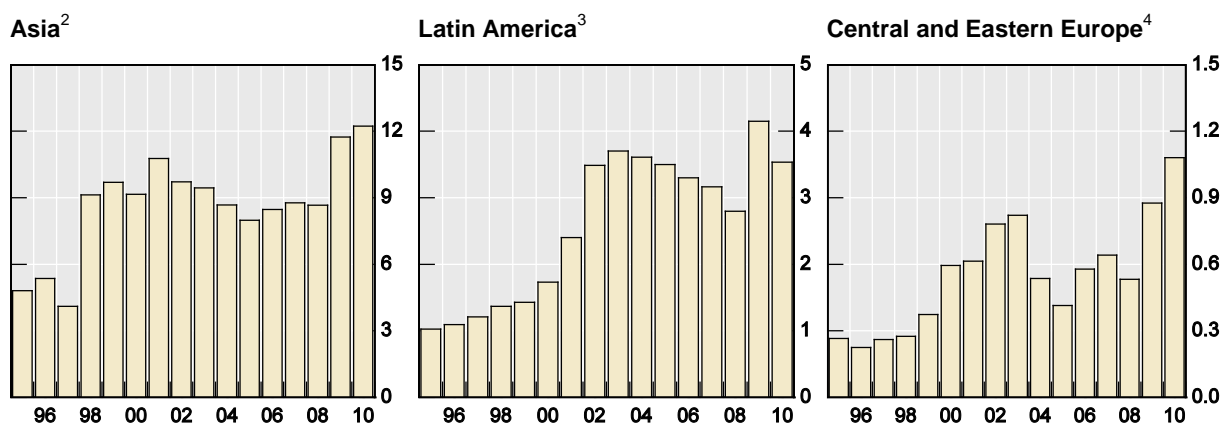
¹¹ See Figure 4.5 in “Banco de Mexico and recent development in domestic currency public debt”.

Notwithstanding the progress made so far, domestic corporate bond markets in EMEs remain underdeveloped. For instance, Goswami and Sharma (2011) note that, in emerging Asia, even large EMEs with sizeable corporate bond markets suffer from low trading volumes and very high transaction costs that inhibit arbitrage and active position-taking.

Graph 6

Outstanding stock of domestic non-financial corporate debt securities¹

As a percentage of nominal GDP



¹ Simple averages across the countries listed. ² China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. ³ Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. ⁴ Czech Republic, Hungary, Poland, Russia and Turkey.

Sources: IMF, *International Financial Statistics*; IMF, *World Economic Outlook*.

Foreign holdings and derivatives markets

Recent episodes of market volatility have highlighted two kinds of risks associated with more developed domestic government bond markets. First, large foreign holdings may increase financial market volatility during times of stress. As suggested by the Reserve Bank of South Africa, foreign portfolio inflows may be driven by carry trade incentives against the backdrop of very low interest rates in advanced economies. Some foreign investors leave their currency risk unhedged for higher total returns on the expectation that particular EM currencies are managed at relatively weak levels and should appreciate, or in order to benefit from diversification. Such a strategy makes carry trade flows inherently sensitive to currency performance in EMEs.

A second source of worry is the potential risk in the derivatives markets.¹² As the Bank of Mexico points out, derivatives add liquidity and depth to domestic bond markets as they offer hedging possibilities and expand the demand for the underlying assets. However, to the extent that residents hedge their financial risk with other residents without involving foreign counterparties, exposures are shifted across balance sheets within the economy. In addition, financial stability risk would be greater if exposures ended up concentrated in a small number of residents. Derivatives products allow both residents and non-residents to take complex and leveraged positions that may be rapidly unwound in the event of market turmoil.

¹² The expansion of derivatives markets in EMEs has been documented by Mihaljek and Packer (2010) and Saxena and Villar (2008).

These risks have prompted many EMEs to beef up existing measures and introduce alternative instruments to limit vulnerabilities in the domestic bond markets and safeguard financial stability. As one line of defence, EMEs have accumulated precautionary official reserves that could be drawn down in times of market stress. A second and complementary line of defence in some cases has been to establish currency swap lines with the major central banks. For instance, in 2008–09, Brazil, Korea, Mexico and Singapore established currency swap lines with the Federal Reserve. These agreements, which expired in April 2009, played a pivotal role in calming markets over possible foreign currency shortages, particularly where the precautionary function of official reserves was believed to be limited, as in the case of Korea. Finally, many countries have introduced measures to help increase the resilience of their domestic financial systems to credit exposures. In some cases, measures to manage capital inflows have also been established (eg taxes on inflows, minimum holding periods and currency-specific reserve requirements).

