

The transmission of unconventional monetary policy to the emerging markets

An overview¹

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Highly accommodative monetary policies in the major advanced economies and the questions about the exit from such policies have created major challenges for policymakers in emerging market economies (EMEs). Quite a few of EMEs that experienced rapid capital inflows and strong currency appreciation pressures during 2010-12 saw a sharp reversal in episodes of market volatility from May 2013 to February 2014.

This meeting of Deputy Governors focussed on three main questions: (i) How can external monetary conditions become a source of risks to monetary and financial stability in EMEs? (ii) How should central banks respond to such shocks? (iii) And, can there be a greater international role for emerging market currencies? A key conclusion from the discussion is that asset prices and interest rates have become more correlated globally during the period of unprecedented monetary easing by advanced economies. One major worry was the risk of an abrupt reversal of capital inflows to EMEs. Central banks face difficult policy dilemmas in preserving financial stability while pursuing their monetary policy goals. It is hard for EME monetary authorities to counter a prolonged period of very low long-term interest rates and increased risk-taking in global financial markets.

Keywords: Monetary policy, international spillover, emerging market economies, capital flows, exchange rate, long term interest rates.

JEL classification: E52, F31, F42, G12, G15

¹ This overview draws on the response of central banks to a BIS survey questionnaire conducted for this meeting as well as their notes and many valuable suggestions and feedback. I am thankful to Claudio Borio, Blaise Gadanecz, Guonan Ma, Ken Miyajima, Előd Takáts, Philip Turner, Agustin Villar and Abraham Vela for comments and contributions.

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Highly accommodative monetary policies in the major advanced economies and questions about the exit from such policies have created major challenges for policymakers in emerging market economies (EMEs). Quite a few of EMEs that experienced rapid capital inflows and strong currency appreciation pressures during 2010–12 saw sharp reversals in a new phase of market volatility that started in May 2013.

This topic was discussed by the Deputy Governors from major EMEs when they convened in Basel on 6–7 March 2014. The meeting focussed on three major issues:

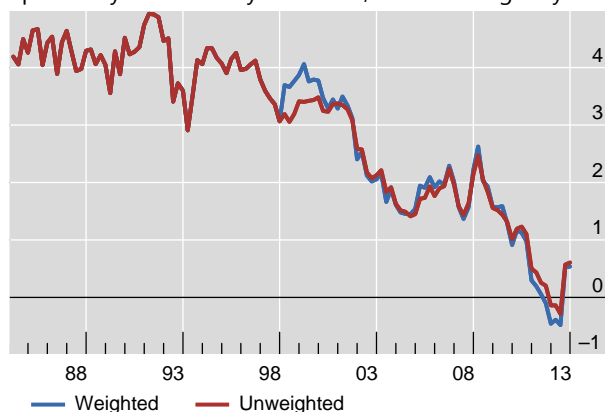
- First, how do external monetary conditions influence the economy? Could they become a source of risk for monetary and financial stability in EMEs?³
- Second, how should central banks respond to such shocks?
- Third, can there be a greater international role for emerging market currencies? Foreign investors' holdings of EME equities and bonds have risen rapidly over the past decade.

World real long term interest rates

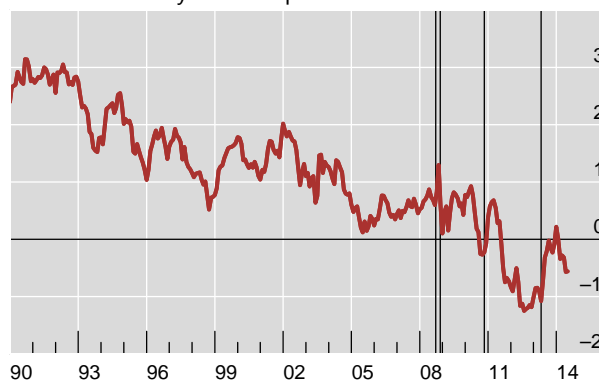
In per cent

Graph 1

Spot real yields on 10-year bonds, G7 excluding Italy¹



Nominal US 10-year term premium²



Vertical lines indicate the Lehman Brothers failure on 15 September 2008, Federal Reserve announcements of quantitative easing on 25 November 2008 and 3 November 2010 and the FOMC hint on tapering on 1 May 2013.

¹ Quarterly data calculated by M King and D Low in “Measuring the “World” Real Interest Rate”, *NBER Working Paper*, no 19887. ² Sum of inflation and real yield risk premia. These are calculated using the BIS term structure model ((see Hordahl and Tristani (2012)).

Sources: BIS calculations and King and Low (2013).

Current monetary policy dilemmas have been accentuated by developments in global long-term interest rates. After trending down for much of the past two decades, the world real long-term interest rates became negative in 2013 in a development associated with sharp declines in the US term premium (Graph 1). The decline in the US term premium in the early 2000s promoted a debate on how various policies influence the long-term rate *given expectations of future short-term rates*. The discussion was much dominated by the reverse spillover effects created

³ For recent reviews on international financial spillovers, see Gagnon et al (2011), Caruana (2012), Chen et al (2012), IMF (2013a, 2013b), and He and McCauley (2013).

on US Treasury yields when EMEs accumulate large holdings of dollar bonds, as part of their strategies for intervening in the foreign exchange market. Since 2009, however, the US term premium has come to be influenced considerably by the Federal Reserve's bond purchase programmes. Questions therefore arise as to whether greater exchange rate flexibility would by itself be enough to insulate domestic monetary conditions from international pressures. It is hard for EME monetary authorities to counter very low long term interest rates in global markets and increased risk-taking encouraged by G3 monetary policy.⁴

One main conclusion emerging from the discussion is that interest rates and asset prices have become increasingly correlated globally during the period of unprecedented monetary easing by the major advanced economies. Both the short- and long-term interest rates of EMEs have been heavily influenced by those in the advanced economies, particularly the United States. EMEs can let their currencies adjust to discourage speculative capital inflows, but this is unlikely to deter investors from risk-taking. There was a concern that many foreign investors preferred to take unhedged foreign exchange exposures when investing in EM local currency bonds. If sentiment changes the exchange rate and the bond market are apt to fall suddenly and simultaneously. At the same time, EME non-financial corporations have sharply increased their foreign currency borrowing in the international bond markets, magnifying financial stability risks in some countries.

The discussion on policy responses highlighted the dilemmas that EME central banks face in preserving financial stability while pursuing their monetary policy goals. One view was that a credible floating exchange rate regime is required if inflation expectations are to be squarely anchored. Another view emphasised the limits to exchange rate and interest rate flexibility in the face of swings in capital flows. From this viewpoint, central banks need several instruments to reduce the risk of monetary and financial instability.

Some participants argued in favour of intervening to restrict excessive exchange rate volatility. There was also some support for efforts to manage long-term interest rates. Some argued that central banks may be required to act as market-maker of last resort in times of extreme stress in debt and foreign exchange markets. But such intervention would also expose central banks to new risks, which could adversely affect their credibility when seeking to control inflation. There was a general view that macroprudential instruments are useful in addressing financial stability risks arising from international spillovers. But they are unlikely to replace interest rate policy as the principal tool for managing aggregate demand.

Finally, the Deputy Governors agreed that greater foreign holdings of EME local currency assets are a positive development in that they enhance the international status of EME currencies and reduce currency mismatches. Yet the recent trend needs to be viewed with caution. If much of the increase in foreign holdings of EME local currency debt and equity has been driven by low interest rates in the advanced economies, EMEs may face sudden reversals once expectations of higher interest rates take root.

