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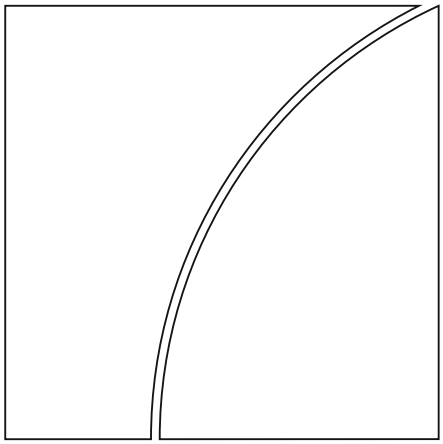

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A new dimension to currency mismatches in the emerging markets: non-financial companies

by Michael Chui, Emese Kuruc and Philip Turner

Monetary and Economic Department

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Keywords: Currency mismatches, corporate balance sheets, leverage, corporate profitability, global liquidity, central bank balance sheets

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A new dimension to currency mismatches in the emerging markets: non-financial companies[1]

Michael Chui, Emese Kuruc and Philip Turner

Abstract

A new dimension to currency mismatches has been created by policies that have increased global liquidity. Lower policy rates and a huge expansion in central bank balance sheets – purchases of domestic bonds in the advanced economies and of foreign assets in the emerging market economies (EMEs) – have served to ease financing conditions facing EME companies. This has allowed these companies to increase their gearing, notably by greater foreign currency borrowing. Aggregate foreign currency mismatches of the non-government sector in the EMEs have therefore risen sharply since 2010. Microeconomic data show that it was not only companies providing tradable goods and services but also those producing non-tradable goods which have increased their foreign currency borrowing. The across-the-board decline in EME companies' profitability since mid-2014 has brought to light significant vulnerabilities that may aggravate market volatility. Weak corporate profitability is also likely to constrain business fixed investment, and therefore growth, in the near term. But the strong external asset positions of most emerging market economies will help the authorities cope with these challenges.

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Keywords: Currency mismatches, corporate balance sheets, leverage, corporate profitability, global liquidity, central bank balance sheets

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Contents

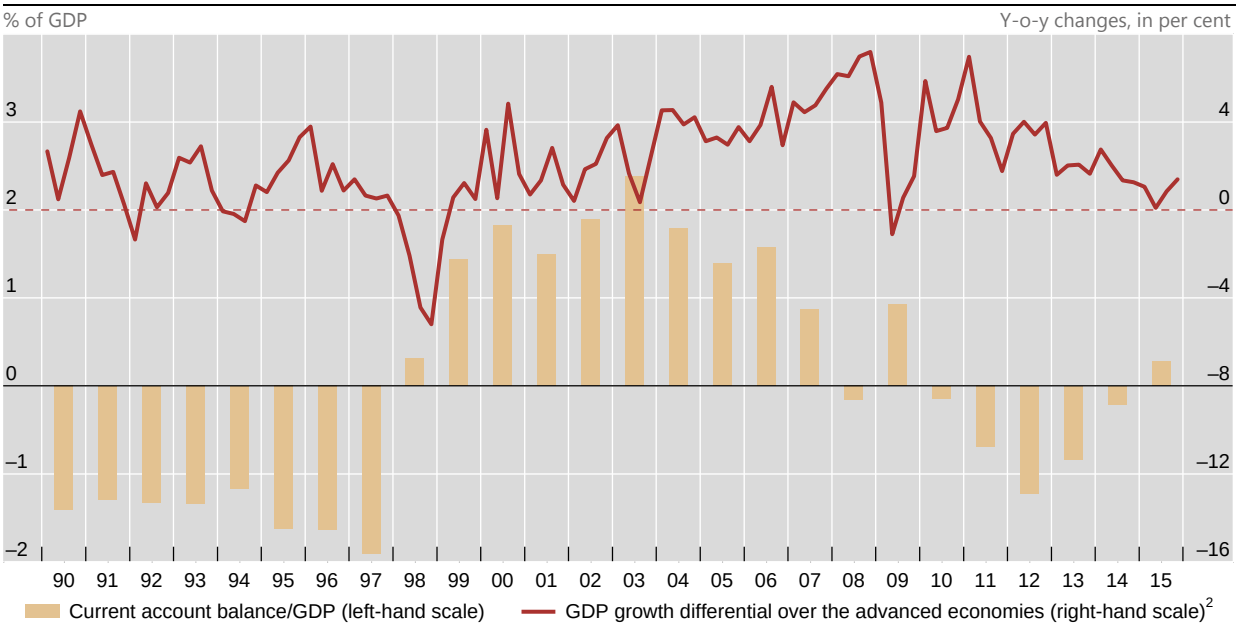
Introduction

A strong mix of policy reforms from the mid- to late-1990s transformed growth prospects and the external position of the emerging market world. Countries that had been burdened by heavy external debt built up external wealth on an unprecedented scale. No transformation was more striking than that of China. Even excluding China, the emerging market economies (EMEs) grew faster than the advanced economies in the 2000s. Graph 1, which is an adaptation of Kamin (2016), shows how this growth differential evolved since 1990. The current account balance of EMEs as a whole went from a deficit to a substantial surplus. These economies built up a very large net external asset position. This co-incidence of much stronger relative growth and large current account surpluses was remarkable.

Emerging markets: the current account and the growth differential[1]

In per cent

Graph 1



[1] Regional aggregates are calculated as 2010 GDP-PPP weighted averages. For emerging markets, Argentina, Brazil, Chile, Chinese Taipei, Colombia, the Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Thailand and Turkey; for advanced economies, Canada, the euro area, Japan, the United Kingdom and the United States. [2] Real GDP growth for emerging markets minus real GDP growth for advanced economies. For some countries, quarterly data were estimated based on annual data and by linear interpolation.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; Datastream; BIS calculations.

The financial crisis in 2008/09, however, hit non-China EME GDP harder than that of the advanced economies. But the rebound was stronger and quicker – albeit at the price of a sizable current account deficit. EME growth over the three years between 2010 and 2012 ran well ahead of that in the advanced economies. Thereafter, however, their growth edge began to decline and has now gone. This paper documents the role played by the financial policies of non-financial companies in the emerging economies – which have made the most of an extraordinary expansion of global liquidity. But the mix of higher leverage, increased currency mismatches and lower profits is now likely to constrain business fixed investment.

EME reforms from the 1990s onwards, and the accumulation of foreign assets (mainly by the official sector) during much of the 2000s, went hand-in-hand with a substantial reduction of both currency mismatches and leverage in most EMEs. By the mid-2000s – that is, on the eve of the Great Financial Crisis – currency mismatches no longer constrained macroeconomic policies in most EMEs. The statistical evidence summarised by Goldstein and Xie (2010) demonstrates this clearly. Because currency mismatches had been virtually eliminated in Latin America, "central banks [could] lower interest rates aggressively in response to falling demand without fear that depreciations would cause a financial crisis" (De Gregorio (2014)). Park et al (2013) reached a similar conclusion for Asia. Stronger national balance sheets allowed the EMEs to pursue expansionary macroeconomic policies to combat the 2009 recession. GDP growth in many EMEs bounced back quickly and strongly, limiting the decline in average corporate profitability in the EMEs during the post-crisis recession.

Companies in the EMEs were also helped by low or non-existent currency mismatches through another mechanism. In the 1990s, large aggregate currency mismatches (often because of the foreign currency debt of government and low levels of foreign exchange reserves) made it very difficult for companies in EMEs to borrow abroad. They lived under the shadow of policy-dependent risks even when their own firms were well-managed – risks such as severe recession induced by a financial crisis, sudden exchange controls, and so on.[2] Because the accumulation of foreign exchange reserves in the 2000s meant that aggregate currency mismatches were progressively reduced, the international credit standing of EME companies improved. The companies could therefore borrow more easily. Hannoun (2010) points out that the $4 trillion accumulation of EME reserves from 2003 to mid-2008 not only made domestic banking systems much more liquid but also contributed to driving down yields on advanced economy bonds. Thanks to these two powerful forces, EME firms found it far easier to borrow abroad during the five years or so before the crisis than in the 1990s (Dailami (2010a)). It is true that during the fourth quarter of 2008, in the eye of the crisis, they were shut out of international bond markets. But their re-entry was rapid, and was subsequently strongly reinforced by the further easing of conditions in global bond markets that followed quantitative easing by advanced economy central banks.[3]

From 2010 to 2014, EME companies did indeed increase foreign currency borrowing on a major scale. Because EME exchange rates in general have remained more volatile than advanced economy exchange rates, foreign currency borrowing has nevertheless remained more risky in EMEs. This paper therefore explores how aggregate and sectoral currency mismatches have developed over the past 5 years as EME corporate borrowing has risen. The combination of stronger domestic fundamentals at the onset of the crisis and very easy conditions in global bond markets facilitated not only greater forex exposures of many EME companies, but also significant increases in leverage.

[2] Even though rating agencies had started from the late 1990s to relax somewhat their "sovereign ceiling" policies – a country's sovereign debt rating caps the external credit ratings for firms domiciled in that country – sovereign ratings remain a significant determinant of the credit rating assigned to corporations: see Borensztein, Cowan and Valenzuela (2013).

[3] As discussed in section 6 below, increased foreign borrowing by non-financial companies often increased the balance sheet of local banking systems.

Any analysis of the vulnerability of EME debtors to foreign currency exposures must take account of three dimensions in addition to currency mismatches narrowly defined – leverage, debt maturity and the external/internal distinction.[4] First, greater *leverage* from higher debt magnifies vulnerabilities. Higher borrowing allows a firm to invest in real assets – and the productivity of such assets will determine whether earnings more than cover extra debt service costs. Hence it is important to examine the company's operational profits. But non-financial companies may also borrow to acquire financial assets including deposits. As the proportion of financial assets rises, the company becomes more vulnerable to financial shocks that affect its financial assets and liabilities differently. The firm may suffer losses even when its operational earnings remain healthy. There is evidence that the financial engineering activities by EME firms (notably carry trades) have grown in recent years (see section 5).

Second, the *maturity of debt* matters. It is, however, a two-edged sword. On the one hand, short-term debt creates a more imminent threat, exposing the borrower to the risk that interest rates will be higher when such debt is renewed. On the other, longer-term debt is more dangerous for the lender – in particular, outsized market reactions by holders of EME bonds can in turn threaten borrowers. A sudden surge of capital outflows can lead to a currency depreciation so sharp that risk premia widen, feeding back into further depreciation. Because of this currency risk-taking channel, the exchange rate shock is magnified (Hofmann et al (2016)).

Third, the distinction between *external and internal debt* is important. External debt, long seen as a key driver of financial crises in EMEs (Al-Saffar et al (2013)), is more dangerous than internal debt.[5] If the assets corresponding to the debt are also internal, then domestic assets rise and this helps to support domestic demand. In addition, there is a fiscal advantage because the holders of such assets can be taxed. Another reason is that domestically-held assets are less likely to "flee". And the government can also induce regulated financial institutions within their own jurisdiction to hold domestic assets. Nonetheless, foreign currency internal debts – and especially the foreign currency loans of domestic banks to residents – do create risks (discussed further in section 1).

Correlations between currency mismatches and these other dimensions matter both as causes of financial crises and in reinforcing the propagation dynamics from adverse shocks. For instance, short-term foreign currency debts create greater rollover or liquidity risks than long-term debts. A country with low debt/income ratios and no net external debt can sustain larger foreign currency exposures than one with larger debt ratios.

Such links go particularly deep when domestic banks intermediate currency mismatches (Lamfalussy (2000), Shin (2005) and Park (2011)). A major ingredient of EME crises in the 1990s was short-term foreign currency borrowing by local banks, who lent in domestic currency to finance long-term or illiquid projects. Accordingly, banks had both currency and maturity mismatches. In such circumstances, a currency crisis would often be aggravated by a banking crisis. In recent years, however,

[4] In addition, there is an important fiscal policy dimension not considered in this paper. The near-term interest costs of financing budget deficits in the major reserve currencies are normally smaller than in local currency. Such a perception of "cheap" finance from foreign currency borrowing can lead to fiscal laxity. Matolcsy (2015) explains how policy correction in 2003–04 in Hungary "would have jeopardised EU accession".

[5] Joyce (2015) shows how the *composition* of a country's external balance sheet also matters.

international flows increasingly have been intermediated via international bond markets. Therefore currency crises nowadays are often linked to disturbances affecting debt markets. The behaviour of asset managers – currently an active area of research – can be key. And there are crucial links between conditions in international capital markets and domestic banking systems – because EME companies awash with cash from easy borrowing abroad increase their deposits with local banks (Acharya et al (2015), Shin and Turner (2015) and IDB (2014)).

Although they are linked, foreign currency exposure is not the same as external debt. Because there has been much confusion on this point, it is worth clarifying when these two concepts would coincide. There are two necessary – but not sufficient – conditions for equivalence. The first is that all contracts between residents (such as, for example, bond sales) be in local currency – that is, there are no internal contracts in foreign currency. The second condition is that all contracts of residents with non-residents be in foreign currency.[6]

These conditions are rarely met. They are not even logically consistent. If non-residents are prepared to buy a country's bonds only if denominated in dollars or some other foreign currency (because they do not trust the local currency), surely some residents would also want to write some domestic contracts in foreign currency? In practice, of course, it is often residents in countries where there is little confidence in the local currency (or in the respect for local contracts) who buy a significant portion of the international bonds issued abroad by their government.

The concept of "original sin", a term coined by Eichengreen, Hausmann and Panizza (2002), was based on the assertion that the second condition applied to most EMEs. EME borrowers, they said, were unable to borrow abroad in their domestic currency – so were forced to borrow in foreign currency. This led them to argue that there was a tight link between original sin and aggregate currency mismatch: "countries with original sin that have net foreign debt will have a currency mismatch on their national balance sheets."[7] Many other observers also believed that EME governments would not be able to eliminate currency mismatches. Yet many EMEs through macroeconomic and microeconomic reforms from the late 1990s proved them wrong. The purpose of this paper is to document some reversal of this great policy achievement – paradoxically partly because the success in eliminating mismatches on government balance sheets made it easier for their non-financial companies in EMEs to increase their own exposures. This is a new and powerful dimension of currency mismatches.

The rest of the paper is organised as follows. Section 1 discusses the concept of currency mismatches, and the data gaps that stand in the way of deriving "clean" empirical measures. Section 2 reviews some easy-to-compute measures and finds that aggregate currency mismatches in the EMEs, after falling for almost a decade, have increased since 2010. Section 3 considers how these aggregate measures can be adjusted to exclude the government, and compute mismatch measures for the

[6] They are not sufficient conditions because external assets could be in one foreign currency while external liabilities be in a different foreign currency. In this case, there would still be foreign currency exposures, but these would arise from movements in the cross-rates between foreign currencies. Because leveraged investors who wish to take calculated risks will usually borrow in a "safe", low-interest-rate foreign currency to hold assets in a higher-interest-rate foreign currency, this type of mismatch is common.

[7] But their views on this question developed over time: see "Evolution of the original sin hypothesis", in Goldstein and Turner (2004), pp 135–143.

non-official sectors, which is essential for assessing financial stability risks. Section 4 discusses the increased importance of foreign currency financing by the offshore affiliates of EME companies, notably in international bond markets. The markets for such bonds have grown enormously over the past 5 years or so – but those markets can become illiquid very rapidly. Section 5 argues that the risks of sudden price movements, and perhaps of contagion to forex markets, have increased. Gauging how far forex exposures of EME corporates have increased, and how other elements of financial weakness could aggravate the risks coming from such exposures, requires firm-level analysis. Section 6 therefore reports on a balance sheet analysis of about 280 companies, distinguishing in particular those which produce tradable goods or services and those which produce non-tradables.