Table A1

Outstanding stocks of domestic government debt securities¹

	Billions of US dollars						Average annual percentage change				Tradable debt ²
	2000		2005		2010		2000–04		2005–10		
	Short-term ³	Long-term ⁴	Short-term ³	Long-term ⁴	Short-term ³	Long-term ⁴	Short-term ³	Long-term ⁴	Short-term ³	Long-term ⁴	
Asia	32	402	58	1010	107	2311	12	17	18	14	44
China	0	111	0	335	0	1006	0	30	0	24	37
Hong Kong SAR	9	6	9	9	18	12	1	8	62	7	22
India	4	108	18	250	27	581	33	19	13	18	38
Indonesia	0	45	0	40	3	65	0	2	43	8	56
Korea	0	62	0	231	0	331	0	27	0	12	78
Malaysia	1	27	1	50	1	124	0	14	4	18	53
Philippines	9	11	12	28	12	50	-1	18	3	13	2
Singapore	8	17	13	34	44	58	11	18	25	11	51
Thailand	1	15	5	33	2	84	49	18	13	18	59
Latin America	211	145	393	246	634	712	12	16	19	28	42
Argentina	5	28	0	48	0	31	-23	10	0	2	1
Brazil	173	46	328	88	520	429	17	3	17	40	22
Chile ⁵	-	1	-	3	-	17	-	41	-	50	68
Colombia	12	4	34	6	66	4	18	19	19	-3	61
Mexico	19	56	28	87	46	201	11	12	14	19	42
Peru	0	4	0	6	0	14	0	6	0	20	60
Venezuela	2	6	3	8	2	16	16	23	63	37	-
CEE	14	42	19	145	23	247	18	38	1	11	69
Czech Republic	5	3	5	21	6	46	10	57	-1	17	76
Hungary	3	13	7	36	8	42	23	27	0	2	67
Poland	6	26	7	88	9	159	21	31	1	13	64
Other EMEs	6	104	19	263	26	395	32	24	14	13	40
Russia	0	8	0	25	0	67	0	26	0	22	37
South Africa	3	44	6	68	20	105	22	11	28	10	60
Turkey	3	52	13	170	6	223	74	34	-12	8	24
Total of above	263	693	489	1664	790	3665	16	21	16	18	47

¹ Central bank issues are excluded. Domestic debt securities in the BIS securities statistics are defined as issues by residents in the local market in local currency, targeted to resident investors. Some foreign currency issues are included in these data, but they are small. The size of the debt stock often reflects circumstances unique to the respective economies. In Mexico, the numbers include debt resulting from the rescue of the banking sector, originally issued off-balance sheet but now included in the government balance sheet. In Brazil, part of the increase in debt represents conversion of former central bank issues into government debt. ² As a percentage share of total debt outstanding. The tradable amounts used are the end-2010 par values taken from JP Morgan Government Bond Index-EM, except for the Czech Republic, Hong Kong SAR, Korea and Singapore (Global Bond Index). ³ Bonds and notes. ⁴ Money market instruments. ⁵ For Chile, figures were taken from the Ministry of Finance: for more information please see <http://www.minhda.cl/oficina-de-la-deuda-publica/estadisticas/composicion-de-la-deuda.html>.

Sources: BIS securities statistics; JPMorgan Chase; national data.

Table A2
Maturities of general government local currency debt¹
 In years

	Average			Longest		
	2000	2005	2010	2000	2005	2010
Asia	3.7	4.8	5.7	15.4	16.9	24.5
Indonesia	5.0	7.0	8.1	8.6	14.7	27.2
Korea	2.6	3.9	5.0	19.0	13.3	20.0
Philippines	3.3	3.0	6.2	24.9	24.6	25.0
Singapore	2.7	3.6	3.3	10.0	15.0	20.0
Thailand	4.9	6.4	5.7	14.5	16.9	30.5
Latin America	2.1	7.9	9.6	9.1	39.2	39.7
Argentina	2.1	13.4	11.1	7.0	84.0	79.0
Brazil	2.7	2.3	3.4	–	–	–
Chile	–	17.0	14.0	–	–	–
Colombia	2.5	3.8	5.1	11.4	14.6	13.6
Mexico	1.0	3.0	6.0	9.0	19.0	30.0
Peru	–	–	18.0	–	–	36.0
Central Europe	2.6	4.7	5.0	18.0	18.0	31.5
Czech Republic	1.5	4.9	5.7	10.0	15.0	47.0
Hungary	3.7	4.5	4.2	26.0	21.0	16.0
Other	5.1	5.1	5.7	13.5	15.8	19.5
Israel	6.2	6.1	6.2	15.0	20.0	31.0
Saudi Arabia	4.3	4.5	2.5	10.0	10.0	7.0
South Africa	8.7	7.8	10.3	27.0	28.0	30.0
Turkey	1.2	2.1	3.6	2.0	5.0	10.0
Total	3.5	5.8	7.0	13.9	21.5	28.2