Given the growing weight of EMEs in global output and trade and the increased depth of their financial markets, a number of EM currencies may become more

⁴ See Bruno and Shin (2012), Rajan (2014), Rey (2013) and Turner (2014a).

actively traded in the global markets in the future. But only a few (eg the renminbi) have the potential to become major international currencies. Not only do network effects play a strong role in the international status of a currency, as in the case of the US dollar, but foreign investors must also be able and willing to lend and borrow in that currency. The volatility of returns from EME local currency portfolios is potentially lower when foreign investors are allowed to borrow in these currencies. In many EMEs (particularly China) restrictions that deter non-residents from borrowing in the domestic currency continue to hinder an international role for these currencies.

The rest of this overview attempts to provide a brief summary of the main points, drawing on the recent facts, central banks' response to a BIS survey questionnaire, the notes prepared for the meeting as well as the discussions at the meeting. The summary is organised along the three main themes identified in the agenda: (i) the channels of international monetary spillovers; (ii) policy responses to such spillovers; and (iii) the internationalisation of emerging market currencies.

1. Channels of international spillovers

The monetary policy of the advanced economies can affect EMEs through several channels, including capital flows, asset prices and the interest rate-setting behaviour of the central bank more broadly. The BIS background paper by Takáts and Vela ("International monetary policy transmission") distinguishes five stylised spillover effects, although these naturally interact closely: (i) the exchange rate; (ii) the policy rate; (iii) long-term interest rates; (iv) international bank lending; and (v) portfolio flows.⁵

In open economies, the most obvious channel of transmission for external monetary conditions is the **exchange rate**. When the exchange rate floats, all else equal, a fall in the foreign interest rate leads to an appreciation of the domestic currency. Asset purchases by major central banks, which drive down interest rates along the yield curve, have a similar effect.

The role of the exchange rate depends, of course, on how flexible it is in practice. Takáts and Vela show that, although the real exchange rates of most EMEs have appreciated over the past decade, such appreciations have been small and have tended to reverse in the absence of significant changes in interest rate differentials.

Nominal exchange rate developments – the main source of changes in their real counterpart – have naturally behaved in a similar way. To focus attention on recent years, Table 1 shows changes in the nominal effective exchange rates in major EMEs following the May 2013 Fed tapering announcement that it would at some point reduce its asset purchases. This announcement was accompanied by strong indications for the Federal Reserve that policy rates would be kept very low. Even before the tapering news, the exchange rates of several EMEs actually depreciated during 2010-April 2013. Nominal appreciations were relatively modest during capital inflow episodes. Exchange rate volatility was high (relative to that of

⁵ See Caruana (2012) for a similar classification and framework for considering spillovers.

advanced economies) in both periods and has increased in some cases since May 2013.

Nominal effective exchange rate of emerging markets

Table 1

	January 2010–April 2013		May 2013–August 2014 ¹	
	% change	Standard deviation ²	% change	Standard deviation ²
China	13.0	1.00	0.3	1.01
India	-15.1	1.66	-9.8	2.26
Indonesia	-7.1	0.92	-15.8	2.74
Korea	0.8	1.56	9.1	1.36
Other emerging Asia ³	10.6	0.95	-3.4	1.06
Brazil	-7.3	2.24	-5.6	2.86
Mexico	5.0	2.14	-6.5	1.54
Chile	7.6	1.83	-14.4	1.52
Other Latin America ⁴	-11.0	3.02	-8.4	1.60
Poland	-5.3	2.09	1.7	0.90
Hungary	-13.2	2.32	-5.4	1.27
Czech Republic	-2.6	1.56	-5.1	1.41
Turkey	-14.3	1.96	-15.6	2.42
South Africa	-16.3	2.36	-12.9	2.33
<i>Euro area</i>	-7.8	1.5	4.1	0.8
<i>United States</i>	-0.5	1.2	2.1	0.6

¹ As of 7 August 2014. ² Standard deviation over the specified period based on percentage change in monthly average exchange rate. ³ Simple average of Malaysia, Philippines, Singapore and Thailand. ⁴ Simple average of Argentina, Colombia, Peru and Venezuela.

Source: BIS calculations.

A second effect operates through the **policy interest rate**: EME central banks may directly respond to actual or imminent changes in advanced economy policy rates by changing their own policy rates. Taylor (2013) argues that EMEs may follow advanced economies in lowering rates because currency appreciation has an immediate negative effect on output, while the favourable trade effect from higher growth in advanced economies comes with a lag. Other considerations may also play a role. These include avoiding long-term damage to trade competitiveness from sustained currency appreciation, preventing perceived “overshooting” of the exchange rate, and reducing the incentive for firms to take on dollar debt during periods of low global interest rates.

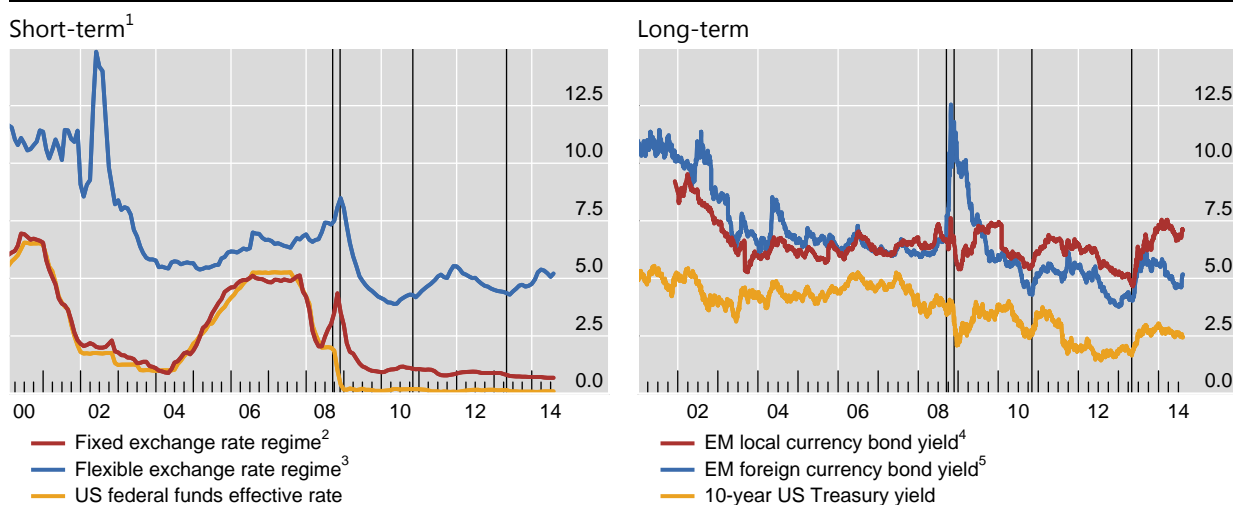
Graph 2 illustrates this point. The left-hand panel shows that average policy rates in economies with fixed exchange rates have moved very closely with the federal funds rate, as one would expect. But notwithstanding their different monetary regimes, this tendency is also apparent in economies with a flexible exchange rate, particularly following the 2008 crisis. It was only in May 2013 that policy rates in this group of countries started to diverge from the federal funds rate, as many EME central banks tightened monetary policy in the wake of a sharp rise in market volatility.

Of course, part of this co-movement may reflect the high degree of convergence in business cycles across economies. But many recent studies find that short-term policy rates in EMEs have been lower than those suggested by standard benchmarks such as the Taylor rule⁶. They have also been lower than output growth over a longer horizon. This tendency is confirmed in the BIS background paper by Takáts and Vela, who find that the US policy rate has been a statistically significant determinant of the policy rate in most, if not all, EMEs over the past decade.

Interest rates

In per cent

Graph 2



Vertical lines indicate bankruptcy of Lehman Brothers on 15 September 2008, Federal Reserve announcements of quantitative easing on 25 November 2008 and 3 November 2010 and FOMC hint on tapering on 1 May 2013.