1. The concept of currency mismatches: stocks and flows

A currency mismatch between domestic and foreign currencies arises whenever an entity's balance sheet or income flows (or both) is sensitive to changes in the exchange rate. The "stock" aspect of a currency mismatch is given by the sensitivity of the balance sheet to changes in the exchange rate, and the "flow" aspect is given by the sensitivity of the income statement (net income) to changes in the exchange rate. The greater the degree of sensitivity to exchange rate changes, the greater the extent of the currency mismatch.

The example used by Goldstein and Turner (2004) – hereafter GT – was that of an individual who raises a mortgage to buy an apartment in London and then rents it out. If he borrows in dollars instead of pounds, he is faced with a currency mismatch. The stock aspect of the mismatch is that his asset (the apartment) is denominated in pounds but his liability (the mortgage) is in dollars. The flow aspect is that the rental income from the apartment is denominated in pounds but mortgage payments are in dollars.[8] The consequence of this currency mismatch is that the owner of the apartment gains or loses as the dollar falls or rises against the pound even if the key parameters of his investment (ie apartment price and rent) do not change. In short, his choice of foreign currency borrowing has made the net present value of his investment project sensitive to changes in the dollar-pound exchange rate.

Even this simple foreign currency exposure is hard to measure using standard macroeconomic statistics. International statistics are usually on a residence basis. They measure cross-border flows and assets/liabilities held vis-à-vis non-residents. But a foreign currency exposure can arise with no external debt. For instance, a household can borrow foreign currency from another resident household. Such foreign currency contracts between residents can have macroeconomic or financial consequences. It matters who has the foreign currency debt. If the borrower of foreign currency is an exporter, for instance, he is protected from currency depreciation. Without such foreign currency receivables, however, a sharp depreciation in the exchange rate can make it harder for the borrower to repay, and

[8] Does the mismatch problem go away if the rent is in dollars? Not necessarily: a tenant paying a dollar rent but without dollar income can become a credit risk if the dollar rises sharply. This is important also for owner-occupiers: in many countries where interest rates are relatively high, long-term local currency mortgages are virtually non-existent. So those who borrow to buy homes have to choose between refinancing risks (short-term local currency loan) and currency mismatch risks (long-term foreign currency.

this will curtail his spending. It could even disrupt such contracts, and lead to default. Such developments have real economic effects. Foreign currency debts between residents do not 'cancel out' even in normal times, because the spending propensities of debtors and creditors differ. In a crisis, actual or threatened bankruptcies have major consequences, even prompting central banks to react in some cases (see Sidaoui et al (2010)).

Data on a country's international investment position usually do not distinguish the currency of denomination. The main exceptions are the BIS's international banking data and data on international bonds, which have extensive data on the currency composition. The IMF (2014) has recently proposed to improve the reporting of foreign currency exposure data within the Fund's International Investment Position (IIP) statistics. In the latest IMF Coordinated Portfolio Investment Survey (June 2014), a subset of countries have reported their portfolio asset holdings by major currencies.

The second major statistical gap that impedes the correct measurement of currency mismatches is the lack of data on foreign currency contracts between residents. Even though many countries collect data on the foreign currency denomination of the deposits and loans of domestic banks (because that is required by bank supervisors), publication was rather limited. In recent years, however, many more central banks (or supervisory agencies) have published such data. It is difficult to overstate the importance of foreign currency contracts between residents, especially those intermediated through the banking system. GT (2004, pp 89–98) argued at length that, in many countries, the ending of exchange controls had left big gaps in bank regulation.

> *"…fearing that refusing to allow residents to maintain accounts would drive deposits offshore, many authorities allowed local banks to take dollar deposits from residents."*

Once banks had dollar deposits, the banks sought dollar assets. Often they would "encourage" local customers to borrow in dollars.

Limits on banks' net forex positions are not sufficient to contain mismatch-related vulnerabilities. The nature of gross forex liabilities also matters (eg offshore in high-quality liquid assets versus illiquid loans to residents). Many earlier studies on currency mismatches had wrongly assumed that banks had no mismatch if the foreign currency of their deposits was roughly equal to the currency composition of their loans. In reality, an exchange rate shock can cause the bank's customers to default on their bank loans. Or the bank could come under political pressure to eventually offer borrowers the chance to redenominate their loans – often at a large cost to the bank.

The BIS has published historical data based on surveys of central banks.[9] Incorporating such data is essential because there is evidence that foreign currency contracts between residents rises when it becomes harder to borrow foreign currency abroad. For instance, EME companies, when they find it harder to borrow foreign currency on international capital markets, turn more to local banks – so that the share of foreign currency loans rises.[10] The proposal of the IMF to develop more

[9] Annex Table 12 in BIS (2007) reports such data for 1995, 2000 and 2005 for a number of EMEs.

[10] A case study on the intermediation of corporate debt through the domestic banking system in Turkey finds evidence of such a link (Acharya et al (2015), Baskaya et al (2015)).

comprehensive data of the currency denomination of contracts between residents (IMF (2014)), in addition to cross-border positions, is to be welcomed.

The currency denomination of income flows is also important. Foreign currency borrowing to finance investment in the production of tradables should produce foreign currency earnings to service the debt. But borrowing foreign currency to finance investment in non-tradables creates a mismatch. Drawing a clear line of demarcation between tradables and non-tradables is hard, however. In the example given above, the owner of the apartment could rent to someone with dollar earnings (that is, the apartment becomes in effect a tradable service) and could charge a rent in dollars to match the currency of his borrowing.

Finally, currency mismatches can also arise between different foreign currencies, and not just between domestic and foreign currencies. For instance, a firm or a household may borrow "strong" currencies at low yields to invest in "weak" currencies offering higher returns. Such thinking drives carry trades. Another example is that companies will typically finance the acquisition of firms abroad by borrowing in dollars rather than in the currency of their acquisition. Hence the acquisition by EME companies of firms in other EMEs will usually be financed by dollar-denominated borrowing – so companies in effect accumulate dollar liabilities but EME currency assets (IDB (2014)).

2. Measuring aggregate mismatches

Heavy foreign currency borrowing was a major factor behind the EME crises in the 1980s and the 1990s. Fixed exchange rate regimes made foreign currency borrowing at low rates look like a good bet. But such regimes could not survive years of large current account deficits. Crisis-induced currency depreciations subsequently increased the domestic value of foreign currency debts, reducing domestic demand and sometimes triggering defaults. The ability of countries to ease monetary policy in the recession that followed the crisis was constrained. In order to limit an "excessive" depreciation, which could push those with dollar debts (and the bank who had lent to them) into bankruptcy, domestic interest rates often had to be kept higher than local macroeconomic conditions warranted. Because high domestic interest rates increased the risk of bank insolvency, domestic financial stability was also often undermined (Shin (2005)).

In order to quantify the riskiness of foreign currency exposures of countries whose foreign currency liabilities exceeded their foreign currency assets, GT developed a measure of aggregate currency mismatches in the economy as a whole **that took account of internal foreign currency exposures** (that is, from one resident to another). The "economy as a whole" principle includes all resident entities whether foreign or domestic-owned. But it did not include entities abroad (eg offshore financing vehicles) even if linked to domestic firms or households – a limitation that has become more serious in recent years, as discussed in section 3).

The idea of the measure was to combine two distinct elements of currency mismatch that are often confused. First, the foreign currency share of total debt, scaled against the share of exports in GDP. The second is the difference between foreign currency assets and foreign currency liabilities as a percentage of GDP.

The statistical strategy was to use what data were available to develop an aggregate measure that could be computed for all major EMEs. Hence, most reliance was put on international sources such as the BIS and the IMF. The richest sources of information on the currency composition of balance sheets were (and remain) data on international banking, on international debt securities and (but to a lesser extent) on domestic debt securities. These data allow for a foreign currency/domestic currency split. But the absence of a full currency decomposition means that changes in assets or liabilities at constant exchange rates cannot be calculated.

IMF statistics on domestic bank credit and on net foreign assets of the banking system (central banks and commercial banks) were also used. Finally, national data on international trade in goods and services and on certain other elements were used. This was designed as a "first-pass" measure of currency mismatch that can be computed for almost all countries. GT drew attention to several data gaps, noting that "… the lack of data on the corporate sector is the biggest hole in the data needed to measure and assess currency mismatches" (page 56). Nevertheless, many data gaps have been plugged so the mismatch measures that can be computed today are more accurate.

A "modified" and more extensive measure was also computed to refine the first-pass measure which had assumed zero foreign currency denomination for domestic contracts. This drew on a number of different national sources to get estimates of the foreign currency denomination of (a) domestic bank loans and (b) domestic bond debt. Such data are not fully comparable across countries and there were gaps in the data. Nevertheless, the data served to illustrate the importance of foreign currency contracts between residents.

(a) Foreign currency share of total debt

The aim was to start from as comprehensive a measure as possible of the percentage of total debts in an economy (including those between residents) denominated in foreign currency (that is, FC%TD). This is of course much broader than the foreign currency denomination of **external** debt. But a number of statistical gaps underlined by GT remained, especially the lack of comprehensive and comparable balance sheet data for non-financial corporations. Company reports provide some information, but not in a fully consistent way.

Underlying the measure of currency exposure is the ratio between the currency denomination of debt and the share of tradables in GDP. Total exports of goods and services were used as a proxy for the tradables share of GDP. Countries with high export/GDP ratios can sustain higher foreign currency shares in total debt. If this ratio is greater than one – larger foreign currency debt than foreign currency earnings from exports can finance – then the country has a problem. Many crises have illustrated the importance of this link. Kohlscheen (2010), for instance, showed that sovereign defaults are driven by a low level of exports relative to external debt service.

What was termed the "pure" mismatch ratio (MISM) – that is, taking no account of the balance between foreign currency assets and foreign currency liabilities held vis-à-vis non-residents – was defined as:

$$MISM = \frac{FC\%TD}{X/Y} \qquad (1)$$

where FC%TD = Foreign currency share of total debt

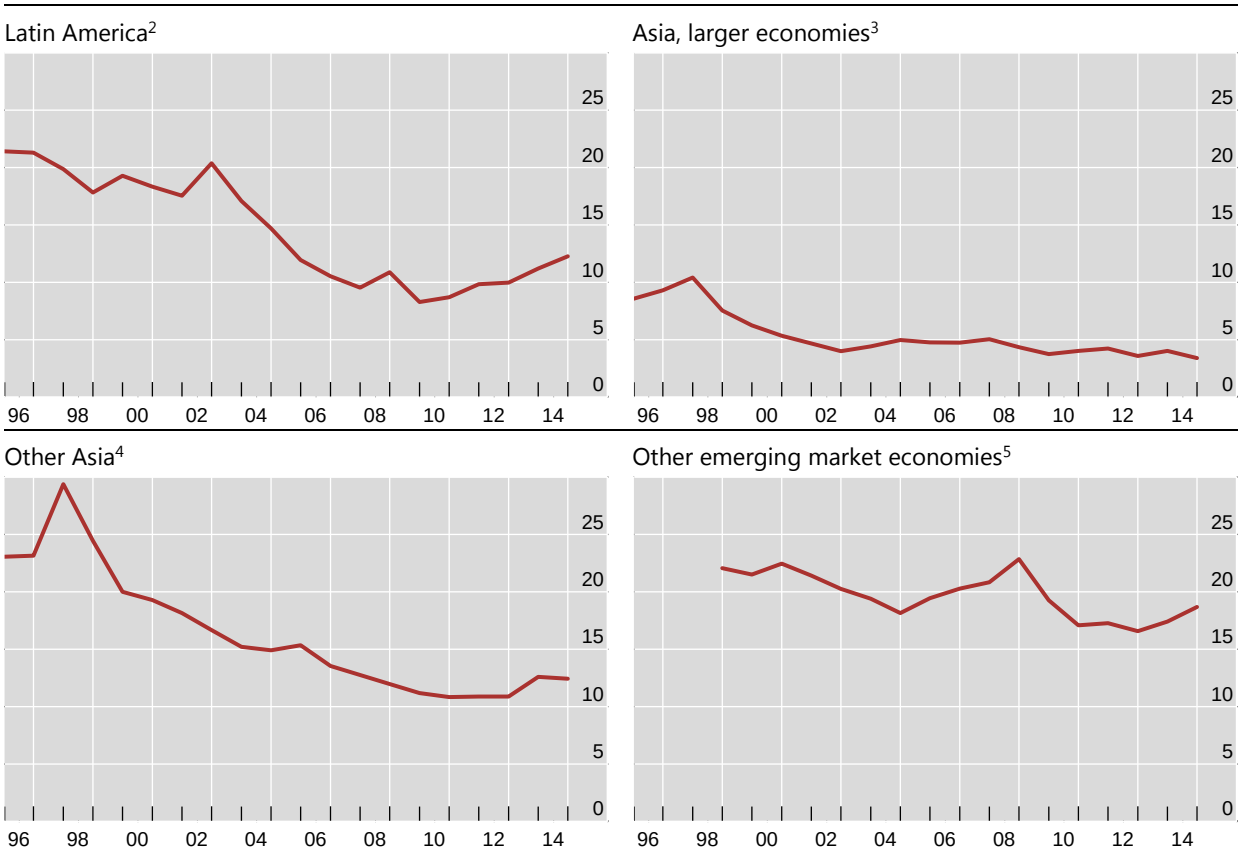
X = Exports of goods and services

Y = GDP

This ratio is based on gross foreign currency liabilities, internal as well as external: there is no subtraction of internal foreign currency liabilities (which are assets for other residents). Note that this ratio takes no account of leverage (ie total debt as a percentage of GDP), a point considered further below.

Foreign currency debt as a percentage of total debt[1]

In percentages Graph 2



[1] Update of Table 4.4 (and the final column of Table 4.5) of *Controlling currency mismatches in emerging markets*, Goldstein and Turner (2004). Outstanding positions of year-end, calculated with aggregates of the economies listed in footnotes 2-5. [2] Brazil, Chile, Colombia, Mexico and Peru. [3] China, Chinese Taipei, India and Korea. [4] Indonesia, Malaysia, the Philippines and Thailand. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Romania, Russia, South Africa and Turkey.

Sources: IMF; CEIC; BIS; national data; BIS calculations.

Developments in the FC%TD variable from end-1995 to end-2014 for broad areas are shown in Graph 2.[11] Readings for this variable in Latin America and medium-sized Asian economies were very high in the second half of the 1990s (when 20% to 25% of total debt was denominated in foreign currency). For some countries, around 40% of total debt was denominated in foreign currency. This not only aggravated the crises in those areas during those years, but also meant that currency depreciation (often warranted on external grounds) could depress domestic demand and increase the risk that those with foreign currency debts would default. Worries about over-depreciated exchange rates constrained the use of monetary policy to fight severe recessions.

Reduced budget deficits, tighter regulation of banks' forex exposures and many other policies succeeded in reducing currency mismatches. By the end of the 2000s, this mismatch ratio had been significantly reduced almost everywhere. The decline in the crisis-hit Asian economies from end-1997 to end-2002 was remarkable. The reduction in mismatches in Latin America varied according to the country, with the sharpest early reduction seen in Mexico.

But this mismatch ratio has steadily risen since 2010, notably in Latin America, Indonesia, Russia and Turkey. Note, nevertheless, that this ratio remains lower than it was in the late 1990s. This graph also lends support to the thesis that turbulence in global financial markets (eg as in 2007/08 and again in 2013) tends to increase the foreign currency denomination of debt (see section 3).