¹ Data for Argentina, Colombia, Philippines, South Africa and Turkey represent central government debt. Annual data on the maturity of domestic central government debt spanning 1995–2010 are available at <http://www.bis.org/statistics/qcsv/cgfs28d4.pdf>

Source: Central bank responses to the BIS questionnaire.

Table A3
Domestic bonds by instrument¹
 As percentage of total outstanding

	2000				2005				2010			
	Floating rate	Straight fixed rate	Inflation-indexed	Exchange rate-linked	Floating rate	Straight fixed rate	Inflation-indexed	Exchange rate-linked	Floating rate	Straight fixed rate	Inflation-indexed	Exchange rate-linked
Asia	12	88	1	0	9	91	0	0	4	96	0	0
China	46	54	...	...	19	81	...	...	...	...	...	...
Chinese Taipei	0	100	0	0	0	100	0	0	0	100	0	0
Hong Kong SAR	0	100	0	0	3	97	0	0	0	100	0	0
India	0	100	0	0	5	95	0	0	2	98	0	0
Indonesia	51	42	8	0	53	47	0	0	22	78	0	0
Korea	8	92	0	0	3	96	0	0	3	95	0	1
Malaysia	0	100	0	0	0	100	0	0	0	100	0	0
Philippines	8	92	0	0	4	96	0	0	2	98	0	0
Singapore	0	100	0	0	0	100	0	0	0	100	0	0
Thailand	4	96	0	0	3	97	0	0	3	97	0	0
Latin America	30	12	25	27	23	28	29	19	18	41	28	13
Argentina	12	0	0	88	1	10	68	18	18	16	38	26
Brazil	58	15	6	21	60	21	16	3	44	31	24	1
Chile	0	0	92	8	0	18	64	18	0	24	76	0
Colombia	0	50	41	7	0	70	29	1	0	75	25	0
Mexico	43	6	16	0	58	27	15	0	39	39	22	0
Peru	0	14	18	68	0	53	12	35	6	66	8	20
Venezuela	100	0	0	0	44	0	0	56	22	36	0	42
Central Europe	18	80	2	0	9	90	1	0	11	86	1	2
Czech Republic	0	95	5	0	0	100	0	0	10	90	0	0
Hungary	34	66	0	0	10	90	0	0	9	86	0	5
Poland	20	80	0	0	17	81	2	0	14	83	3	0
Other	9	62	12	16	15	61	15	9	14	65	16	2
Israel	11	17	61	11	16	26	50	6	6	26	52	6
Russia	0	37	0	63	0	76	3	22	0	96	1	3
Turkey	24	70	0	6	31	42	11	15	36	47	15	2
Saudi Arabia	9	91	0	0	17	83	0	0	15	85	0	0
South Africa	1	97	0	0	9	77	9	0	11	71	14	0
Total EMEs	17	61	10	11	14	67	12	7	11	72	12	4

¹ Comprises only bonds and notes and excludes money market instruments. Regional totals based on the simple averages of the countries listed in the table. Asia and total emerging markets exclude China for all periods. 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.

Source: Update of CGFS Papers no 28 on local currency bond markets; Working Group survey.