¹ Three-month Treasury bill yield for Algeria, three-month interbank rates otherwise. ² Simple average of Hong Kong SAR, Saudi Arabia and the United Arab Emirates. ³ Simple average of Algeria, Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Thailand and Turkey. ⁴ JPMorgan Government Bond Index – Emerging Markets (GBI-EM), 7–10 years. ⁵ JPMorgan Emerging Market Bond Index (EMBI), 7–10 years.

Sources: Bloomberg; Datastream; JPMorgan; national data.

A third spillover effect works through **long-term interest rates**. The US long-term rate affects both the global benchmark yield and risk appetite, which together determine the pricing of bonds issued by EMEs in local and international markets. Thus, given the growing presence of foreign investors in the EME local currency bond markets, the monetary policy of the advanced economies is likely to have a larger effect on EME yield curves than it did in the early 2000s.

The right-hand panel of Graph 2 shows a significant positive correlation between US and EME long-term yields. Between mid-June 2009 and end-April 2013, while the US 10-year Treasury yield fell by about 206 basis points, EM local currency bond yields declined by 236 basis points. The decline in the yield was more rapid for EME foreign currency bonds (341 basis points). However, between end-April 2013 and end-January 2014 while the US long-term yield rose by about 97 basis points, the yields of EME local currency bonds jumped by 268 basis points, exacerbating

⁶ See, for example, Hofmann and Bogdanova (2012).

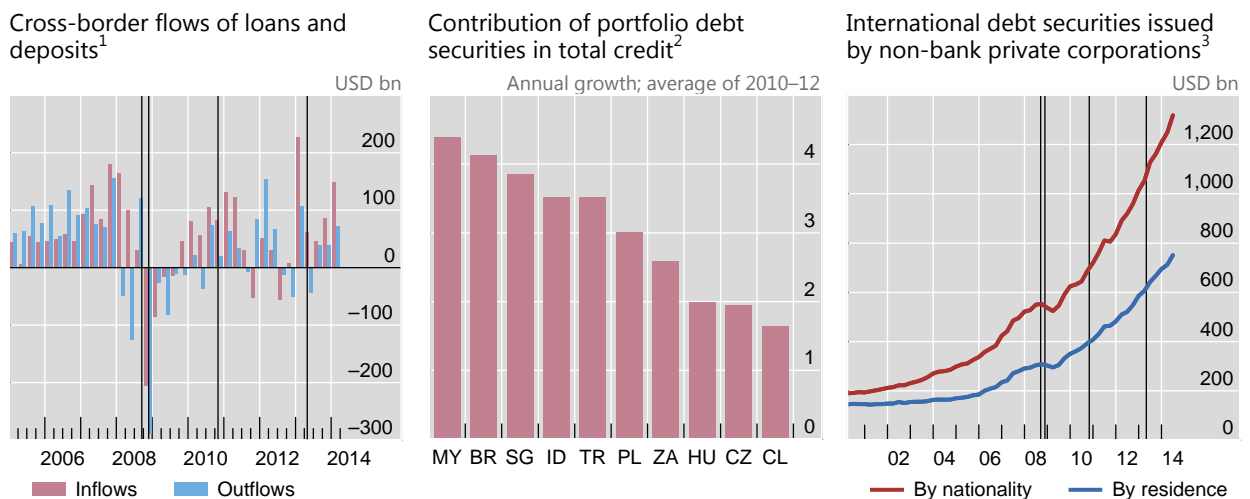
the tightening of financing conditions induced by the Federal Reserve’s tapering announcement. By comparison, the rise in the EME foreign currency yields has been modest (172 basis points). The yields on both types of bonds have since stabilised at a higher level.

The fourth and fifth spillover effects work through **cross-border bank lending** and portfolio flows (or **market risk-taking**), which can be grouped under a single “capital flows” effect. As the left-hand panel of Graph 3 shows, cross-border bank lending played a major role during 2000–07, accounting for a large part of gross capital flows to and from EMEs. Subsequently, with international banks cutting down their assets following the 2008 crisis, cross-border bank lending has not only become very volatile but has also lost substantial ground to other capital flows. In many cases, its role has been taken over by portfolio flows.

Indeed, the value of aggregate cross-border bond and equity investment in EMEs increased from \$3.29 trillion at the end of 2007 to \$4.46 trillion at the end of 2012, according to the IMF’s Coordinated Portfolio Investment Survey. The increase of more than \$1.17 trillion reflected both large gross capital inflows and a substantial appreciation of the value of the existing stock of assets. About 85% of the increase was in the form of debt (or \$994 billion), with a much smaller part (\$170 billion) in equity. These numbers suggest that cross-border debt investment has been a significant driver of credit growth in many EMEs. For instance, non-resident debt investment contributed 2–5% of the growth in total credit (private and public sector) in a number of EMEs during 2010–12 (Graph 3, centre panel).

Cross border flows, portfolio investment and debt securities of EMEs

Graph 3



Vertical lines indicate bankruptcy of Lehman Brothers on 15 September 2008, Federal Reserve announcements of quantitative easing on 25 November 2008 and 3 November 2010 and FOMC hint on tapering on 1 May 2013.

¹ Inflows (outflows) of developing countries are represented by estimated exchange rate-adjusted changes in assets (liabilities) of loans and deposits of all BIS reporting banks vis-à-vis developing countries. ² Portfolio debt securities are non-resident investment in debt securities taken from derived liabilities of IMF CPIS. Total credit is sum of total credit to private non-financial sector and total debt securities issued by the general government. ³ Amount outstanding of international debt securities issued by non-bank private corporations in all maturities. Aggregate of Algeria, Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, the United Arab Emirates and Venezuela.

Sources: IMF, *Coordinated Portfolio Investment Survey*; BIS debt securities statistics; BIS locational banking statistics by residence; national data.

A key development over the past five years is the massive expansion of debt issuance by EME corporations in the international markets. The outstanding international debt of EME corporations based on the residency of the borrower (consistent with the BOP classification) has tripled since 2009, to about \$750 billion by the second quarter of 2014 (blue line in Graph 2, right-hand panel). Even so, this number actually understates issuance of international bonds by these firms, as a large part of such fund-raising was undertaken through offshore affiliates. This is captured by the red line in the right-hand panel of Graph 3, which shows debt issuance by the borrower's nationality. On this measure, the outstanding international debt securities of EME corporations more than doubled between 2009 and the second quarter of 2014, to \$1.32 trillion.⁷

Recent shifts in the size and composition of capital flows may have changed international spillovers in ways that increase the EMEs' vulnerabilities. First, such borrowing may be highly procyclical, driven by the behaviour of a few large asset management firms that are major investors in EME bonds. To the extent that these firms adopt similar investment strategies ("herding"), they may serve to amplify asset price dynamics. Second, it is true that the increase in foreign investors' holdings of EME local currency bonds has helped to develop domestic bond markets and reduce some of the traditional vulnerability of EMEs. It has also exposed these investors to the exchange rate risk. At times of stress, sharp exchange rate depreciations may result in further selling pressure on EME markets.

Central bank views about the relative importance of different spillover effects

Table 2 summarises the responses of central banks to a BIS questionnaire on the main international monetary spillover effects. There is a significant convergence of views among central banks. According to the majority view, advanced economy monetary policy is transmitted to EMEs mainly through the policy rate, long-term interest rate, the exchange rate and portfolio flows, representing induced risk-taking. In fixed exchange rate regimes, the policy rate is obviously the most important factor. By contrast, most countries with a flexible exchange rate consider the exchange rate to be the main mechanism. In addition, a number of central banks suggest that the monetary policy of the advanced economies can affect commodity prices, international credit conditions and inflation expectations.