There were two main drivers of the 2000s decline, common to most countries. The first was a shift of government bond issuance from international issuance in dollar markets to local issuance, almost entirely in domestic currency (BIS (2007)). In many countries, this shift in financing was greatly facilitated by lower primary budget deficits (or by primary surpluses). Once governments had become more wary of excessive debt accumulation, non-resident investor appetite for local currency EME government debt proved much stronger than many had expected. Foreign investors are often particularly present at the longer end of such markets and currently hold more than 20% of such bonds issued by the governments of Hungary, Malaysia, Mexico, Peru, Poland, South Africa and Turkey.[12] Illustrating the external debt/foreign currency debt distinction drawn above, increased foreign holdings of local currency EME bonds increase external debt of emerging economies but do not add to their direct foreign currency exposure.[13]

The second driver was a change in the lending strategy of international banks. Up until the mid-1990s, lending by international banks to the emerging markets was almost entirely either cross-border or, even if channelled through local affiliates, denominated in foreign currency. From around 1995, however, local currency claims via the local affiliates of international banks grew much more strongly. This was in large part because international banks – who suffered losses on their dollar loans to

[11] The country data underlying the currency mismatch data shown in Graphs 2 to 6 are available from the authors.

[12] See Table A2 in Mohanty (2014).

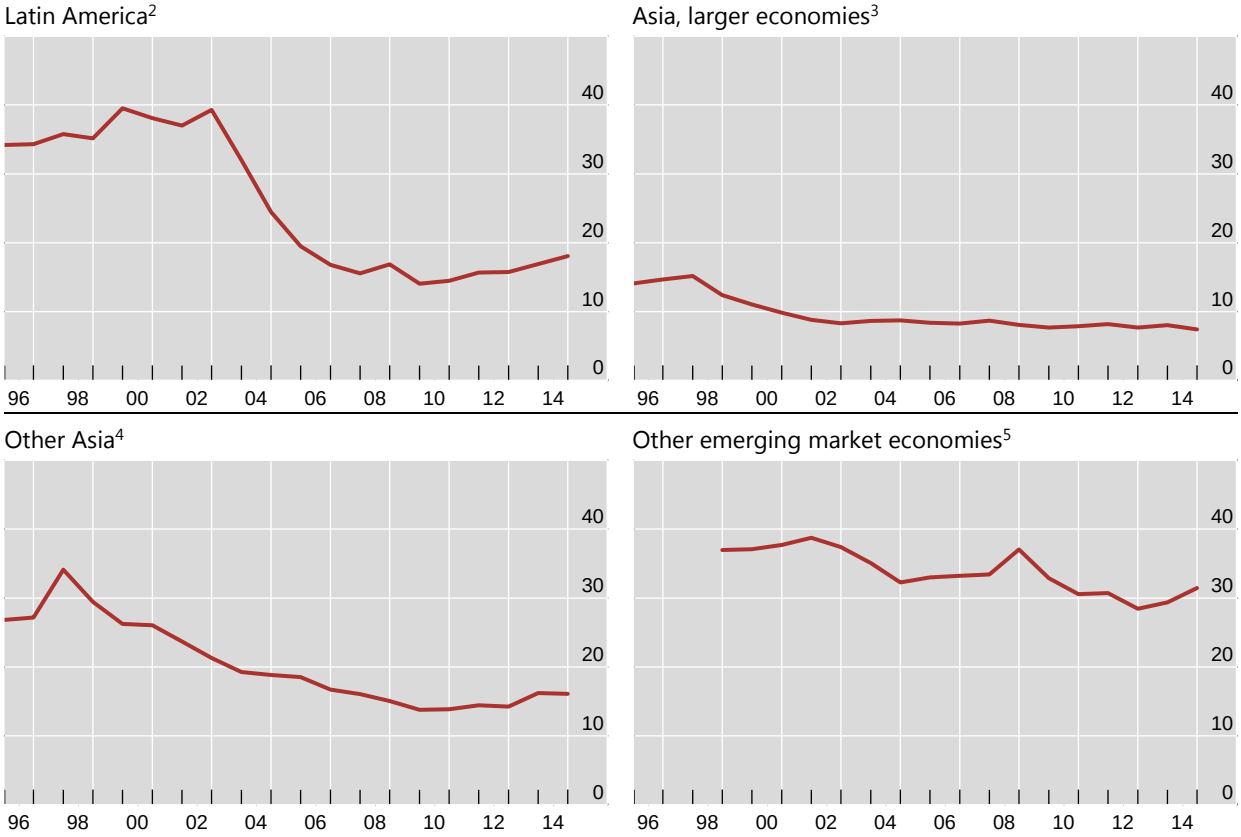
[13] Note the qualification "direct": as discussed in Section 5 below, indirect exposures may have increased via stronger contagion effects on the exchange rate. The quantitative significance of this is not to be underestimated. Citing a sample of ten major EMEs, Carstens (2015) notes that non-resident holdings of EME government bonds now amounts to 35–40% of the foreign exchange reserves of these countries.

developing countries – took over significant portions of some EME banking sectors (BIS (2009)). Where the banks they had taken over had a rich local currency deposit base, they could extend local currency loans, avoiding currency mismatches.

An additional element in some countries (eg Argentina, Indonesia, Mexico and Peru) was a reduction in the foreign currency denomination of domestic bank deposits and loans. In many countries, banks' balance sheets had been heavily dollarised and determined steps were taken to encourage households to make bank deposits in local currency and to take loans in local currency (Armas et al (2006)). Graph 3 extends the FC%TD measure to include data on the currency composition of domestic bank deposits and loans. Data on the foreign currency denomination of domestic bonds were also used. Such data are taken from various national sources and some series are less complete than the data underlying Graph 2.

Modified foreign currency debt as a percentage of total debt[1]

In percentages — Graph 3



[1] Update of the final column of Table 4.6 of *Controlling currency mismatches in emerging markets*, Goldstein and Turner (2004). Outstanding positions of year-end, calculated with aggregates of the economies listed in footnotes 2-5. [2] Brazil, Chile, Colombia, Mexico and Peru. [3] China, Chinese Taipei, India and Korea. [4] Indonesia, Malaysia, the Philippines and Thailand. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Romania, Russia, South Africa and Turkey.

Sources: Rennhack and Nozaki (2006); ECB; IMF; CEIC; BIS; BIS/CGFS Working Group on Financial stability and local currency bond markets, Questionnaire; national data; BIS calculations.

In developing Europe, mismatches remained very high. The foreign currency share of debt in developing Europe (included in the bottom right panels of Graphs 2 and 3) is high. Zettelmeyer et al (2010) attribute financial dollarisation in the less advanced countries of emerging Europe to the legacy of weak institutions and a lack

of monetary policy credibility. In the more advanced countries in the region, expectations of euro adoption and the funding of their banking systems by euro area banks were important factors the favouring "euroisation" of private sector banks. See also Matolcsy (2015).

Some authors have used the simple MISM ratio, without modification to take account of the country's aggregate foreign currency liabilities. For instance, Montoro and Rojas-Suarez (2012) found that the simple currency mismatch was a significant explanatory factor of the resilience of real credit growth after crises in Latin America. Those countries with smaller mismatches were more able to rebound after a crisis than countries with larger mismatches. This was after allowing for other balance sheet characteristics: their model included two aggregate balance sheet variables (viz total external debt/GDP and short-term external debt/gross international reserves) which were also significant.

(b) Net foreign currency asset position

How large a problem a pure currency mismatch creates depends on a country's net foreign currency position: a large net liability position compounds the difficulty.[14] Hence the GT index for aggregate 'effective' currency mismatch (termed AECM) is the product of MISM and the net foreign currency assets (NFCA) as a percentage of GDP viz:

$$\begin{aligned} AECM &= \frac{NFCA}{Y} . \frac{FC\%TD}{X/Y} \\ &= \frac{(NFCA)(FC\%TD)}{X} \end{aligned} \qquad (2)$$

If foreign currency assets are exactly equal to foreign currency liabilities, then AECM is zero – that is, there is no aggregate effective currency mismatch. This measure can be thought of as a stress test for the economy – combining a mismatch ratio with a measure of a country's net foreign currency position. When the economy has a net liability position in foreign currency (ie NFCA<0), an exchange rate depreciation has a negative balance sheet effect (that is, the country's net worth falls). The larger is net liability position relative to GDP, the greater is this balance sheet effect.[15] Working in the opposite direction is a positive competitiveness effect from currency depreciation (exports rise and imports fall).

Note the word "aggregate". The government may have a positive NFCA but the private sector a negative NFCA. A positive aggregate NFCA may conceal large net private sector liabilities. This matters because the government will not want to pay private sector debts and because market dynamics will be shaped by the private sector's reaction to an external shock (eg companies with large dollar debts will buy dollars when they think it will appreciate and so put downward pressure on the local

[14] The *net* foreign currency position variable (NFCA) is vis-à-vis non-residents because local foreign currency assets (ie vis-à-vis residents) equal local foreign currency liabilities, and so cancel out. By contrast, FC%TD is a gross concept. Note that NFCA is not the same as a country's net external investment position. An external liability denominated in local currency – therefore not included in the NFCA – is non-resident holdings of governments bonds issued domestically in local currency. For many countries this element has grown substantially in recent years.

[15] A country with a large net foreign asset position faces a negative balance sheet effect when the currency appreciates.

currency). Estimates of mismatches in the non-official sector (which are new and not developed in GT are presented in the next section.

This definition of AECM as the product of MISM and NFCA has an important implication for dollarised economies. The FC%TD ratio for such economies – the pure mismatch ratio – is very high. But how much of a risk this represents for the country depends on the country's balance between its foreign currency assets and its foreign currency liabilities, that is the net foreign currency position. Economies with a large positive net foreign currency assets position (that is, vis-à-vis the rest of the world) can more easily sustain dollarisation. Think of Hong Kong.

A number of studies have found that this currency mismatch indicator has a significant role in explaining emerging market bond spreads once allowance is made for the standard variables related to debt sustainability. For instance, Prat (2007) finds this result is particularly strong for the banking sector. To reiterate a point made at the beginning of this paper: currency mismatches are only one dimension of risk exposures. This is what AECM is meant to capture in summary form. Another important dimension is leverage. GT report some experiments which allowed the ratio of total debt to GDP to increase the mismatch indicator. However, most empirical studies have used separate variables for currency mismatches and for leverage, hoping to disentangle the effects of these two variables.

Developments in net foreign currency assets as a percentage of exports (that is, NFCA/X) are shown in Graph 4. In the mid-1990s, many EMEs had sizable net foreign currency liabilities. But then such debts were reduced.[16] Most major areas show a significant rise in net foreign currency assets up to the end of 2009.[17] Notable exceptions are Hungary, Poland, Romania and Turkey, which have significant net foreign currency liabilities. Higher foreign exchange reserves in almost all EMEs is the main factor behind the emergence of positive NFCA positions in much of the developing world. In some countries, increased cross-border bank deposits of non-banks with BIS reporting banks has been another significant element.

Since the end of 2009, however, the ratio of net foreign currency assets to exports has declined in Latin America (where it became close to zero at the end of 2014) and other Asia. The main common factor has been a significant rise in international debt securities outstanding in foreign currencies. The calculation of AECM was based on bonds outstanding on a residence basis and so did not include corporate borrowing by offshore affiliates. As will be discussed further in section 4 below, such borrowing has become more important since 2009.[18] In addition, sizable rises in non-bank cross-border liabilities to international banks in some countries – notably Brazil, China, India (peaking end-2012), Indonesia and Russia (peaking at end-2012) – reduced net foreign currency assets.

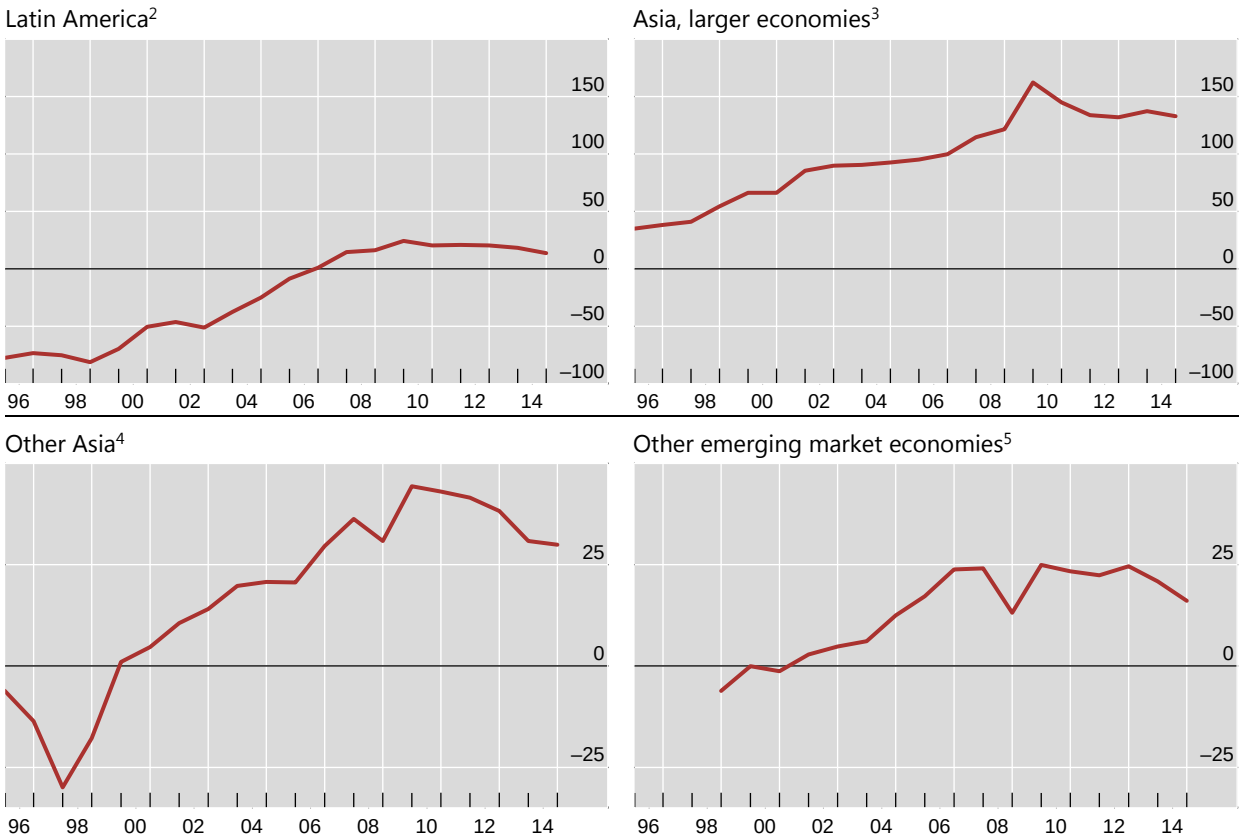
[16] The sizable current account surpluses in the 2000s (shown in Graph 1) facilitated this debt reduction.

[17] The net foreign debt (ie without distinction about currency) of EME economies improved steadily from 1999 to 2007, but has deteriorated since that year (Figure 4 of Acharya et al (2015)).

[18] The AECM measure does not apply to countries with a positive NFCA position. For such countries, a currency depreciation would improve their net foreign currency asset position. (Countries with large NFCA positions face a different problem – currency appreciation reducing the local value of their foreign currency assets).