Table A4
Domestic exchange rate-linked bonds¹

As percentage of total outstanding

	2000	2005	2006	2007	2008	2009	2010
Asia	0	0	0	0	0	0	0
Korea	0	0	0	1	2	1	1
Latin America	27	19	11	18	18	13	13
Argentina	88	18	20	22	25	26	26
Brazil	21	3	1	1	1	1	1
Chile	8	18	13	2	0	0	0
Colombia	7	1	0	0	0	0	0
Peru	68	35	29	17	25	19	20
Venezuela	0	56	14	82	74	43	42
Central Europe	0	0	0	2	2	2	2
Hungary	0	0	0	5	6	5	5
Other EMEs	16	9	7	5	4	3	2
Israel	11	6	7	8	9	7	6
Russia	63	22	14	10	4	3	3
Turkey	6	15	13	9	8	5	2
Total EMEs	11	7	4	6	6	4	4

Note: For China, Chinese Taipei, Czech Republic, Hong Kong SAR, India, Indonesia, Malaysia, Mexico, Philippines, Poland, Saudi Arabia, Singapore, South Africa and Thailand percentage shares are equal to zero throughout the years shown.

¹ Comprises only bonds and notes and excludes money market instruments. Regional totals based on the simple averages of countries listed in the table and the footnote. Ratio calculated taking the central government and all other issuers as reported in Table 2d of the Working Group questionnaire.

Source: same as Table A3.

Table A5
Indicators of liquidity in government bond markets¹

	Ratio of turnover to average outstanding stocks in 2010	Most liquid (important) maturities	Typical bid-ask spread on the most liquid issue ²
Asia			
Hong Kong SAR	29.0	2, 5, 10 years	5
Korea	1.4	3 years	1
Philippines	0.7	2, 5, 7, 10 years	3
Singapore	0.5	2 years	5
Thailand	0.7	5 years	7
Latin America			
Argentina	1.7	2015 ³	77
Chile	0.2	10 years	4
Colombia	0.3	9–10 years	4
Mexico	20.0	Dec 2024 ³	2
Central and Eastern Europe			
Czech Republic	0.1	2024 ³	10
Hungary	2.8	2015; 2019 ³	40
Other emerging markets			
Israel	0.6	7–11 years	5
South Africa	15.0	2016 ³	3

¹ Only the maturity with the highest turnover for each country is shown. ² In basis points. ³ Maturing in the indicated year.

Source: Central bank responses to the BIS questionnaire.

Table A6
Central bank bonds
As percentage of GDP

	2005	2010
Asia¹	6.4	13.3
Hong Kong SAR	9.2	37.4
Indonesia	2.6	3.1
Korea	18.2	14.2
Thailand	8.3	24.8
Latin America¹	4.6	3.0
Argentina	4.8	5.1
Brazil	0.3	0.0
Chile	16.3	9.4
Mexico	2.8	2.9
Peru	3.3	0.9
Central Europe¹	11.5	15.3
Czech Republic	22.9	19.4
Hungary	0.1	11.1
Other¹	4.4	8.9
Israel	14.1	17.5
Saudi Arabia	3.3	16.8
South Africa	0.3	1.2

Note: For Colombia, Philippines, Singapore and Turkey percentage shares are equal to zero for the years shown.

¹ Simple averages of economies listed.

Sources: Central bank questionnaires; IMF, *World Economic Outlook*.

References

Bank for International Settlements (2002): "The development of bond markets in emerging economies", *BIS Papers*, no 11, June.

_____ (2007): "Financial stability and local currency bond markets", *CGFS Papers*, no 28, June.

Eichengreen, B, R Hausmann and U Panizza (2005): "The pain of original sin" in B Eichengreen and R Hausmann (eds), *Other people's money: debt denomination and financial instability in emerging market economies*, University of Chicago Press.

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

Goswami, M and S Sharma (2011): "The development of local debt markets in Asia", *IMF Working Paper*, 11/132.

JP Morgan Securities (2012): "Global fixed income strategy", 11 January.

Mihaljek, D and F Packer (2010): "Derivatives in emerging markets", *BIS Quarterly Review*, December.

Panizza, U (2009): "Is domestic debt the answer to debt crisis?", in B Herman, J-A Ocampo and S Spiegel (eds), *Overcoming Developing Country Debt Crises*, Oxford University Press.

Reinhart, C, K Rogoff and M Savastano (2003): "Debt intolerance", *NBER Working Paper Series*, no 9908, August.

Saxena, S and A Villar (2008): "Hedging instruments in emerging market economies", in "Financial globalisation and emerging market capital flows", *BIS Papers*, no 44.

Turner, P (2012): "Weathering financial crisis: domestic bond markets in EMEs", in *BIS Papers*, no 63, January.

Vegh, C and G Vuletin (2012): "Overcoming the fear of free falling: monetary policy graduation in emerging markets", mimeo.