There is also some evidence that the relative importance has changed since the 2008 crisis. This is most evident in central banks' opinions about portfolio flows, with 87% of respondents (20 out of 23) viewing this as an important spillover variable following the May 2013 Fed tapering announcement. This compares with responses of 83% during 2009–12 and about 70% before the 2008 crisis. Likewise, the share of central banks that consider the monetary policy of the advanced economies as having an influence on their domestic long-term interest rate is now higher than before the 2008 crisis.

⁷ For a detailed analysis, see Turner (2014a).

Main international monetary spillover transmission

Number of central banks considering them relevant for their economy (total 23)

Table 2

Transmission	Pre-2008 crisis		Post-2008 crisis		Post-Fed tapering announcement in May 2013	
	Fixed ¹	Flexible ²	Fixed ¹	Flexible ²	Fixed ¹	Flexible ²
Policy rate	3	13	3	12	2	12
Long-term interest rate (bond yield)	2	11	2	15	2	15
Exchange rate	1	17	1	19	1	18
International bank lending (credit)	2	9	2	9	2	9
Portfolio flows ³	2	14	2	17	2	18
Other ⁴	0	5	0	6	0	6

¹ Economies under fixed exchange rate regime: Hong Kong SAR, Saudi Arabia and United Arab Emirates. ² Economies under flexible exchange rate regimes. ³ Changes in the advanced economy monetary policy stance affect investors risk appetite and thereby their demand for emerging market assets. ⁴ Argentina, Colombia and Peru suggested the commodity price channel; Argentina also suggested the GDP growth of major trading partners; Mexico suggested international credit conditions; Philippines suggested inflation expectations.

Source: BIS questionnaire, September 2013.

A number of factors seem to condition the relative influence of these spillovers. The first is the degree of exchange rate flexibility. In Hong Kong SAR, given the currency board arrangement, short-term interest rates have historically been highly synchronised with the federal funds rate. As pointed out by the paper from the Hong Kong Monetary Authority in this volume, such synchronisation ensures the stability of the currency board regime. This is also true to some degree in Singapore, where the exchange rate serves as an intermediate target for monetary policy. As a result, three-month Singapore dollar rates have closely tracked three-month US dollar Libor, particularly since 2008 (see the paper from the Singapore Monetary Authority in this volume).

On the other hand, it appears that countries with a floating exchange rate have been able to set short-term rates relatively independently from the monetary policy of the advanced economies. Chile is an important example. As discussed by Claro and Opazo, in Chile short-term interest rates were only weakly correlated with those of the advanced economies during 2008–13. And domestic monetary conditions have been broadly consistent with those implied by the Taylor rule.

That said, in several cases, global factors, rather than local policy rates, seem to have influenced long-term interest rates most strongly. In Malaysia, a surge of capital inflows into the domestic bond market has led to a persistent flattening of the yield curve (see the paper by Singh). Likewise, the yield curve has steepened considerably following the Fed's tapering announcement. In Korea, as pointed out by the paper by Kim, the correlation between domestic and US long-term yields has jumped since 2008. In Poland, foreign portfolio inflows have led to a compression of long-term rates, although bond market volatility has fallen because of a growing base of stable non-resident investors (see Adam, Kozinski and Markun in this volume). The paper from Colombia shows that the nature of shock to the US long-term rate also matters in determining the spillover effect, particularly whether the shock is due to the expected path of future short-term rates or changes in the US term premium (see Guarin, Moreno and Vargas in this volume).

Yet another factor is the structure of the financial system. The paper from the Central Bank of Brazil argues that Brazil's deep derivatives market, combined with a high degree of capital account openness and exchange rate flexibility, has contributed to amplifying the impact of global shocks on the economy (see Barroso, Kohlscheen and Lima). In Brazil, capital flows have the strongest influence on asset prices and credit growth.⁸

Finally, a number of central bank notes suggest that country-specific factors play a crucial role in the transmission of global shocks. For instance, South Africa's high exposure to external monetary factors has been related to its large current account deficits and high degree of dependence on portfolio flows – a vulnerability it shares with Brazil and India (see the paper from the South African Reserve Bank). Likewise, Argentina's vulnerability stems from the strong correlation of commodity prices with the sovereign credit spread, which tends to amplify the effects of large external monetary shocks (see the paper by Pesce in this volume).⁹

The discussion at the meeting also highlighted the key importance of investor psychology in driving capital flows (the so called "psychological channel"). There was a view that macroeconomic factors cannot fully explain the very quick changes in investor sentiment that occurred after the Fed's first "tapering" announcement. Although there were no apparent shifts in EMEs' macroeconomic and external fundamentals, some investors and analysts chose to brand selected EMEs as the "fragile five". These psychological shifts reflected the familiar agency problem of "herding" by investors, so widely evident in the past financial crises.

There was a consensus that, in the current environment, push factors (ie those related to the advanced economies) are much stronger drivers of capital flows to EMEs than pull (ie domestic) factors. Global monetary conditions seem to determine the total amount of capital flows, while pull factors play a role only in allocating these flows across EMEs. This market differentiation across EMEs seems to have strengthened recently, especially since January. Nevertheless, both factors can interact in ways that can aggravate the impact of an adverse external shock, as demonstrated in recent months by substantial weakening of EMEs' growth prospects following the Fed's "tapering" announcement.

In many countries the relevant risks stem not so much from the volume of capital flows but from the specific high-risk borrowing and lending strategies adopted by the residents and non-residents alike. One source of that risk related to the large unhedged forex exposures undertaken by foreign investors through carry trades on EME debt and currency products. A second was the vulnerability that EME corporations incur when they take on dollar debt in the international debt market to finance local currency-denominated investments.

Some participants felt that EME corporations have accepted risks that they do not fully understand. One element is their exposure to potential currency

⁸ The Central Bank of Brazil points out that estimating the impact of international spillovers accurately depends on the construction of proper counterfactual scenarios (Barroso et al (2013)). Assuming that the US term spread would be higher by 150 basis points without Fed quantitative easing measures, a shock of that size would generate additional capital inflows to Brazil in the order of \$100 billion, leading to large effects on the exchange rate, equity prices and credit flows.

⁹ Such spillovers also stem from the increasing role of EMEs in global growth both as producers and consumers of commodities.

mismatches. Covenants issued by affiliates of EME corporations in the process of debt issuance in offshore centres can also affect the health of the parent companies. International debt obligations of EME firms have therefore the potential to create systemic risks which might go undetected for a long time. Serving to heighten these risks are the lack of sufficient information on the balance sheets of non-financial corporations and the unregulated nature of these liabilities.

The impact of future spillovers seems to be even harder to judge. Many participants expressed concern about asset prices: as the monetary policy of the advanced economies has started to determine domestic bond and equity prices, traditional pricing tools have lost their anchoring role, and asset prices are becoming increasingly dependent on expectations for the future path of US monetary policy. Thus, even apparently marginal changes to policy may have the potential to create large-scale market volatility.

2. Policy responses to international spillovers

How should EME policymakers respond to international spillovers? There is no unique answer to this question, and whatever approach is chosen will involve trade-offs. Allowing the exchange rate to appreciate is an option when aggregate demand is strong and inflation rises. But a very significant appreciation also carries risks. It can shift output from the tradable to the non-tradable sector.

One gambit could be active countercyclical fiscal measures, as suggested by Eichengreen (2013). Tightening fiscal policy in the face of rising capital inflows will dampen spending, reduce upward pressure on asset prices and put downward pressure on domestic interest rates. By reducing currency appreciation pressures, it could also increase the flexibility of monetary policy in responding to inflation. However, the required scale of fiscal adjustment is likely to be very high if the economy is to be stabilised in the face of strong swings in capital flows – and adjustments on this scale may not be realistic.