Net foreign currency assets as a percentage of exports[1]

In percentages Graph 4



[1] For net foreign currency assets, outstanding positions of year-end. Calculated with aggregates of the economies listed in footnotes 2-5. [2] Brazil, Chile, Colombia, Mexico and Peru. [3] China, Chinese Taipei, India and Korea. [4] Indonesia, Malaysia, the Philippines and Thailand. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Romania, Russia, South Africa and Turkey.

Sources: Datastream; IMF; BIS; national data; BIS calculations.

(c) Other currency mismatch measures

Several other measures of currency mismatch have been prepared: a good recent overview is Tobal (2013). Many indicators have been based on data on a country's net international investment position. Lane and Shambaugh (2010) adopt this approach for 145 countries for their External Wealth of Nations dataset. Using information on the currency of composition of foreign assets and liabilities, they seek to measure the impact of currency movements on the valuation of a country's external balance sheet. But they ignore, because of lack of data, foreign currency contracts within a country.

Many researchers have taken advantage of banking data which contain detailed information on currency denomination. Using a specifically constructed dataset for banks in Latin America and the Caribbean, Tobal (2013) estimated mismatches by the ratio of foreign currency assets to foreign currency liabilities for quarterly data.

Rancière et al (2010) pay particular attention to foreign currency loans by domestic banks to households and firms without foreign currency income. Such loans become a credit risk when the exchange rate changes sharply even if the bank appears to have no currency mismatch on its balance sheet. They suggest subtracting

such loans from the bank's foreign currency assets to get a more realistic measure of currency mismatches, one that is larger than measures that take no account of such indirect mismatches.

Beckmann et al (2015) examined for central Europe the currency of denomination and the maturity of loans simultaneously. They found that foreign currency denomination was more prevalent for longer maturity loans with a maturity of more than one year than those at shorter maturities. One reason for this has often been the absence of long-term local currency funding for banks.

3. Measuring non-government mismatches

The measures outlined in the previous section are aggregate economy-wide measures. They include both the official sector and the private sector. The decline in currency mismatches revealed by these aggregate measures reflects to a significant extent changes in the *official* sector's currency exposures. It is governments which have reduced their foreign currency liabilities by shifting from bond issuance in dollars to local issuance, almost entirely in domestic currency. And it is central banks which accumulated foreign exchange reserves. The net result is that many governments now have a large net foreign currency asset position – so that currency depreciation actually improves their balance sheet. The combination of those developments and better fiscal positions improved the credit standing of many EME governments. Because perceptions of sovereign debt problems in many EMEs had in the past also forced private corporate borrowers to pay significant credit spreads (eg, Dailami (2010b)), EME companies also found it easier to borrow abroad. And they could do so even though their own currency mismatches had worsened.

The *non-official* sector's currency mismatches matter. It cannot be assumed that the government would directly cover private sector currency exposures – whether because of moral hazard or because of political difficulties in getting support for bailing out private sector borrowers.[19] Increased non-official-sector foreign currency debt, notably that of non-financial companies, has aggravated currency mismatches in many countries.

The international data sources used in the aggregate currency mismatch measures, however, do not provide full official sector/private sector breakdowns. Only very recently, for instance, do the BIS's banking statistics identify official sector positions separately. Nevertheless, two big components are known: the central bank's foreign exchange reserves and international foreign currency bonds issued by the government.[20] Subtracting these elements from the totals used in Graph 3 shows gives the non-government foreign currency share of debt. Graph 5 shows this is higher than the aggregate ratio, but the trend over time is similar. Table A1 in the Annex gives the country details.

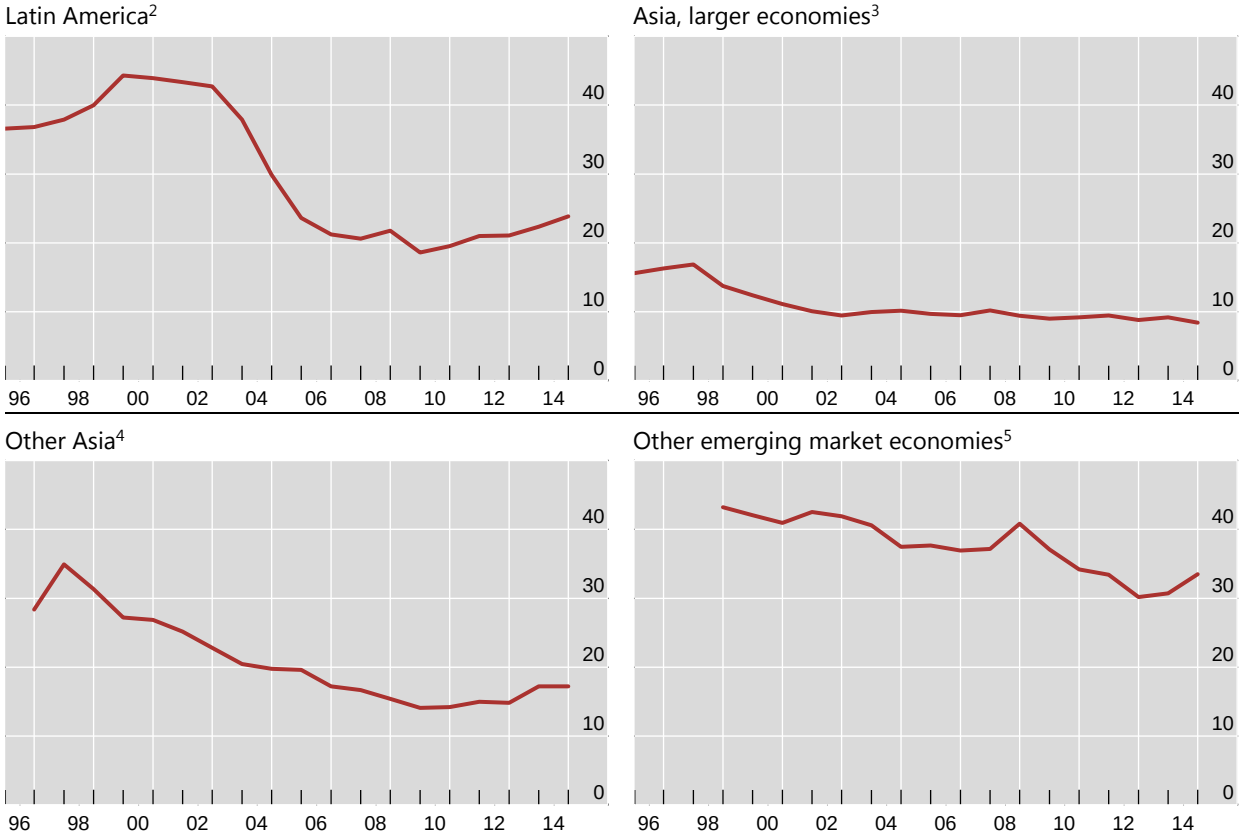
[19] But many EM companies are semi-State entities or enjoy implicit guarantees. There have also been various indirect bail-outs of private sector companies by the government. During periods of market stress, central banks or governments have insured the forex exposures of their companies. Use of the central bank's reserves to limit currency depreciation indirectly helps indebted corporates.

[20] Gagnon (2014) also uses these data to provide a public sector/private sector split.

Modified foreign currency debt as a percentage of total debt, non-government sectors[1]

In percentages

Graph 5



[1] Outstanding positions of year-end, calculated with aggregates of the economies listed in footnotes 2-5, excluding the central bank and general government liabilities where these can be identified separately. [2] Brazil, Chile, Colombia, Mexico and Peru. [3] China, Chinese Taipei, India and Korea. [4] Indonesia, Malaysia, the Philippines and Thailand. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Romania, Russia, South Africa and Turkey.

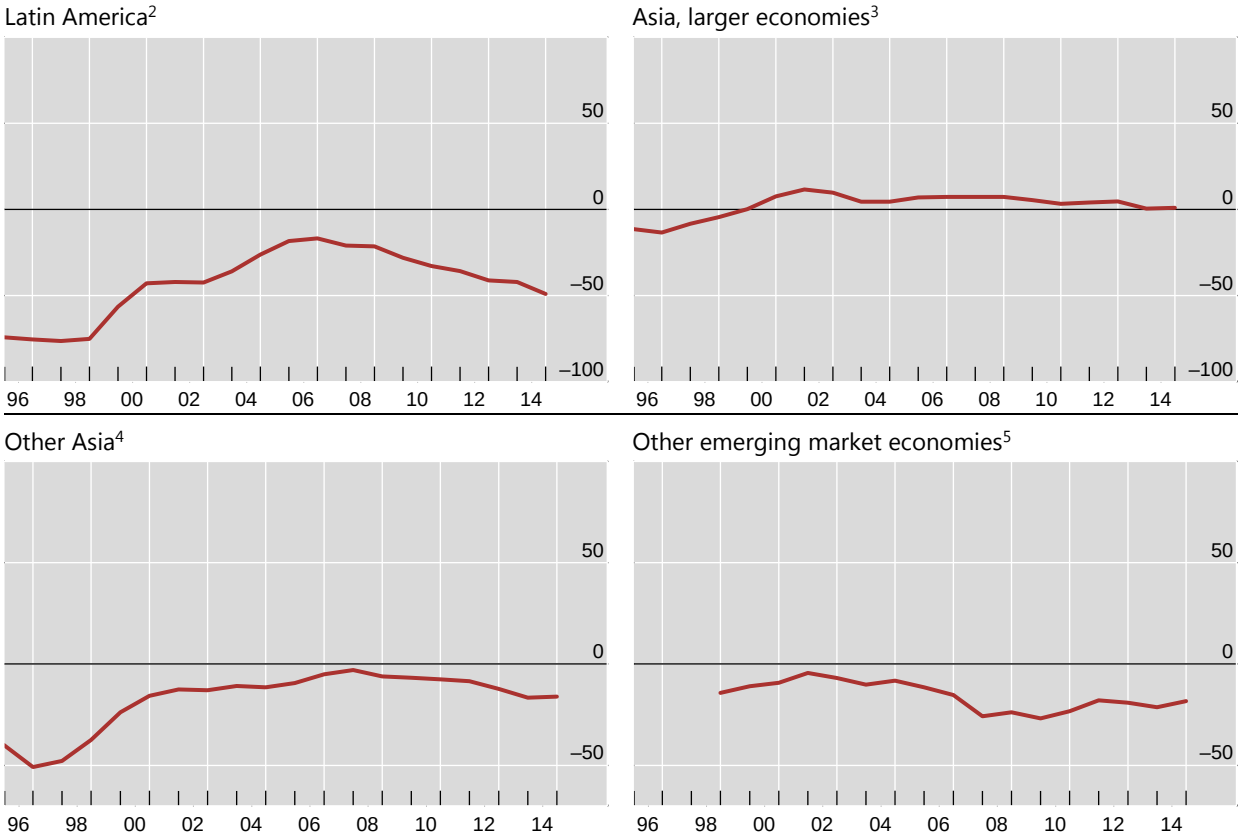
Sources: Rennhack and Nozaki (2006); ECB; IMF; CEIC; BIS; BIS/CGFS Working Group on Financial stability and local currency bond markets, Questionnaire; national data; BIS calculations.

In contrast, the impact of this government/non-government adjustment is much greater for the calculation of net foreign currency assets. Subtracting the elements that can be identified as official from the totals used in Graph 4 gives the approximation for the non-government component that is shown in Graph 6. The net foreign currency asset position is quite different because the non-government sector (which will include semi-State enterprises) has large foreign currency liabilities – which have increased sharply over time. In Latin America, for instance, the net foreign currency liabilities of the non-government sector amounted to 50% of exports at the end of 2014, mainly reflecting increased foreign currency borrowing of non-financial corporations – to be further explored in section 4. Note, however, that while we have good data on foreign currency cross-border bank deposits (and these assets are incorporated in the measure described in this section), there are no comprehensive measures of other foreign currency assets of corporations. (This is why the review of corporate profitability in section 6 is key to this analysis).

Net foreign currency assets of non-government as a percentage of exports[1]

In percentages

Graph 6



[1] For net foreign currency assets, outstanding positions of year-end, excluding the central bank and general government assets/liabilities where these can be identified separately. Calculated with aggregates of the economies listed in footnotes 2-5. [2] Brazil, Chile, Colombia, Mexico and Peru. [3] China, Chinese Taipei, India and Korea. [4] Indonesia, Malaysia, the Philippines and Thailand. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Romania, Russia, South Africa and Turkey.

Sources: Datastream; IMF; BIS; national data; BIS calculations.

4. Debt of EME companies and increased offshore borrowing

The debt of EME companies has risen sharply since 2008 (Graph 7), a significant part borrowed abroad. EME companies have taken full advantage of a long period of very low interest rates and abundant liquidity in global markets. This was part of what the governor of the Banco de México has described as

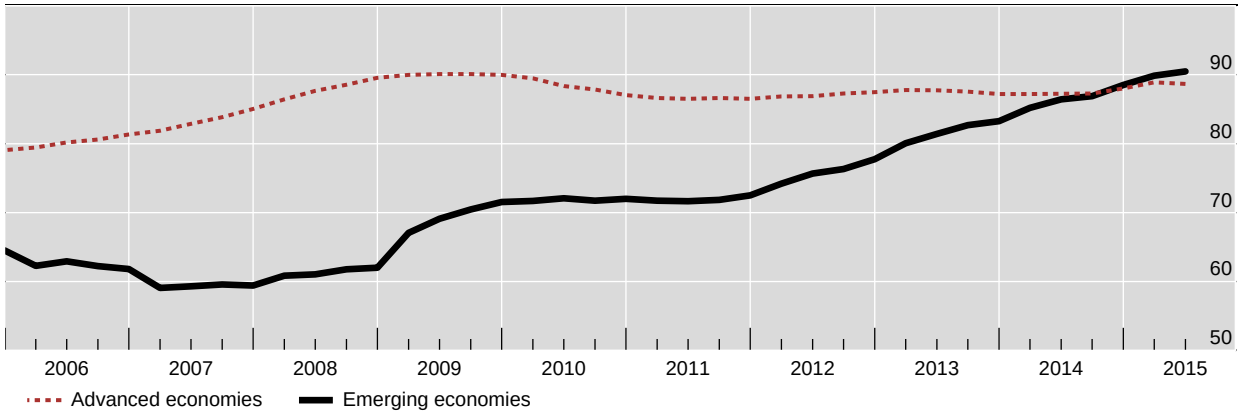
> *"massive capital inflows into EMEs…fuelled primarily by carry trades…[given] ex ante covered interest rates arbitrage…which in turn generated…meaningful real exchange rate appreciations" (Carstens (2015)).*

In the early years, expectations of EME currency appreciation against the dollar provided a powerful spur to dollar-denominated borrowing. According to the BIS's debt statistics, non-financial corporate debt in the major EMEs rose from about 60% of GDP at the start of 2009 to around 90% currently. In stark contrast, the non-

financial corporate debt in the advanced economies has been constant in terms of GDP. This big increase in aggregate indebtedness (without a commensurate rise in real fixed investment) makes the balance sheets of EME companies more vulnerable to financial shocks.

Non-financial corporate debt

As a percentage of GDP — Graph 7



Note: The advanced economies is 2010 GDP-PPP weighted average of Australia, Canada, the euro area, Japan, Sweden, Switzerland, the United Kingdom and the United States. The emerging economies is a 2010 GDP-PPP weighted average of Argentina, Brazil, China, India, Indonesia, Korea, Mexico, Poland, Russia, Saudi Arabia, South Africa and Turkey.

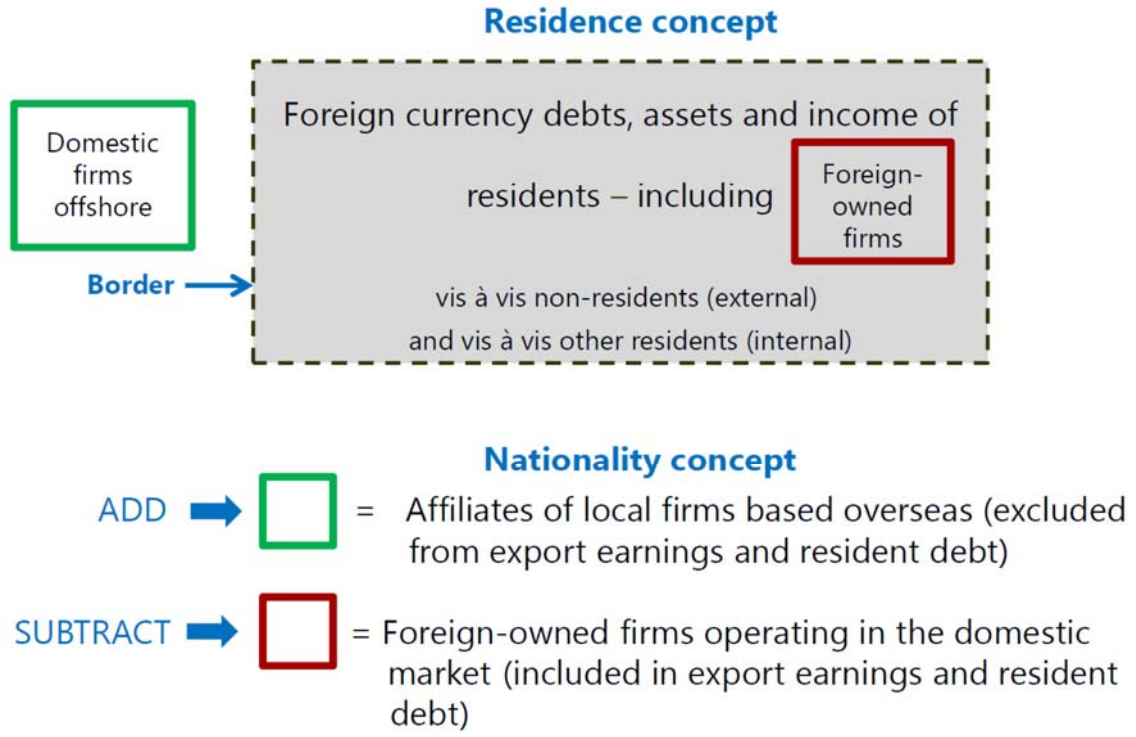
Sources: IMF, *World Economic Outlook*; BIS data on total credit to non-financial corporations.

The distinction between the residence and nationality concept of debt is important for measuring the forex exposures of companies (Graph 8). The international bond statistics used in the original GT measure of currency mismatches were those compiled on a **residence** basis – that is, issuance by entities located in the country. Since 2010, however, local EME corporations have increasingly relied on bond issuance by their overseas subsidiaries – including financing vehicles established in financial centres offshore. Such issuance is captured by statistics based on the **nationality** of the issuer. Nationality-based measures are better measures of the true risk exposures of corporate borrowers. It is the consolidated balance sheet of an international firm which best measures its vulnerabilities, which, therefore, determines how the firm will react to macroeconomic or financial shocks.

Following a parallel logic, the foreign currency debt of the local affiliates of foreign-owned non-financial companies will be included in residence-based currency mismatch measures – but do not represent the same riskiness as such borrowing by domestic-owned companies.[21] For multinational companies managing currency exposures at the group level, currency mismatches at each affiliate may not matter. The BIS's nationality-based bond data therefore exclude bonds issues by the affiliates of foreign-owned companies. How foreign-owned firms react to shocks, however, could have a material macroeconomic impact – if so any analysis will need to include the debts.

[21] Angel et al (2014) report that, in the case of Colombia, 84% of foreign currency corporate debt is in companies with foreign capital

Graph 8: The residence versus nationality concepts of debt



Graph 9 shows how the gap between the residence and the nationality bases has widened in recent years. The difference between international bonds outstanding in foreign currency on a residence basis and that on a nationality basis is largest for China ($260 billion on a nationality basis compared with $7 billion on a residence basis at end-2014), Brazil ($150 billion compared with $36 billion), India ($47 billion compared with $20 billion) and Russia ($96 billion compared with $34 billion).

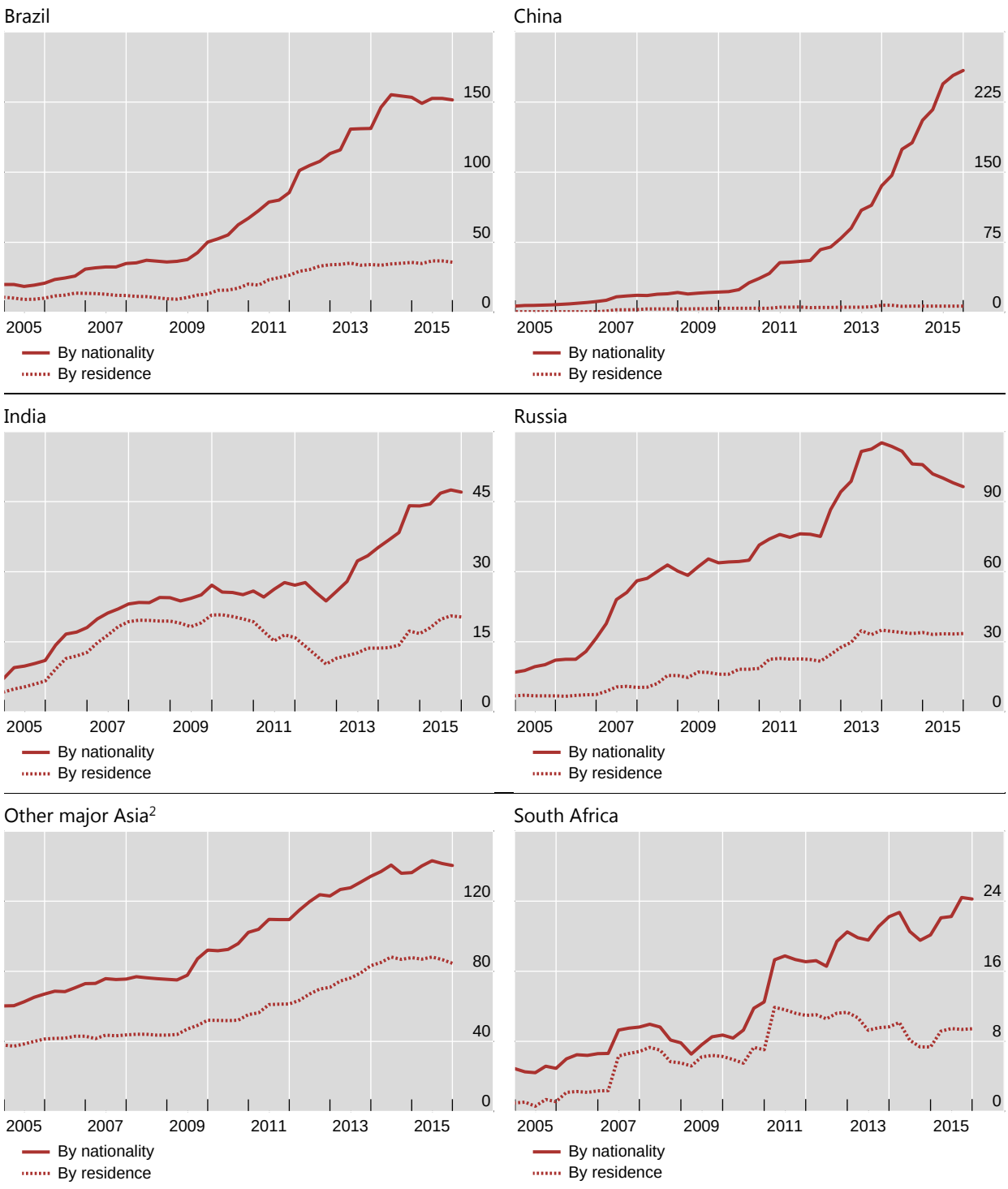
Should the mismatch measure described above be adapted by replacing international bond issuance on a residence basis by that based on a nationality basis? The answer is, "not necessarily." This is because the foreign trade measure in equation (1) in section 2 above is a residence-based estimate of exports – reflecting the cross-border movement of goods and services. It does not include the sales of overseas affiliates that have their own productive capacity. But if an affiliate that has been designed as just a financing vehicle for the corporation (motivated by tax, regulatory or jurisdictional considerations), it would generate no new foreign currency sales. In such a case, the measures reported here would understate the true size of currency mismatches. To draw the correct distinctions, microeconomic data on the exposures of specific companies are needed. Section 6 below explores what information can be gleaned by comparing bond issuance by bond sectors with balance sheet data from company accounts.

It has long been a matter of concern that public disclosure of currency mismatches on the balance sheets of non-financial companies is not uniform. Data on the aggregate position of the corporate sector are meagre. One question is whether it is producers of tradables or of non-tradables that have borrowed heavily in foreign currency. Several studies have used detailed company reports to examine this question for specific countries. Before the recent boom in EME corporate

International debt securities issued by non-financial companies outstanding in foreign currencies, by residence and by nationality

Outstanding amounts, in billions of US dollars

Graph 9



[1] Issuer sector is immediate borrower basis by residence and ultimate borrower basis by nationality. [2] Sum of Indonesia, Korea, Malaysia, the Philippines and Thailand.

Sources: BIS international debt securities statistics.

international bond issuance, such studies usually found that exporters tend to borrow more in foreign currency than those focused on the domestic market. Krueger and Tornell (1999) found that it was that Mexican export firms who were able to obtain financing in international capital markets from the early 1990s: the 1995–97 credit crunch mainly hurt small and medium-sized firms in the non-tradables sector. The 142 nonfinancial firms listed on the Mexican stock exchange, mainly tradable-sector firms, had an export-to-sales ratio of 40% in 1997 and over half (53%) of their liabilities denominated in foreign currency. Even more notable is the fact that those firms with the highest share of liabilities denominated in foreign currency had a higher-than-average export-to-sales ratio. Their explanation for this tradable/non-tradable distinction is that firms exporting a substantial portion of their sales are more likely to be able to provide collateral (often implicit rather than contractual) in the form of receivables denominated in dollars. Cowan et al (2006)'s study of Chilean nonfinancial corporations has also found the ratio of dollar-denominated liabilities to assets was higher in firms that exported most of their output than firms that sold their output at home. Finally, there is some evidence that a flexible exchange rate makes borrowers more aware of the risks of unhedged foreign currency exposures. Kamil (2012)'s study found that greater exchange rate flexibility led to a reallocation of dollar debt towards firms better able to absorb the impact of currency depreciation (that is, exporters or those with foreign currency assets).

Developments since 2010, however, throw doubt on the earlier consensus in Latin American studies that it is usually exporters – not companies focused on the domestic market – who borrow more in foreign currency. The sheer size of increased foreign borrowing (given the strong interest rate/exchange rate incentives) and the larger number of firms borrowing suggest that firms in many different sectors increased their foreign borrowing. Companies producing non-tradables (eg property developers) have raised funds in dollar bond markets. Other borrowing was to finance increased production of oil and other primary commodities – with projects often predicated on commodity prices remaining very high. In addition, the balance sheets of many EME corporations have become more leveraged. Ayala et al (2015) find that the share of issuers with ratings below investment grade, which had fallen back during the financial crisis, rose sharply from 2010 to 2013. Corporate foreign currency borrowing – involving a larger number of companies – has greatly increased. Table 1 shows net international bond issuance for the major EMEs. The cumulative flows have been very large: about $1.2 trillion debt issuance on international markets over the 5-year period from 2010 to 2014. Such issuance has been consistently dominated by Chinese companies ($376 billion). Net issuance by Brazilian companies has also been large ($179 billion), but has fallen since 2012.

2015 marked the end of this issuance boom, and net issuance fell to just $128 billion. Note that this happened at a time when many advanced economy borrowers had increased issuance to take advantage of unusually depressed long-term interest rates (especially on euro-denominated paper – in which the term premium, as shown in Graph 10, was unusually negative). There are already signs that declining earnings and a stronger dollar make it harder to service international bond debt. Because the issuance boom began in 2010, scheduled repayments to date have been comparatively modest. But repayments will rise sharply from 2016. The latest estimate is that scheduled repayments for the three years 2016, 2017 and 2018 will exceed $340 billion.

Net issuance of corporate bonds by EM companies[1]

By nationality of issuer, in billions of US dollars — Table 1

	2010	2011	2012	2013	2014	Total	2015	
							$bn	% change[4]
Total emerging markets[2,3]	151	169	290	313	303	1,226	128	–58
Banks	54	53	138	107	125	478	13	–89
Non-banks	97	116	152	205	178	748	115	–36
By country								
China	24	43	49	98	163	376	104	–36
Korea	8	19	14	21	10	72	–6	
Brazil	34	34	55	26	30	179	–14	
Mexico	7	17	22	23	20	89	15	–25

[1] Net issues of international debt securities, financial and non-financial corporations, in all maturities, by nationality of issuer. [2] Including euro area member states Latvia, Lithuania, Slovenia, Slovakia and Estonia. [3] Excluding major international banking centres. [4] Annual change for positive net issuance.

Source: Dealogic; Euroclear; Thomson Reuters; Xtrakter Ltd; BIS international debt securities; BIS calculations.

Using BIS international banking data, Turner (2014) argues that there is no evidence that bond issuance has just filled the gap left by reduced foreign currency borrowing from international banks.[22] The microeconomic data discussed in section 6 below suggest that many borrowers have increased foreign currency borrowing to finance local currency investments (notably in local property markets). This was often intermediated through the domestic banking system, sometimes with a multiplicative effect on total credit. Currency mismatches have therefore increased. It is possible that some balance sheet exposures are hedged by derivatives. In less developed currency or bond markets, however, the absence of a suitable market product in the local currency will often mean that such mismatches are unhedged. In any event, attempts to hedge currency exposures through derivatives often create maturity mismatches because derivatives contracts are typically of short maturity and need to be rolled over (Gagnon (2014)). Such imperfect hedges have often had unintended consequences during times of market stress – as the case studies on Mexican and Korean companies in BIS (2009) clearly demonstrate. Standard balance-sheet indicators such as return on assets, the debt-earnings ratio and profit growth are the basic measures of the capacity of firms to withstand negative shocks when global financing conditions tighten. But large currency movements could also impose significant foreign exchange losses on companies with apparently sound balance-sheet ratios. The losses shown in Table 2 stemmed largely from complex derivatives contracts that triggered payments when exchange rates moved beyond a pre-specified range or when significant misalignments lasted much longer than the maturity of any derivatives contract designed as a hedge.

[22] A recent comprehensive IMF study on total EME corporate bond issuance (domestic as well as international) found that the stock of outstanding bonds of EME firms rose from 2.8% of GDP at end-2008 to 5.3% of GDP at end-2013. The stock of bank loans actually edged down (to 40.5% of GDP). See Ayala et al (2015).