A second approach, consistent with the conventional view, is for the central bank to focus on limiting specific risks to the financial system by using macroprudential tools. These tools can be directed at areas/sectors exposed to greatest risks.

A third approach is to address the problem at its source, by restricting capital flows. In 2009, a BIS working group agreed that capital account measures could, “at least in the short run, help monetary policy by moderating the size or the volatility of inflows and by modifying their composition in favour of more stable flows” (CGFS (2009)). However, views about the effectiveness of capital flow management measures vary widely. And, these measures are not without costs, particularly as they can potentially raise financial intermediation costs and reduce efficiency.

Table 3 reports central bank responses to two specific questions: what foreign factors have had important implications for the economy and the financial system? What role did these factors play in monetary policy?

Foreign factors influencing domestic economy and monetary policy decisions

Number of affirmative responses (total 23)

Table 3

	Importance for domestic economy				Incorporation in monetary policy decisions			
	Output and inflation volatility		Financial stability and asset prices		Incorporate formally or informally		Incorporation increases policy effectiveness	
	Fixed ¹	Flexible ²	Fixed ¹	Flexible ²	Fixed ¹	Flexible ²	Fixed ¹	Flexible ²
Foreign policy rates	0	11	3	14	1	14	1	11
Global long-term interest rates	0	9	2	17	0	13	0	10
Exchange rates	0	17	1	17	0	18	0	13
International bank lending	0	7	2	10	0	6	0	5
Portfolio flows ³	0	13	2	18	0	15	0	11

¹ Economies under fixed exchange rate regime: Hong Kong SAR, Saudi Arabia and United Arab Emirates. ² Economies under flexible exchange rate regimes. ³ Changes in the advanced economy monetary policy stance affect investors' risk appetite and hence their demand for emerging market assets.

Source: BIS questionnaire, September 2013.

As regards the first question, for most central banks international spillovers appear to be a concern from the viewpoint of both macroeconomic and financial stability. But risks are perceived to be significantly higher for financial stability. Among the five factors listed in the table, risk-taking in global financial markets through portfolio flows present the most difficult challenge for most central banks, together with the exchange rate, and global long-term and policy rates.

It is therefore not surprising that a majority of central banks take these factors into account in the formulation of monetary policy. For instance, 78% of the reporting central banks (18 out of 23) formally or informally incorporated exchange rate developments in their monetary policy decisions; 65% did so with respect to foreign policy rates and portfolio financial positions. Over 56% of the respondents took some account of global long-term interest rates in their monetary policy formulation. The success rates of these measures are shown in the last two columns of Table 3. Several central banks took the view that monetary policy effectiveness was enhanced when their decision-making also took account of foreign policy rates, global long-term interest rates, portfolio flows and the exchange rate. A lower percentage of central banks thought that this was true also for international bank lending.

That said, the survey results do not provide insight into whether central banks responded to these variables with a view to changing their direction or path, nor do they provide information about the precise methods used to respond to monetary spillovers.

What instrument to respond with?

Monetary policy measures

One possible instrument is the interest rate: the central bank moves its policy rate more aggressively to stabilise output and inflation following large changes to the exchange rate. Research has generally supported the conclusion that very high exchange rate volatility increases the volatility of both output and inflation, thus

jeopardising financial stability.¹⁰ Gourinchas and Obstfeld (2012) find that an overvalued exchange rate can lead to cyclical booms and a financial crisis.

Bond yields, however, tend to be more influenced by yields in the main centres, notably by those of the US Treasury market, than by changes in local policy rates. The BIS background paper by Gadanez, Miyajima and Urban (“How might EME central banks respond to the influence of global monetary factors?”) makes the case for a central bank response to the exchange rate and domestic long-term bond yields. Using a highly stylised macroeconomic model, the authors show that by expanding the interest rate rule with exchange rate and bond yields, central banks can improve macroeconomic performance.

These results are based on the assumption that the exchange rate and bond prices exert a large, independent influence on aggregate demand and inflation. This could be true if long-term interest rates and exchange rates are volatile, causing frequent deviations of inflation and aggregate demand from their targets. Yet, as the authors note, central banks are confronted with large parameter uncertainty, which could stem from the changing relationships between the exchange rate, long-term yields and the real economy. This may imply that the reliance placed on different instruments should vary over time according to circumstances.

Another instrument extensively used by central banks is foreign exchange intervention. Evidence from a previous survey conducted for the 2013 Deputy Governors’ Meeting suggested that in a large number of EMEs, FX intervention was intended to dampen capital flow volatility and reduce risks to monetary and financial stability.¹¹ The paper from the Czech National Bank in this volume discusses the special role of FX intervention in the Czech Republic, where the short-term interest rate has remained at zero since 2012 (see Skorepa and Hampf).

Nevertheless, FX intervention also presents a number of challenges. First, the cost of intervention may be large when the interest rate differential is high and rising. The paper from South Africa mentions that the carry cost due to the positive interest rate differential is the main reason for South African Reserve Bank’s losses on reserve holdings. Second, when an intervention is made in order to avoid raising policy rates, it may inadvertently promote a domestic credit boom. Finally, interventions to restrict exchange rate flexibility can lead to more risk-taking and increased speculation about the future value of the currency, encouraging investors to exploit interest rate differentials more aggressively (Claro and Soto (2013)).

A key issue is whether the accumulation of FX reserves resulting from such intervention is cyclical or structural. When FX intervention is used to dampen cyclical capital flow volatility around the trend in both directions, its balance sheet impact is likely to be limited. By contrast, when such interventions resist fundamental appreciation pressures, financial imbalances can increase.

Unsurprisingly, therefore, views differed significantly among participants about the role of the exchange rate. Some advocated a free-floating exchange rate as one of the main lines of defence against external shocks, as long as prudent macroeconomic – notably fiscal – policies are in place to support it. Participants

¹⁰ See the summary of discussions and country papers in BIS (2013).

¹¹ See Mohanty and Berger (2013).

from countries with free-floating regimes believed that sterilised intervention has little sustainable effect on exchange rate movements.

By contrast, some Asian economies advocated foreign exchange intervention, notably when the exchange rate puts an excessive adjustment burden on the tradable sector. Although they are generally high, the costs of holding foreign exchange reserves should be assessed against the benefits (eg preventing risks to financial stability). According to one participant, solid reserves should be built based on their permanent component, which is related to the current account surplus, rather than the transitory element related to the aim of stemming capital inflows.

Participants agreed that greater attention needs to be paid to long-term rates, which can no longer be viewed as an average of future short-term rates. Long term rates are key to government financing costs. In addition, long rates matter for the funding of large corporations with their increasing use of the capital markets. However, more needs to be known about the transmission of longer-term rates to bank lending rates.

Some took the view that greater management of long-term rates may be needed to gain adequate control over the economy. This is particularly relevant when policy rates are at the zero low bound or when there is a risk that bond yields will overshoot in reaction to capital flow volatility. One central bank said that it has had recourse to dual intervention in the forex and debt markets since 2010. Another central bank observed that it may become more involved in yield curve management: spillovers from the reversal of unconventional monetary policies in the United States could lead to a steeper, and perhaps more volatile, yield curve (Turner (2014b)). However, any such intervention should be consistent with the central bank's inflation objectives and it must be coordinated with the national debt management office. In addition, it must take into account the costs of impairing the information role of the yield curve for monetary policy.

Non-monetary policy measures

The use of non-monetary instruments for stabilisation purposes has received much attention since 2008. One set of such instruments are macroprudential tools. Gadanez, Miyajima and Urban discuss the rationale for their use in EMEs. Targeted macroprudential measures can reduce risks from currency mismatches or certain types of funding that are particularly susceptible to global liquidity conditions. In addition, macroprudential tools can help prevent domestic booms associated with capital inflows.