Derivative losses of non-financial corporations during the financial crisis Table 2

	Company/ Sector	End-2007							End-2008	
		Profitability (%)		Indicators of leverage			5-y growth (%)		($ million)	
		ROA	ROE	Liab/ Assets	Debt/ Earnings[1]	Interest cover[2]	Total Rev[3]	Gross profit[3]	Gross profit	FX losses
Brazil	Paper	6.7	20.5	0.5	1.8	7.5	13.6	7.2	498	2,100
	Supermarket	5.6	27.1	0.6	3.5	n.a.	16.0	14.2	559	1,012
China	Diversified	2.1	20.5	0.4	6.7	14.0	11.5	24.3	1,039	2,050
Korea	Shipbuilding	2.0	16.7	0.8	1.3	15.1	17.6	4.9	1,102	1,038
Mexico	Retail	5.2	12.0	0.4	1.3	6.2	7.5	9.6	797	2,225
	Cement	4.3	14.1	0.6	4.5	5.5	23.4	16.8	5,206	1,350
	Chemicals	4.5	10.1	0.7	2.7	4.4	21.8	13.4	1,406	277
	Glass	5.6	1.4	0.7	3.6	2.3	1.2	1.6	562	240

[1] Total debt/EBITDA (earnings before interest, taxes, depreciation, and amortisation). [2] EBITDA/interest expenses. [3] Compound annualised growth rate.

Sources: S&P Capital IQ; company reports.

5. The global bond market

Yields in global bond markets depend on monetary policies in major currencies and on the choices private sector (or similar) borrowers or investors in many countries make in reaction to current and expected future economic developments. It is now well established that movements in bond yields are highly correlated across countries – and that emerging market bond markets have become part of this expanding global market (see Obstfeld (2015) and Mohanty (2014)). As King and Low (2014) have concluded, "it seems therefore quite reasonable to talk about a "world" interest rate". Graph 10 shows their calculation (red line in the top left-hand panel). Observations for more recent years are shown by a principal components estimate based on three major markets shown in the top right-hand panel. This shows a real long-term rate of interest hovering around zero since mid-2011.

The lower panels, based on calculations from Hördahl and Tristani (2014) for the United States and for France (as a proxy for the euro area), show that, since 2014, the decline in the long-term interest rate has been driven by steep declines in the term premium – that is, over and above any shift in the expected path of short-term interest rates.

The yield on US Treasuries dominates the calculation of the "world" long-term rate. But the US yield does not depend only on developments within the United States. The huge volume of dollar bond transactions between non-US residents is driven also by developments abroad (McCauley et al (2015), Sobrun and Turner (2015)). The dollar remains the first choice for international financial contracts. The financial and economic growth of EMEs in Asia and Latin America – where the dollar is still seen as the standard of value – relative to western Europe has doubtless reinforced this appeal of the dollar. The corporate and household demand for dollar assets in EMEs has strengthened as their real incomes have risen. The dollar share of

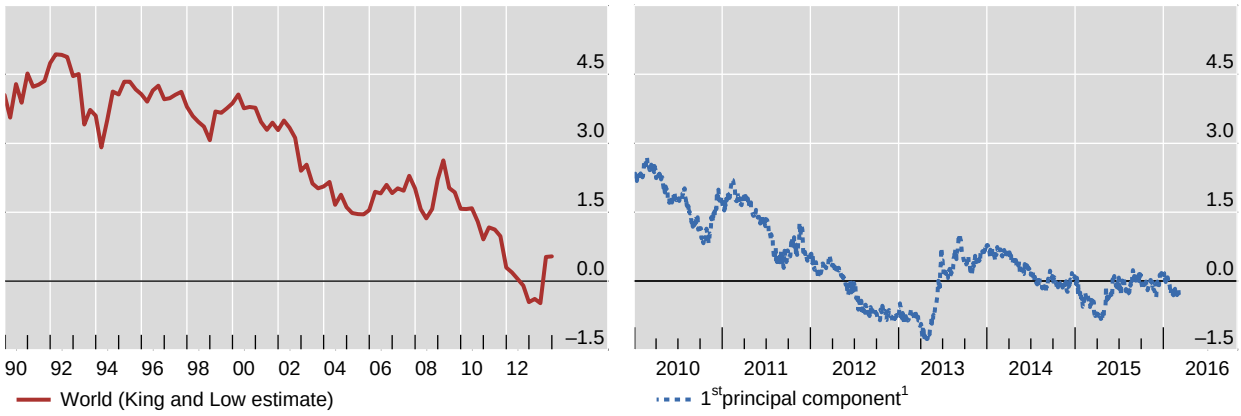
international bonds and bank loans has risen significantly over the past decade as that of the euro has fallen (BIS (2015a)).

The long-term interest rate

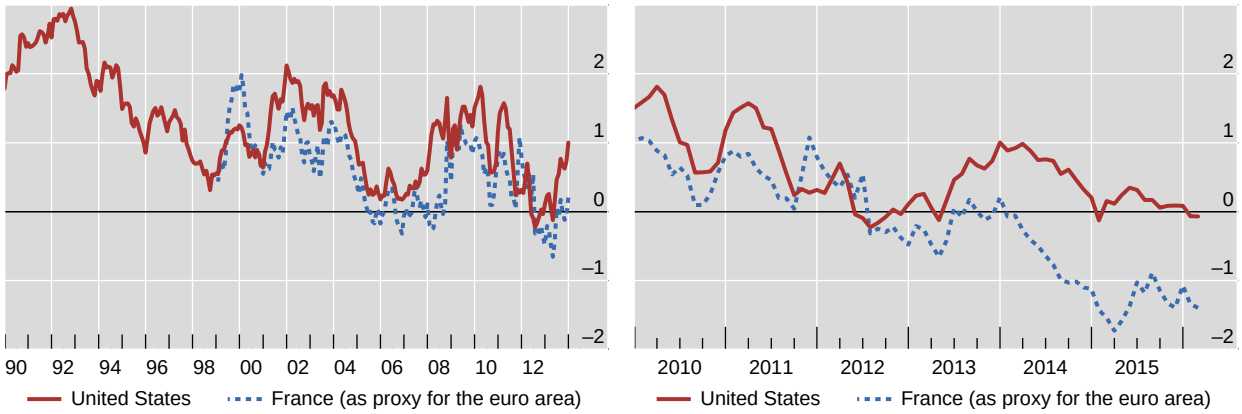
In per cent

Graph 10

A. World real long-term interest rate



B. 10-year bond term premia



[1] Across the euro area, the United Kingdom and the United States; BIS computations of the real interest rates are based on index-linked 10-year bonds. This calculation serves to extract what is common in these three markets. [2] Sum of inflation and real yield risk premia in the 10-year government bond yield. These are calculated using the BIS term structure model.

Sources: King and Low (©February 2014); Bloomberg; national data; BIS calculations.

Although the dollar remains dominant, it is no longer the unique medium of international financing. Because investors/borrowers can move between dollar markets and other liquid non-dollar bond markets whenever dollar/non-dollar interest rate differentials change, the dollar yield curve can be affected by monetary and other policies in other currency issuing areas, notably the euro area.

There is no agreement on why the real long-term interest rate has been zero for so long. A higher global saving rate, population ageing creating demand for financial assets that outruns the supply of real assets and the proclivity of official investors for highly liquid and "safe" assets are three important factors.

In any event, such low long-term rates have allowed all EME borrowers to lengthen the maturity of their dollar liabilities. If such financing is used for fixed capital formation in the tradable sectors, this trend can strengthen company balance sheets. But a recent BIS study of companies from 47 countries outside the United States finds

that EME non-financial companies have used US dollar bond issuance to take on financial exposures with the attributes of a dollar carry trade. They have invested part of the US dollar bond proceeds in local currency bank deposits or shadow banking products, commercial paper (or similar instruments) issued by other firms and so on (Bruno and Shin (2015)).

The markets for EME corporate bonds are generally illiquid, and end-investors can often only be attracted through bond funds that promise daily liquidity. The Hong Kong Monetary Authority (2015) has warned that the increased participation of retail investors in EME corporate bonds (as evidenced by the strong growth in bond mutual funds) could make markets more volatile because retail investors tend to rush out in times of stress. Miyajima and Shim (2014) have shown that the benchmark-tracking strategies of emerging market bond funds holding correlated portfolios could well accentuate selling by asset managers into a falling market. Yet these managers are often overconfident about their ability to sell in a crisis when investor redemptions tend to be very concentrated. A recent Bank of England survey of 135 asset managers found that the aggregate of their expectations of what they could sell was a multiple of the underlying turnover in those bond markets.[23] A quite different picture emerged for equity markets where such expectations were only a very small fraction of equity market turnover. And, there is evidence that investor flows into and out of EME funds tend to cluster more than for advanced economy markets, perhaps an optimal reaction in the face of asymmetric information (Calvo and Mendoza (2000)). In addition, discretionary sales by EME bond fund managers tend to amplify investor redemptions (Shek et al (2015)).

International investors find many local currency government bond markets illiquid. EME governments may well face strong contagion from shocks in global bond markets. Non-resident investors now hold a much higher proportion of local currency government debt than in the mid-2000s. Dollar-based investors in local currency paper, whose returns depend on the exchange rate, may use comparatively liquid forex markets to short the local currency once sentiment changes. All this reinforces the tendency for the price of the local benchmark bond and the exchange rate to fall simultaneously. Similarly, the duration of EME sovereign bonds has risen – increasing the exposure of investors to rises in long-term interest rates. The replacement of foreign currency government debt with local currency debt has reduced currency mismatches. But it may have also magnified international contagion effects on the exchange rate. To reiterate a general point made at the beginning of this paper: correlations between currency mismatches and other dimensions of balance sheet vulnerability matter because key macroeconomic variables – such as the exchange rate and the long-term interest rate – can move together in ways that compound the difficulties faced by debtors when markets change.

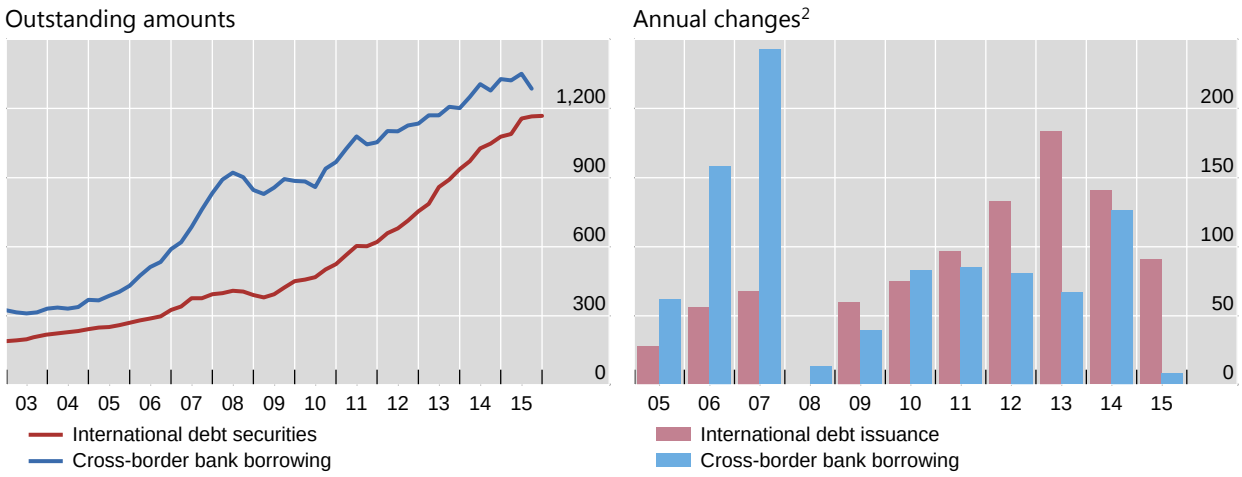
[23] Reported by Mr Carney in oral evidence to the Treasury Committee on *Bank of England July Financial Stability Report*, 14 July 2015.

6. EME corporate balance sheets: new currency mismatch risks?

Bank claims still account for the largest share of outstanding cross-border credit for the private non-bank sector (Graph 11, left-hand panel). Nevertheless, growth in international debt issuance by EME non-financial corporations and their overseas affiliates has outpaced that in bank claims from the onset of the global financial crisis (Graph 11, right-hand panel).[24]

EME private cross-border bank borrowing and international debt issuance[1]

In billions of US dollars — Graph 11



[1] Private non-bank sector. Cross-border bank borrowing (by residence) also includes claims on the household sector and claims on portfolio debt investment (implying a degree of double-counting), while international debt issuance (by nationality) includes securities issued by non-bank financials and non-financial corporations; and these securities could be denominated in local or foreign currency. [2] Based on end-of-year data; for 2015, based on data up to Q3 for cross-border bank borrowing.

Source: BIS consolidated banking statistics and international debt securities statistics.

(a) Link with local banks

EME companies raising dollar (or euro) funds in international markets can help finance viable domestic projects or overseas acquisitions, which in turn can boost growth. If such projects yield dollar earnings, currency mismatches can be avoided. But there is a risk of currency mismatch if dollar debt is used to generate non-dollar foreign currency earnings – the strategy employed by many EME companies whose main foreign activities are outside the dollar zone.

There is clearly a risk of currency mismatch if these borrowers repatriate the funds raised overseas to the headquarters for domestic investment without adequately hedging these positions. In any event, there is evidence that very easy conditions in global capital markets from 2010 to 2014 meant that many companies raised more money than they needed for real fixed investment. As noted above, many EME firms seem to have engaged in a form of "carry trade" by being short in US dollars and

[24] See Shin (2013) for a discussion of this changing landscape of global liquidity and its impact on EMEs.

holding long positions in domestic currency. In addition, companies may have both dollar deposits held onshore (subject to local regulation) and offshore dollar loans, and movements between the two can have significant effects (McCauley and Shu (2016)).

Putting surplus cash as wholesale deposits with local banks can in turn encourage the banks to increase lending. This is presumably why several researchers have found a strong positive correlation between the issuance of overseas debt and domestic bank credit (see, for example, Shin and Zhao (2013) and Caballero et al (2015). A recent comprehensive survey of the role of banks in the EMEs (BIS (2015b)) sheds some light on this issue. The median of the central banks' surveys suggests that corporate deposits contributed 31% of the debt liability growth of EME banks from 2009 to 2013 at a time when bank credit rose from 56% of GDP to 70% of GDP (Table 3). With loans rising faster than deposits, the loan-to-deposit percentage rose by about 20 percentage points within a decade. So the funding of banks has become more vulnerable to any withdrawal of wholesale deposits of non-financial companies.

Corporate deposits and banks in the EMEs — Table 3

	2004	**2009**	**2013**
Total credit[1] as % of GDP	41	56[2]	70
Bank credit as % of total credit	87	83[2]	81
Loans as % of deposits	78	90	99
Memorandum:	**2004–09**	**2009–13**	
Contributions to debt liability growth			
Corporate deposits	24	31	
Household deposits	21	31	

These estimates are the medians of a sample of 25 emerging markets. Lack of data means that the sample is smaller for some variables shown above.

[1] To non-financial private sector. Total credit is bank credit plus international debt securities (ie domestic debt securities are not included). [2] 2007 estimate.

Source: BIS (2015b).

The currency of denomination of the loan-to-deposit ratio also responds to interest rate and exchange rate expectations. Although comprehensive international data are not available, there are indications that US dollar loan-to-deposit ratios in Hong Kong rose sharply – a speculative response to very low dollar interest rates and a currency pegged to the dollar. A similar trend in China reversed sharply in recent months as the renminbi fell against the dollar.[25]

[25] The US dollar loan-to-deposit ratio rose from around 30% in 2010 to 90–100% by 2014 (HKMA (2015)).

(b) Leverage and profitability: company data

A recent report by a group of distinguished economists (Acharya et al (2015)) provides an acute analysis of the several ways strains on the balance sheets of non-financial companies can affect the banking system (and even increase sovereign risk premia). They argue that "the potential for firms to act as financial intermediaries and engage in speculative activity is greater in emerging economies than in advanced economies".[26]

BIS statistics show that international debt issuance by EME non-financial corporations have been dominated by US dollar denominated securities. Any in-depth analysis of the extent of the currency risk facing these EM corporations requires information about their earnings (foreign or domestic currency) and how far their foreign currency liabilities are hedged. Macroeconomic or aggregate data on these areas are generally not available in most jurisdictions.

Microeconomic or firm-level data may be more illuminating: those companies producing tradable goods or services are better placed to service foreign currency debt – they have a natural hedge. This section therefore examines the borrowing strategy of a sample of EME non-financial companies which produce tradable or non-tradable goods. Companies that have international bonds issued and traded in secondary markets form the sample used given our interest in possible stresses in bond markets. Largely drawing on the JPMorgan Chase Corporate Emerging Markets Bond Index (CEMBI), 281 such companies from 15 major EMEs are included.[27] These companies are mostly listed companies, whose income and balance sheet reporting is therefore subject to external requirements and thus more reliable. Nevertheless, some biases are inevitable as companies facing difficulties may overstate profits and underreport debt. Other studies based on much larger samples (eg an IMF study by Chow et al (2015) uses the Orbis database of 40,000 firms) reveal rather similar patterns of debt, profitability and interest coverage.

The firms used in our sample span across 11 sectors, of which six could be classified as "tradables" and the rest as "non-tradables".[28] Companies producing tradables, which generally receive some income streams in foreign currencies, are expected to be more resilient to large currency movements than companies producing non-tradables. To gauge to what extent these firms have become exposed to currency mismatch risk, this section examines first their borrowing pattern in international capital markets during the past few years and then their resilience to external shocks.

[26] Using the BIS's *Global Liquidity Indicators*, they note that the non-core liability ratio of EME banks has risen from a range of 16–20% during 2009–12 to around 24% currently.

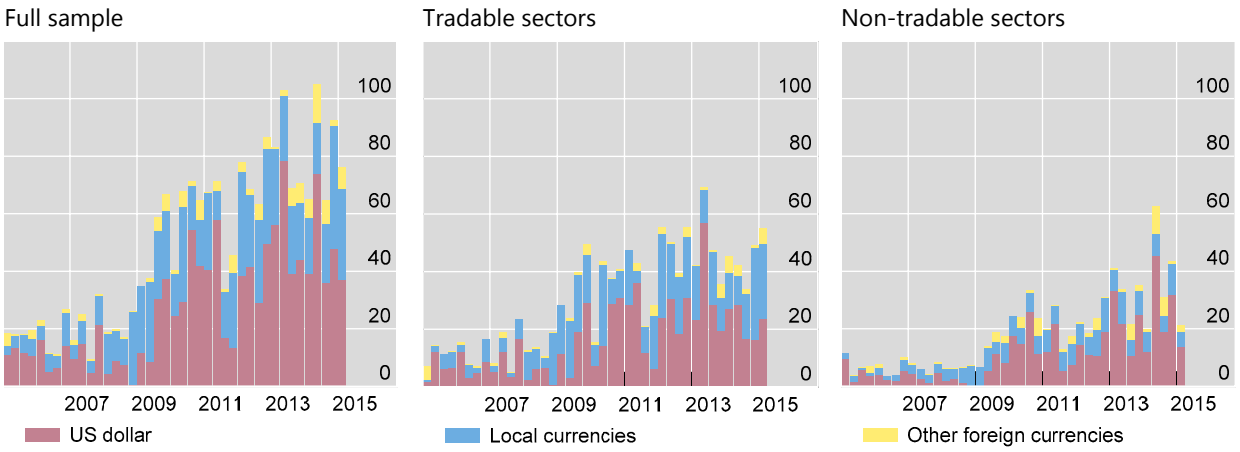
[27] Brazil (31), Chile (20), China (91), Colombia (7), India (14), Indonesia (10), Korea (13), Malaysia (5), Mexico (25), Peru (14), the Philippines (9), Russia (26), Thailand (4), Turkey (6) and South Africa (6). Figures in brackets are the number of companies in the sample.

[28] Tradables: Diversified/conglomerates (8), industrial (29), metals & mining (34), oil & energy (30), pulp & paper (8), and transport/airlines (6), Non-tradables: consumer (35), infrastructure (9), real estate (58), telecommunications (31) and utilities (6). Figures in brackets are the number of companies in the sample.

Gross debt issuance by EME non-financial corporations

In billions of US dollars

Graph 12



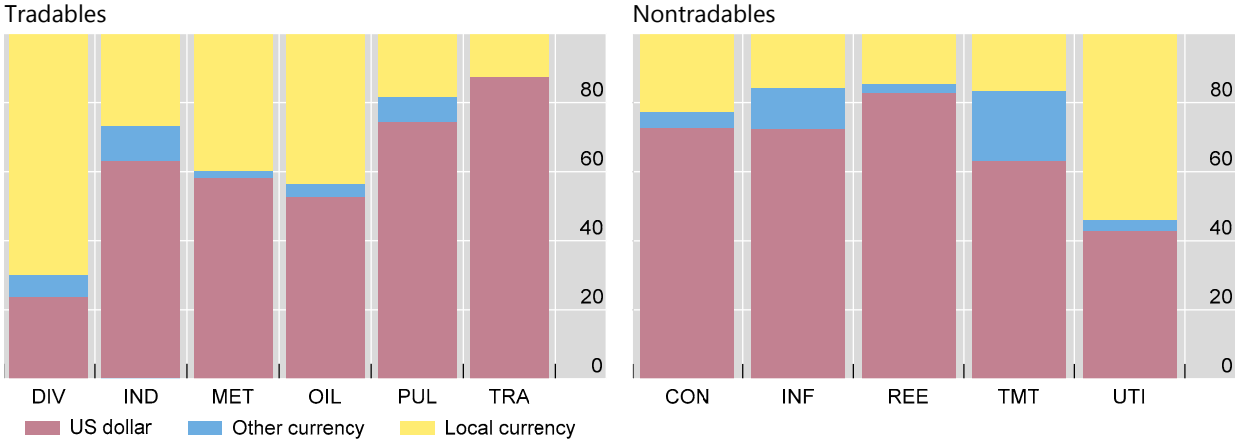
Source: Thomson Reuters Eikon.

The **debt issuance pattern** of both firms that produce tradables and firms that produce non-tradables resembles that of aggregate data: a sharp increase beginning in 2009, dominated by US dollar-denominated securities (Graph 12, left-hand panel). There is little difference between the two sets of firms except that – surprisingly – tradables firms borrowed more in local currency terms (Graph 12, centre and right-hand panels).

Currency shares of EME non-financial international bond issuance between 2006 and 2014

In percent

Graph 13



The sectors are as follows: **Div**ersified/conglomerates, **ind**ustrial, **met**als & mining, **oil** & energy, **pul**p & paper, and **tra**nsport/airlines, Non-tradables: **con**sumer, **inf**rastructure, real estate (**REE**), telecommunications (**TMT**) and **uti**lities.

Source: Thomson Reuters Eikon.

Across all the EMEs, with the exceptions of the diversified sector (typically holding companies that have businesses spreading across a variety of sectors) and utilities, all sectors have denominated more than half of their international bonds issued since

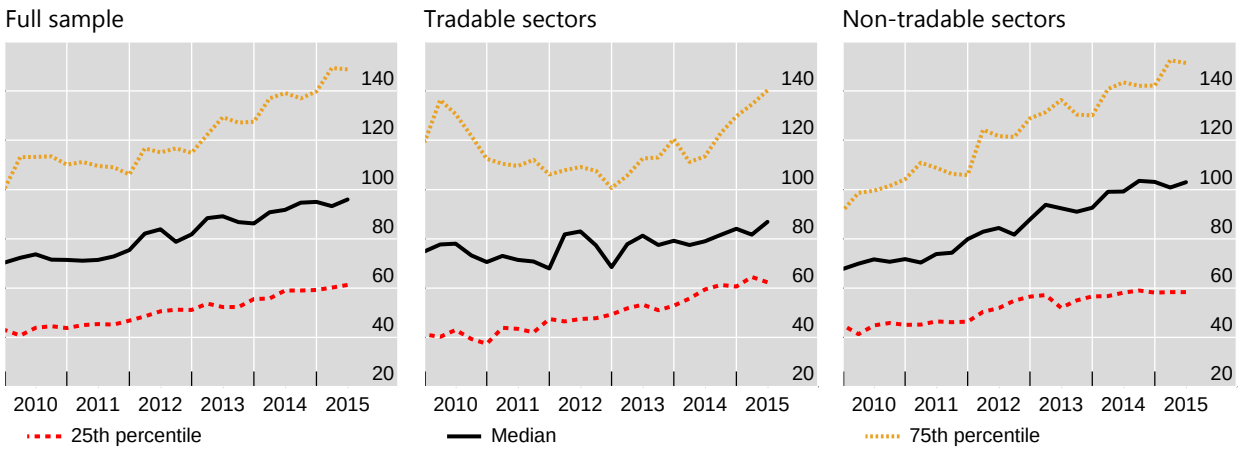
2006 in US dollars (Graph 13). The currency exposure patterns, however, do differ across countries. In some countries, firms that have a large proportion of debts falling due denominated in US dollars are mostly with expected foreign income (ie the tradable sectors). But in others the non-tradable sectors have also borrowed heavily in dollars. In addition, many EME companies that produce tradables have borrowed dollars to finance foreign acquisitions in non-dollar countries, also generating a currency mismatch.

In principle, increased dollar borrowing could be a rational response to easy financing conditions in dollar markets. If used prudently, EME firms could be able to boost profits while remaining resilient to currency shocks. Was this borrowing used prudently? To shed some light on this question, this section examines three balance-sheet indicators – debt-to-equity ratio (leverage), return on equity (profitability), earnings to interest expense (debt-servicing capacity) – to gauge whether this has been the case.

Leverage of EME non-financial companies – total debt to equity[1]

In per cent

Graph 14



[1] A sample of 280 companies which have issued international bonds. Tradables: Diversified (conglomerates), industrial, metals & mining, oil & energy, pulp & paper and transport (airlines); non-tradables: consumer, infrastructure, real estate, telecommunications and utilities.

Source: S&P Capital IQ.

Consider, first, the leverage of our sample of companies. The black line in the left-hand panel of Graph 14 shows that the median has risen from a debt equivalent of around 70% of equity at the beginning of 2010 to almost 100% by the end of 2015. It is worrying that the increase in leverage is most marked in the highly indebted segment – the 75th percentile shown in the yellow line of the graph. Note next that leverage of these companies which produce non-tradables has since 2010 increased more sharply than companies producing tradables. Companies producing non-tradables which have borrowed in foreign currencies are therefore less well placed to weather the simultaneous shocks of a large currency depreciation and higher financing costs than they were in 2010. As such companies will not have used financial instruments to fully hedge their leveraged positions, their currency mismatches have probably increased.

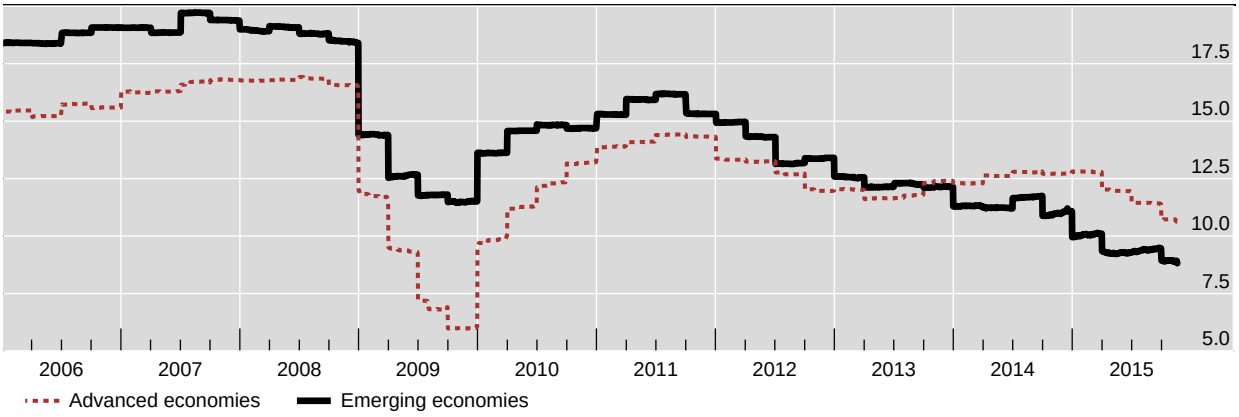
Next, consider trends in profitability. The striking fact is that EME companies in aggregate have become less profitable. Before 2013, EME companies were much more profitable than those in the advanced economies. No longer. Financial

statements of companies in the indices underlying Graph 15 suggest that average EME corporate profitability (as measured by return on equity) fell sharply in 2015, and is now lower than it has been in a decade.

Profitability of non-financial companies

In per cent

Graph 15



Note: Profitability is defined as the return-on-equity. The advanced economies index is the 2010 GDP-PPP weighted average of the euro area, Japan, the United Kingdom and the United States. The emerging economies index is provided by Datastream Worldscope.

Source: Datastream.

Table 4 summarises profitability developments of our sample of EME companies over the past 5 years. Their median profitability has fallen from 16.6% in 2010/11 to 7.3% in 2014/15. The return on equity in the lowest quartile has fallen from 11% to 0.7%. The slump has been particularly sharp in the tradables sector. Weak world trade growth and perhaps currency overvaluation seem to be plausible explanations for the drop during the 2010–12 period. Since 2014, the decline in commodity prices has been the major factor. The profitability of non-tradables companies has also fallen over the past few years, but less dramatically.

The profitability of non-financial companies in the EMEs

Table 4

		2010/11	2011/12	2012/13	2013/14	2014/15
Full sample	25th percentile	11.1	7.0	6.0	5.1	0.7
	Median	16.6	12.8	12.6	11.4	7.3
	75th percentile	26.2	19.9	18.9	17.4	13.9
Tradables	25th percentile	13.9	4.9	4.3	3.3	–5.4
	Median	19.2	11.9	8.9	8.5	2.9
	75th percentile	27.0	21.5	16.2	14.9	9.8
Nontradables	25th percentile	9.5	8.1	6.7	5.4	4.4
	Median	16.0	13.0	13.8	12.5	9.9
	75th percentile	24.8	19.7	20.9	18.7	16.5

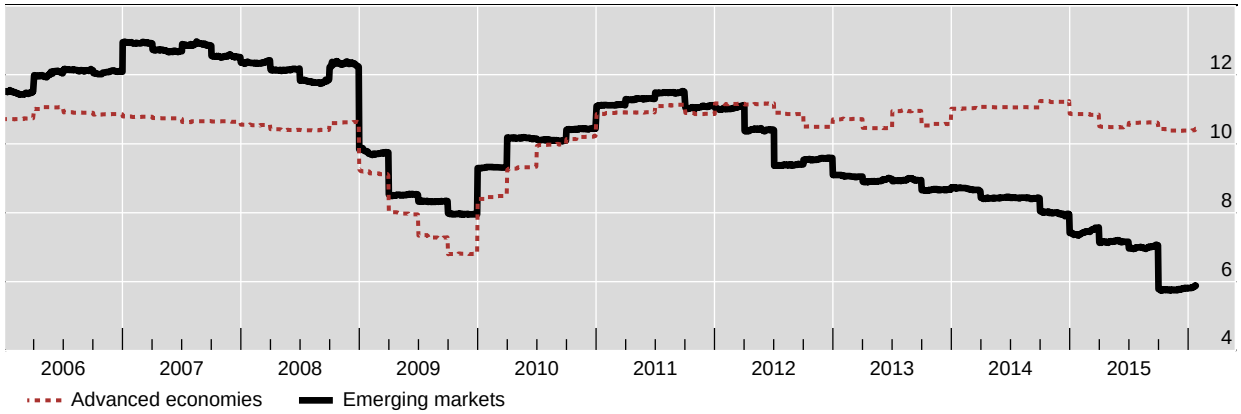
Source: A sample of 280 companies which have issued international bonds: S&P Capital IQ.