Table 4 summarises the survey responses of central banks on non-monetary policy measures along three dimensions: the types of measures used since 2008, the purpose for which they were used, and their effectiveness. The responses are shown as percentage of total respondents.

A large number of EMEs have used macroprudential tools that are targeted specifically at the banking sector. Caps on loan-to-value ratios and debt service ratios are the most common, followed by rules on currency mismatches. Among the measures focused specifically on limiting risks to bank balance sheets, reserve

requirements on banks,¹² adjustment to risk weights on assets, caps on loan-to-deposit ratios and loan loss provisioning have been most popular. As regards measures related to collateral in wholesale funding, about 9% of EMEs have used margins or a haircut requirement to prevent procyclicality in funding. In addition, a number of EMEs have used other measures, such as regulation of foreign exchange derivatives (Korea), limits on the maximum tenure of loans (Malaysia) and limits on non-deliverable forward (NDF) exposures (the Philippines). Annex Table A1 lists some of these measures.

Use of non-monetary policy measures since 2008

Percentage of 23 respondents

Table 4

	Measure is used	Purpose		Measure is effective
		Financial stability	Monetary policy	
Capital account				
Capital inflows	26	13	13	26
Capital outflows	26	17	13	26
Bank loans				
Caps on loan-to-value for mortgages	52	48	0	43
Caps on ratio of debt service to household income	57	48	0	48
Rules on reference interest rate used for mortgage lending	22	9	0	4
Rules on currency mismatches of borrowers	30	30	0	26
Ceilings on credit growth (aggregate or by sector)	4	9	0	4
Bank balance sheets				
Countercyclical capital ratios	17	22 ¹	0	9
Dynamic provisioning	22	17	0	17
Adjustment to asset risk weights	52	61 ^{1,2}	0	48
Rules on loan loss provisioning	48	39	0	39
Caps on loan-to-deposit ratios, core funding ratios, other liquidity requirements	48	48	0	43
Bank reserves deposited with the central bank	65	39	26	61
Limits on interbank exposures (domestic or cross-border)	26	17	0	17
Capital surcharges for systematically important institutions	17	22 ³	0	17
Other	4	0	0	4
Collateral used in wholesale funding				
Prevention of procyclical variation in minimum margins or haircuts (or making such variation countercyclical)	9	9	0	4
Other ⁴	83	95 ⁵	5 ⁵	79 ⁵

¹ Mexico has not yet adopted this measure and is working on it for financial stability. ² Argentina has not yet adopted this measure but regards it as serving financial stability purpose. ³ Mexico has been considering this measure partially based on recommendations by the FSB and BCBS. ⁴ Nineteen other measures were cited by 11 central banks. See Annex Table A1 for details. ⁵ As a percentage of 19 measures.

Source: BIS questionnaire, September 2013.

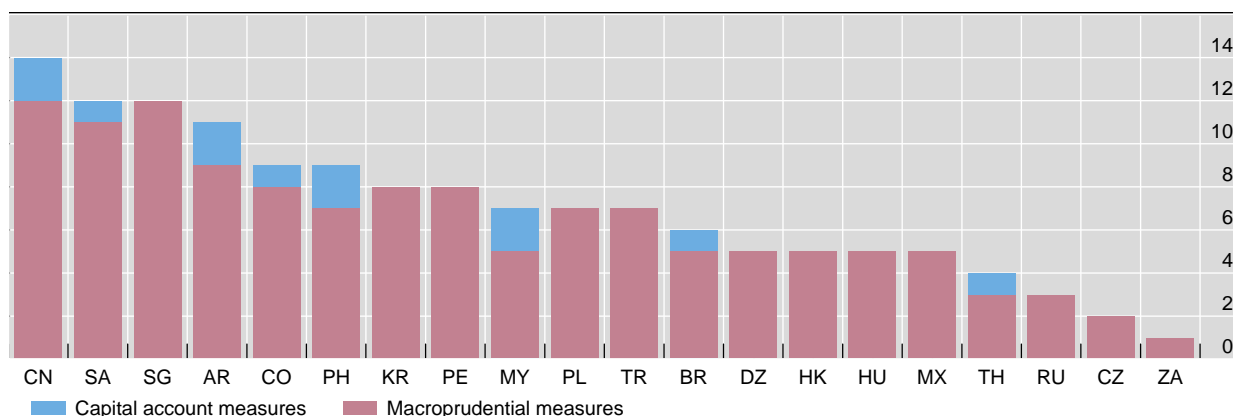
¹² Strictly speaking, these are probably best classified as traditional administrative monetary policy tools.

The survey results also suggest that many EMEs have used multiple non-monetary measures – rather than a selected few – to tackle the spillover problem. As shown in Graph 3, the number of measures introduced since 2008 has varied significantly across economies, with a typical median value of around seven.

Regarding the purpose of such instruments, a high percentage of central banks reported that macroprudential measures were used primarily to limit financial stability risks. None reported that bank-specific measures were exclusively directed at monetary policy objectives. The only exception is reserve requirements, which are viewed partly as a monetary instrument.

Number of non-monetary policy measures

Graph 3



¹ Sixteen measures are specified in the questionnaire. Replies from 11 central banks indicate measures in addition to the specified ones. See Annex Table A1 for details.

Source: BIS questionnaire, September 2013.

On the effectiveness of macroprudential measures, central bank views seem to converge on several points: first, according to a significant majority of central banks (61%), reserve requirements have a high degree of effectiveness as a stabilisation instrument. Second, rules regulating banks' exposure to real estate markets (eg loan-to-value, adjustment to risk weights, loan loss provisioning) and debt accumulation by borrowers (eg debt service ratio) appear to be more successful than other measures in limiting risks to the economy.

This view is also supported by country experiences as summarised in several central bank notes. First, macroprudential measures are more effective in influencing bank credit and leverage than in dampening property prices. In addition, their effectiveness can vary depending on the state of the economy: LTV ratios are more powerful in curbing excess credit demand than in limiting supply (Hong Kong SAR). Second, macroprudential policies work better when complemented by other policies, such as taxation. Both Hong Kong SAR and Singapore used taxes on property transactions alongside LTV ratios to stabilise their property markets. Third, the experience of Korea suggests that measures such as leverage caps on derivative transactions and a bank levy on non-core liabilities can be successful in limiting currency mismatches and increasing the maturity of borrowing.¹³ Finally, in a

¹³ The paper from Turkey presents empirical analysis on the interaction between macroprudential policies, VIX and portfolio flows. The results show that Turkey's modified monetary operating

number of cases, reserve requirements on banks – especially when imposed on foreign currency deposits, as in Peru – seem to be useful in resolving trade-offs facing monetary authorities due to capital flows.

Participants generally believed that macroprudential measures tend to complement traditional interest rate policy. The case for complementarity between the two sets of policies was seen as especially relevant if macroprudential policy shifted lending into the shadow banking system. The general view was that both monetary and macroprudential policies should be used to achieve the joint objectives of price and financial stability. In short, multiple targets demand multiple instruments.

The survey results also shed light on the use of capital account measures. As shown in the top rows of Table 4, slightly more than one quarter of central banks since 2008 have used measures on capital inflows and outflows as stabilisation tools. Only half of them viewed these measures as aimed at preserving monetary stability. But all countries that used capital account measures considered them to have been relatively successful in achieving their intended objectives.

3. Internationalisation of EME currencies

Over the past decade, internationalisation of EME asset holdings has proceeded apace. For instance, as Annex Tables A2 and A3 show, at the end of 2012 the foreign share in total holdings of Asian and Latin American local government bonds has risen from very low or negligible to 10–50%. In the equity market, this share was 20–45% in many cases. At the same time, however, the EME official sector has invested much of its foreign assets in major advanced economies' currencies. This discrepancy between the asset preferences of foreign investors' and those of the EME official sector raises questions about the future role of EME currencies in international asset allocation.