The third and final element is debt-servicing capacity. By 2015, the debt-servicing capacity of EME companies in aggregate had fallen well below the nadir reached

during the financial crisis (Graph 16). In advanced economies, the interest coverage ratio (ICR) of non-financial companies (that is, EBITDA divided by interest expenses) has exceeded ten in normal times. In the emerging economies, this ratio is now below six.

Interest coverage ratio (ICR): EBITDA/interest expenses of non-financial companies[1]

Graph 16



Note: The advanced economies is 2010 GDP-PPP weighted average of the euro area, Japan, the United Kingdom and the United States. The emerging economies is provided by Datastream Worldscope.

[1] Interest expenses represent the service charge for the use of capital before the reduction for interest capitalized.

Source: Datastream.

Table 5 shows that the decline in the debt-servicing capacity of EME companies applies to both tradable and non-tradable segments. Such a decline took place over a period of declining long-term interest rates in benchmark markets, and puts companies in a weak position if the interest rates they have to pay were to rise sharply. Note the large difference between the ICR of the weakest 25% of companies and that of the median. As Fuertes and Serena (2014) concluded, using a different data base, it is the "more highly leveraged companies that are hiding pockets of risk".

The interest coverage ratio of non-financial companies in the EMEs

Table 5

		2010/11	2011/12	2012/13	2013/14	2014/15
Full sample	25th percentile	5.3	5.0	4.2	4.5	3.7
	Median	9.3	8.8	7.9	7.1	6.0
	75th percentile	19.6	24.3	17.5	14.9	12.0
Tradables	25th percentile	5.1	4.2	4.0	4.1	3.0
	Median	8.7	6.8	6.5	6.1	5.4
	75th percentile	20.5	20.3	15.9	12.2	10.1
Nontradables	25th percentile	5.2	4.9	4.1	4.3	3.5
	Median	9.0	10.0	8.5	7.5	6.5
	75th percentile	19.2	26.2	19.1	17.2	12.8

Source: S&P Capital IQ.

There is of course no "magic" interest coverage ratio indicating near-term default risk. It is however, useful that several central banks have conducted stress tests of

corporate balance sheets. A recent report by the Monetary Authority of Singapore, for example, identifies "firms at risk" as those with an ICR of less than two (MAS (2015)). Under a stress scenario of a 25% increase in interest costs and a 25% decline in EBITDA, they found that the percentage of firms at risk would increase from 23% to 32% of all listed companies.[29]

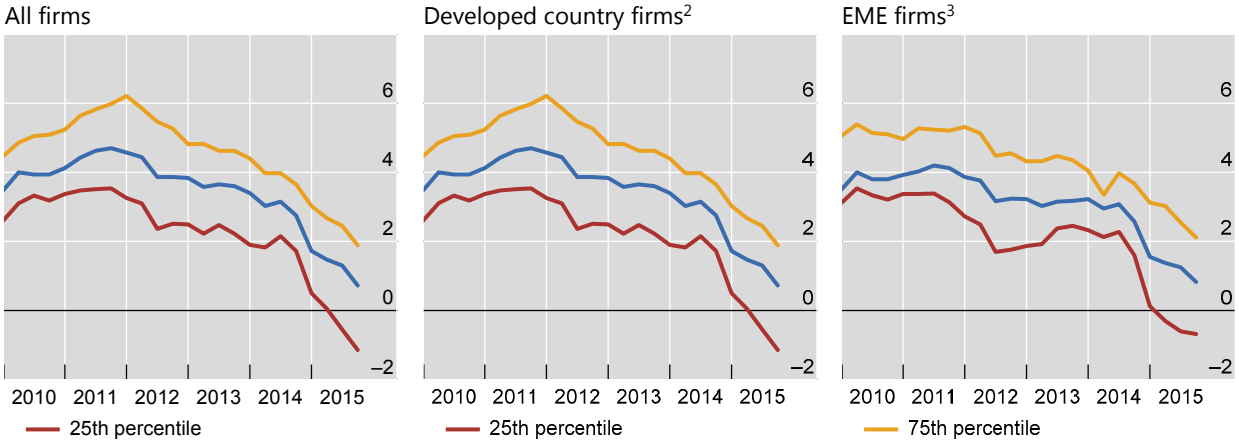
Downward pressure on profitability of large oil companies

The oil companies exemplify the high sensitivity of tradable firms' profitability to external economic conditions. The combination of a strong rise in production of shale oil in some developed countries since 2010 and the more recent slowdown in EMEs has contributed to a supply-demand imbalance in global oil consumption. As a result, oil prices fell significantly. Declining oil prices, in turn, weigh on these firms' profitability. Graph 17 shows that large oil companies headquartered in both developed and emerging economies have witnessed a similar decline in return on equity in recent years.

The case of EME oil companies is also interesting in that most of them are owned by the government. Against the background of falling income and rising interest rates, some of these companies may find it difficult to rollover their external debts. Debt maturity profiles suggest that rollover needs remain modest in this year. But if subdued oil prices and global economic conditions were to persist, these companies may face stronger financial pressure from 2017 onwards.

Return on equity of large oil producers[1]

In percent — Graph 17



[1] Sample drawn from the top 25 oil producers by average daily production in 2012, subject to data availability; 4-quarter moving average. [2] Includes: ExxonMobil (5.3), BP (4.1), Royal Dutch Shell (3.9), Chevron (3.5), Total SA (2.7), Eni (2.2), Statoil (2.1), ConocoPhillips (2.0); figures in brackets are average daily production, in million barrels. [3] Includes: Gazprom (9.7), PetroChina (4.4), Petrobras (2.6), Rosneft (2.6), Lukoil (2.2), Sinopec (1.6), Petronas (1.4).

Sources: Thomson Reuters Eikon; Forbes.

This preliminary, and inevitably tentative, review suggests the need to look more closely at microeconomic data in assessing the risks from dollar exposures. EME non-financial corporations have increased their US dollar borrowing considerably over the past few years. Many of these firms have expected US dollar income and thus considered to have a natural hedge to currency risks. But many others are exposed to the risk. Among these firms, real estate companies appear to be those particularly

[29] But they noted that firms' cash reserves provide a significant buffer: taking account of this, 9% of firms would still be in the firms-at-risk category.

exposed as company reports suggest that many of these firms are not hedging the currency risk at all.

7. Conclusion

As a result of major reforms, aggregate currency mismatches in EME economies were much reduced in the decade before 2010. The lower sovereign credit spreads in international bond markets that resulted made it easier for EME companies to borrow abroad. Although they have increased since 2010, aggregate currency mismatches remain modest in most EMEs. But this is almost entirely due to the stronger foreign exchange position of the official sector – higher forex reserves and less foreign currency-denominated government debt. The measures reported in this paper show that currency mismatches of the non-official sector are larger and show a bigger rise than the aggregate.

Of particular concern is the remarkable growth in EME corporate borrowing in global dollar bond markets as a very long period of low long-term interest rates has allowed EME companies much cheaper financing than they had before the mid-2000s. Many firms have widened the global reach of their operations. Their expansion, fuelled by an extraordinary rise in their total debt, has been accompanied by a large and broad-based decline in profitability. EME companies in aggregate are now much less profitable than companies in the advanced economies. On average, the interest coverage ratio has fallen significantly even though nominal interest rates in global markets have declined.

The EME corporate sector as a whole thus faces increased currency mismatches with weaker balance sheets. Many companies face much-increased dollar exposures. The sharp appreciation of the dollar against other major reserve currencies (notably the euro and the yen) has put EME firms under some pressure. Microeconomic data from about 280 companies show that such borrowing has not been closely matched with the currency of their earnings. Firms producing non-tradable goods and services have borrowed in dollars. The combination of increased leverage with much lower profitability suggests that the EME corporate sector has become more vulnerable to currency and interest rate shocks as well as to earnings shocks. Large currency depreciations and increased financing costs would be expected to hurt those firms producing non-tradables but with large dollar debts. Because debt is so high, the feedback loops between financial conditions and the real economy could be strong. There could be a significant impact on local banks. Even so, the external asset positions of most emerging market countries (far stronger than in the 1990s) should help the authorities in these countries manage periods of turbulence.

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Statistical annex

Modified foreign currency share of total debt outstanding, non-government sectors[1]

In percentages — Table A1

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Latin America[2]	22.4	21.9	22.7	19.0	20.1	21.4	21.0	21.9	22.9
Argentina	29.5	34.0	33.1	30.2	31.3	30.3	22.3	20.2	19.5
Brazil	19.6	18.6	18.4	15.1	16.3	17.1	17.2	18.2	18.7
Chile	26.6	22.3	26.1	23.6	23.3	25.9	24.6	26.0	28.2
Colombia	16.4	18.4	18.3	15.0	18.5	20.9	20.8	23.9	26.2
Mexico	21.9	23.9	28.0	23.6	24.6	28.6	27.7	28.5	32.5
Peru	64.9	60.3	60.1	58.7	60.9	61.0	60.0	60.7	62.9
Venezuela	24.2	24.1	19.2	19.8	32.1	26.0	18.1	15.0	10.5
Asia, larger economies[2]	9.5	10.2	9.4	9.0	9.2	9.4	8.8	9.2	8.4
China	6.7	7.1	5.8	6.3	6.8	7.2	7.2	7.7	7.0
Chinese Taipei	11.3	11.7	10.1	8.9	11.6	12.8	11.0	15.4	17.1
India	13.6	16.1	19.1	16.4	16.3	18.2	16.3	15.8	13.5
Korea	13.5	14.9	17.4	15.8	14.9	15.3	13.2	12.9	13.1
Other Asia[2]	17.2	16.7	15.4	14.1	14.2	15.0	14.8	17.2	17.2
Indonesia	32.7	34.0	32.9	26.1	27.8	29.6	29.3	33.3	33.8
Malaysia	14.3	14.0	12.8	12.3	11.0	12.1	11.1	13.8	14.4
Philippines	40.4	36.8	34.5	33.3	35.3	34.2	32.1	32.4	28.7
Thailand	8.0	6.6	5.5	5.5	5.9	5.4	6.6	8.2	7.2
Central Europe[2]	36.3	36.8	43.4	41.1	39.6	38.3	34.6	33.1	33.9
Czech Republic	22.7	22.5	21.8	19.9	20.8	20.9	20.4	23.0	24.8
Hungary	59.0	64.6	70.7	67.2	64.5	62.5	56.9	51.8	61.2
Poland	31.2	30.0	39.2	37.7	37.4	37.4	33.8	31.9	31.3
Russia	38.6	37.6	38.5	34.1	31.3	29.0	25.2	26.7	34.3
Israel	29.5	25.0	25.2	22.3	19.9	21.8	19.8	13.4	14.6
Turkey	42.4	37.3	41.4	38.0	36.9	40.2	37.2	41.0	42.6
South Africa	15.7	15.2	14.3	12.4	11.4	14.8	14.1	15.3	17.0

[1] Outstanding positions of year-end; debt defined as cross-border liabilities (excluding debt securities) to BIS reporting banks plus domestic bank credit to the private sector plus domestic debt securities outstanding of non-government sectors plus international debt securities outstanding of non-central bank and non-government sectors. Where no data are available, the stock of domestic loans denominated in foreign currency and the stock of domestic debt securities denominated in foreign currency are assumed to be zero. [2] Calculated with aggregates of the economies shown.

Sources: Rennhack and Nozaki (2006); ECB; IMF; CEIC; BIS; BIS/CGFS Working Group on Financial stability and local currency bond markets, Questionnaire; national data; BIS calculations.

Net foreign currency assets of non-government as a percentage of exports[1]

In percentages — Table A2

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Latin America[2]	–9.7	–14.0	–13.4	–18.3	–24.3	–28.0	–32.1	–33.5	–39.7
Argentina	9.0	4.3	7.6	17.0	10.0	3.7	7.7	9.3	9.7
Brazil	–34.2	–43.3	–37.0	–45.6	–54.4	–60.2	–72.2	–64.1	–74.6
Chile	–21.6	–20.6	–34.6	–51.8	–44.8	–43.8	–47.1	–48.5	–58.7
Colombia	16.1	4.0	0.8	4.9	–5.0	–11.2	–13.7	–19.7	–30.9
Mexico	–10.4	–10.3	–9.7	–15.1	–18.0	–18.9	–21.3	–27.4	–30.3
Peru	0.6	–11.4	–19.4	–19.2	–29.5	–29.7	–44.0	–53.6	–73.4
Venezuela	33.9	29.7	26.1	36.0	27.0	11.8	12.1	9.8	16.9
Asia, larger economies[2]	7.3	7.2	7.2	5.4	3.3	4.0	4.6	0.4	0.9
China	20.6	16.4	18.2	14.6	10.7	11.9	12.0	3.0	2.3
Chinese Taipei	14.1	17.9	25.3	37.1	23.9	21.1	25.1	31.4	36.7
India	–11.9	–15.3	–16.5	–18.4	–18.2	–16.1	–19.1	–19.5	–18.6
Korea	–25.1	–15.3	–23.4	–26.1	–19.2	–16.9	–14.3	–11.0	–9.6
Other Asia[2]	–5.0	–3.0	–6.1	–6.7	–7.5	–8.5	–12.3	–16.6	–16.2
Indonesia	–9.9	–12.6	–7.9	–4.9	–8.7	–14.5	–23.1	–31.3	–41.1
Malaysia	–13.0	–8.0	–12.7	–14.5	–8.0	–7.9	–5.1	–10.8	–8.7
Philippines	–3.0	–0.7	–2.9	–1.4	–11.5	–15.8	–23.5	–25.5	–16.3
Thailand	7.4	8.7	1.6	–1.6	–4.9	–1.7	–6.7	–7.9	–4.0
Central Europe[2]	–5.7	–12.5	–22.2	–30.9	–26.5	–21.6	–20.6	–20.3	–16.1
Czech Republic	7.6	5.8	0.1	–1.4	–3.6	–4.8	–2.4	–6.3	–5.7
Hungary	–25.7	–30.7	–40.1	–48.9	–34.4	–26.3	–26.3	–22.6	–16.9
Poland	–2.9	–14.4	–27.6	–42.0	–38.5	–31.2	–30.6	–28.6	–22.7
Russia	–23.8	–37.2	–16.0	–8.1	–5.5	–1.3	–2.1	–5.7	1.5
Israel	27.0	30.6	9.8	3.5	–3.3	–11.5	–8.8	–0.6	1.8
Turkey	–33.5	–41.8	–37.7	–46.1	–64.4	–60.5	–67.9	–86.9	–91.4
South Africa	20.2	10.4	8.0	9.9	8.2	7.1	3.0	7.0	0.7

[1] Net foreign assets of depository corporations (excluding central bank) plus non-bank foreign currency cross-border assets with BIS reporting banks less non-bank foreign currency cross-border liabilities (excluding debt securities) to BIS reporting banks less international debt securities outstanding of non-bank and non-government sectors in foreign currency; outstanding positions of year-end. For exports, national accounts definition except China (BoP) and Venezuela. [2] Calculated with aggregates of the economies shown.

Sources: Datastream; IMF; BIS; national data; BIS calculations.

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