Frankel (2011) notes that three fundamental factors determine the international status of a currency: (i) the size of the economy; (ii) confidence in the value of the currency, as influenced by its long-term strength and short-term variability as well as the country's net asset position; and (iii) the financial system's degree of development. In all these dimensions, the US dollar continues to be the world's dominant currency.

The BIS background paper by Ma and Villar in this volume ("Internationalisation of emerging market currencies") reviews most of these factors in its assessment of the international role of EME currencies. The authors observe that, compared with the previous decade, international investors' holding of EME financial assets have risen substantially. And this has been accompanied by rapid growth in the offshore foreign exchange turnover of EME currencies. The Chinese renminbi and Mexican peso were among the top 10 traded currencies of the world in 2013. In addition, the share of EMEs in world GDP and trade has doubled from 15% in early 1990s to 30% by 2013.

procedure with the option for banks to maintain reserves in local and foreign currency (Reserve Option Mechanism) has had a significant effect in terms of dampening capital inflows during periods of high investor risk appetite (a reduction of VIX).

Yet EMEs lag far behind advanced economies in financial development, and their governments have yet to attain the highest credit standing. Ma and Villar note that managing currency risk is costly for global investors, and together with strong home bias, it places limits on global asset allocation to EMEs. The internationalisation of EME currencies also depends crucially on EME authorities' willingness to liberalise cross-border capital movements and facilitate offshore currency trading.

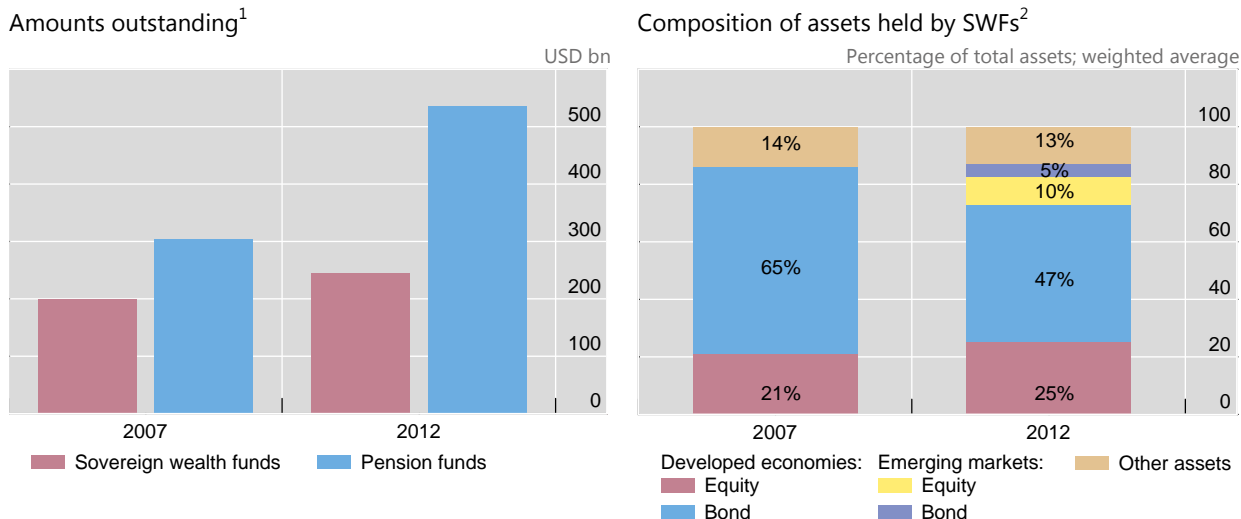
Looking forward, an international role for EME currencies raises at least three interrelated issues: (i) implications for EM financial markets; (ii) the role of sovereign wealth funds including central banks; (ii) and the importance of the Chinese renminbi.

As regards the first topic, the lack of financial market depth will pose challenges to many EMEs in managing the risks from growing foreign ownership of their assets. Both the exchange rate and the interest rate could become more volatile, exposing EMEs to financial fragility. The potential costs of currency internationalisation could be particularly high for countries with weak balance sheets.

Second, the role of official investors is likely to be crucial. As noted by Ma and Villar, official investors such as sovereign wealth funds (SWFs), which have a longer investment horizon and greater risk appetite, can play a useful stabilising role in EME asset markets. They can be a catalyst for greater private investment in EME assets.

Assets of sovereign wealth funds (SWFs) and pension funds

Graph 4



¹ Aggregate of data from five central banks for sovereign wealth funds and data from six central banks for pension funds. ² Data are from Chile, Colombia and Korea only. Weighted averages based on total assets of these three countries are shown.

Source: BIS questionnaire, September 2013.

As one illustration of their importance, Graph 4 shows the size and composition of pension fund and SWF assets in a group of EMEs that responded to the survey. Total assets managed by both types of fund have risen over the past five years. Total assets of pension funds appear to be far larger than those of SWFs, notwithstanding differences in samples. Information about the composition of pension fund assets is not available, but it is possible that home regulations require

a large chunk of these assets to be invested in local debt and equities. When it comes to SWFs, the shares of assets invested in EME bonds and equities in their total assets have increased from practically zero in 2007 to 5% and 10%, respectively, at the end of 2012. But these shares are nowhere comparable with the proportions of total assets invested in the bonds and equities of advanced economies.

Another relatively unexplored question is what role the large foreign reserves held by EME central banks might potentially play in the development of EME asset markets. The note from the South African Reserve Bank (SARB) in this volume argues that the official reserve management strategy is changing. The traditional priorities of reserve managers – capital preservation, liquidity and returns – have been called into question by extremely low returns on traditional reserve assets, the growing interest rate risk exposure on these assets and the reduced availability of high-quality assets. While the SARB has not changed its objectives, it has started giving more weight to returns in the management of reserves, leading to more investment in EME currencies such as the renminbi and the Korean won. That said, the allocation to EME assets is still very small (renminbi assets constitute about 3% of the SARB's total reserves). The paper from the Central Bank of Malaysia makes a similar point. It argues that reserve managers can potentially boost risk-adjusted returns by increasing allocation of foreign reserves to EME currencies. But the actual decision to invest in EME currencies would depend on several other factors, including country fundamentals, accessibility, regulatory regimes, financial market valuation and liquidity.

A final issue concerns the potential for the renminbi to play a more international role. Over the past decade, renminbi internationalisation has been deepening through the financial markets of Hong Kong SAR. In addition, the Chinese authorities have initiated a number of steps such as promoting trade settlement in renminbi, partially liberalising capital account transactions and developing offshore markets in renminbi products. All these measures will further enhance the role of the renminbi as a future international currency.

Greater internationalisation of the currency could also serve Chinese interests by accelerating domestic financial liberalisation and creating better risk-sharing opportunities for residents. But there are also risks. First, greater renminbi internationalisation could lead to a more rapid appreciation of the currency and possibly unsustainable current account deficits, although the historical record is not conclusive on this. Second, the more open capital account associated with the renminbi's internationalisation could increase the Chinese economy's vulnerability to spillovers from external shocks.

Appendix

List of non-monetary measures specified by central banks¹

Table A1

	Measure 1	Measure 2	Measure 3
Argentina	Limits on application of foreign currency funding: it must be applied to credit recipients whose income is generated in foreign currency (exporters), or related to such activities.	Limits on financial institutions' global position in foreign currency, defined as total assets and liabilities related to financial intermediation denominated in foreign currency, plus foreign currency-denominated bonds	
Korea	Regulation on the ratio of banks' FX derivatives positions and macroprudential stability levy.		
Malaysia	July 2013: limit on maximum loan tenure (i) purchase of properties: 35 years, (ii) personal financing: 10 years.		
Mexico	A bank has to obtain authorisation from the central bank to transfer or sell assets between banks or related counterparties when those operations exceed 25% of its basic capital in a year.	The value-at-risk limits for pension funds were increased and their methodology was changed to avoid massive asset sales after the recent financial crisis.	
Peru	Additional reserve requirements conditional on foreign exchange mortgage and car loans growth.	Additional reserve requirements conditional on foreign exchange aggregate credit growth.	
Philippines	Limits on the amount of NDF exposures at 20% and 100% of unimpaired capital of domestic banks and foreign bank branches, respectively.	Non-residents prohibited from investing in trust departments/entities in the SDA facility, a BSP monetary tool used for managing excess domestic liquidity in the financial system.	Capital conservation buffer of 2.5% (the requirement of 2.5% capital conservation buffer took effect starting 1 January 2014).
Poland	Recommendation by the Polish Financial Supervision Authority on profit retention to strengthen banks' capital buffer.		
Singapore	Leverage ratio: to be introduced in line with Basel timeline – MAS has published and implemented requirements on the calculation of the leverage ratio and reporting to MAS in MAS Notice 637 based on the rules published in the Basel III text dated 16 Dec 2010 (revised 1 Jun 2011). The Basel rules on the Leverage Ratio were updated by end-2013 for implementation of disclosure requirement by 1 Jan 2015, and the final Basel rules on the Leverage Ratio are expected to be published in 2017. MAS will reference these revisions in the Basel rules and implement them in the regulations accordingly.	MAS imposes large exposure limits on banks' exposures to any one single counterparty group.	The rules on margins and haircuts are set out in the Securities and Futures Act (SFA). Under SFA, margining requirements are imposed on capital markets services licensees who carry out securities financing and dealing in contracts for differences. The SFA margin requirements prescribe the minimum margin rate, the acceptable collateral and the applicable haircuts for acceptable collateral. Securities financing transactions by capital markets services licensees are required to be fully secured at all times.

¹ Hong Kong SAR, Saudi Arabia and Thailand have measures other than those listed in Table B2 but have not specified these measures. Source: BIS questionnaire, September 2013.

Foreign ownership in domestic bond markets

Percentage of market capitalisation

Table A2

	Local currency government bonds			Corporate bonds		
	2000	2007	2012	2000	2007	2012
Asia						
China	–	0.1	0.5	–	0.1	0.5
Korea	0.2	9.3	13.9	0.6	0.5	0.3
Malaysia	0.3	14.1	29.6	–	5.9	3.4
Philippines	–	–	10.3	–	–	–
Thailand	–	0.9	16.2	–	–	0.2
Latin America						
Brazil	–	5.1	13.7	–	0.1	0.8
Colombia	0.0	3.9	4.1	–	–	0.3
Mexico	1.4	8.7	30.8	–	1.1	0.6
Peru	–	22.6	53.2	–	14.1	30.6
Central and Eastern Europe						
Czech Republic	7.4	27.5	14.2	–	–	–
Hungary	17.0	30.0	40.0	11.0	22.0	5.0
Poland	18.2	20.9	36.0	9.2	10.4	2.0
Russia	24.6	0.8	17.4	–	–	–
Turkey	9.0	13.4	23.3	–	–	5.2
Other						
Algeria	–	0.0	0.0	–	0.0	0.0
South Africa	22.0	18.0	31.0	2.0	6.0	4.0

Source: BIS questionnaire, September 2013.

Foreign ownership in domestic equity markets

Percentage of market capitalisation

Table A3

	2000	2007	2012
Asia			
China	–	1.7	1.6
Korea	27.0	31.0	32.4
Malaysia	19.5	26.6	24.5
Philippines	–	33.3	26.4
Thailand	–	–	34.7
Latin America			
Argentina	7.9	11.9	12.1
Brazil	–	26.0	29.0
Chile	–	6.8	9.0
Colombia	4.4	2.8	2.7
Mexico	–	39.3	31.9
Peru	–	47.6	45.9
Central and Eastern Europe			
Hungary	71.0	80.0	66.0
Poland	45.5	47.6	44.4
Turkey	–	72.4	65.8
Other			
Saudi Arabia	–	2.5	6.3
South Africa	23.0	20.0	21.0

Source: BIS questionnaire, September 2013.

References

Bank for International Settlements (2013): "Market volatility and foreign exchange intervention in EMEs: what has changed?", *BIS Papers*, no 73.

Barroso, J, L Pereira da Silva and A Sales (2013): "Quantitative easing and related capital flows into Brazil: measuring its effects and transmission channels through a rigorous counterfactual evaluation", *Working Papers*, no 313, Central Bank of Brazil.

Borio, C and H Zhu (2012): "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism", *Journal of Financial Stability*, vol 8, no 4.

Bruno, V and H Shin (2012): "Capital flows and the risk-taking channel of monetary policy", *BIS Working Papers*, no 400, December.

Caruana, J (2012): "International monetary policy interactions: challenges and prospects", speech to the CEMLA-SEACEN conference, 16 November.

Chen, Q, A Filardo, D He and F Zhu (2012): "International spillovers of central bank balance sheet policies", *BIS Papers*, no 66.

Claro, S and C Soto (2013): "Exchange rate policy and exchange rate interventions: the Chilean experience", *BIS Papers*, no 73, October.

Committee on the Global Financial System (2009): "Capital flows and emerging market economies", report by a CGFS Working Group chaired by Rakesh Mohan, *CGFS Papers*, no 33, January.

Eichengreen, B (2013): "Currency war or international policy coordination?", University of California, Berkeley, January.

Frankel, J (2011): "Historical precedents for internationalisation of the RMB", Council on Foreign Relations, November.

Gagnon, J, M Raskin, J Remache and B Sack (2011): "The financial market effects of the Federal Reserve's large scale asset purchases", *International Journal of Central Banking*, vol 7, no 1.

Gourinchas, P and M Obstfeld (2012): "Stories of the twentieth century for the twenty-first", *American Economic Journal: Macroeconomics*, vol 4, no 1.

He, D and R McCauley (2013): "Transmitting global liquidity to East Asia: policy rates, bond yields, currencies and dollar credit", *BIS Working Papers*, no 431, October.

Hofmann, B and B Bogdanova (2012): "Taylor rules and monetary policy: a global Great Deviation?", *BIS Quarterly Review*, September.

Hordahl, P and O Tristani (2012): "Inflation risk premia in the term structure of interest rates" *Journal of the European Economic Association*, vol 10, no 3.

International Monetary Fund (2013a): "2013 spillover report", *IMF Policy Paper*, August.

_____ (2013b): "Global impact and challenges of unconventional monetary policies", *IMF Policy Paper*, October.

King M and D Low (2013): "Measuring the "World" Real Interest Rate", *NBER Working Paper*, no 19887.

Mohanty, M and B Berger (2013): "Central views on foreign exchange intervention", *BIS Papers*, no 73, October.

Rajan, R (2014): "Competitive monetary easing – is it yesterday?" Speech at the *Brookings Institution*, Washington DC, 10 April

Rey, H (2013): "The global financial cycle and monetary policy independence", paper presented at the Jackson Hole Symposium, 24 August.

Taylor, J (2013): "International monetary policy coordination: past, present and future", *BIS Working Papers*, no 437, December.

Turner, P (2014a): "The global long-term interest rate, financial risks and policy options in EMEs", *BIS Working Papers*, no 441, February.

Turner, P (2014b): "The exit from non-conventional monetary policy: what challenges?", *BIS Working Papers*, no 448, May.