What have central banks in EMEs learned about the international transmission of monetary policy in recent years?

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Abstract

This note considers the international transmission of monetary policy conditions to emerging market economies (EMEs) with a focus on Brazil's experience. The main points are as follows: (i) growing foreign participation in Brazil's domestic Treasury markets has increased the sensitivity of the long end of the yield curve to global factors; (ii) the role of foreign factors in the term spread of most EMEs is growing in importance, but domestic factors still account for most of the variation; (iii) unconventional monetary policy in advanced economies (AEs) impacts asset prices and economic activity in EMEs, with capital inflows an important transmission channel; (iv) the prospect of tapering amplified asset price volatility, and interventions with swap instruments – backed by international reserves – are an effective way to cope with hedging demand; and (v) macroprudential instruments, including capital flow regulation and liquidity buffers, are effective in reducing financial instability associated with global factors.

Keywords: International transmission, yield curve, unconventional monetary policy, tapering, intervention, macroprudential policy

JEL: E50, E58, F36, F42

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Introduction

This note considers the international transmission of global monetary policy conditions to emerging market economies (EMES) and associated policy choices in recent years, with a focus on Brazil. The first section argues that growing foreign participation in domestic treasury markets has increased the sensitivity of the long end of the yield curve to global factors. The second section looks at the term spread for a sample of emerging market economies and investigates the relative importance of domestic and foreign factors. The third section shows that unconventional monetary policy in advanced economies (AEs) impacts asset prices and economic activity, with capital inflows an important transmission channel. The following section describes how the prospect of tapering amplified asset price volatility and shows that intervention with swap instruments – backed by international reserves – are an effective way to cope with hedging demand. The final section argues that macroprudential instruments, including capital flow regulation and liquidity buffers, are effective in reducing financial instability associated with global factors.

Fading market segmentation and increased interdependence

Recent experience has taught us that the world has become more interconnected. Spillover effects of monetary policies have become more evident, in particular with regard to asset prices. Financial investment in the pre-crisis world, for instance, was based largely on an idea of clear market segmentation. There was a distinct segment composed of the low-priced risk to be found in advanced economies, and then there was a separate asset class composed of more speculative investments. The crisis challenged the underpinnings of this clear and rigid market segmentation, which in many cases had become institutionalised. When risk indicators in some advanced economies started to exceed those in several EMEs, changing risk perceptions helped to set a global portfolio rebalancing process in motion. This rebalancing and the growing weight of EME assets in global funds in the medium to long term have increased EMEs' links with the global economy.

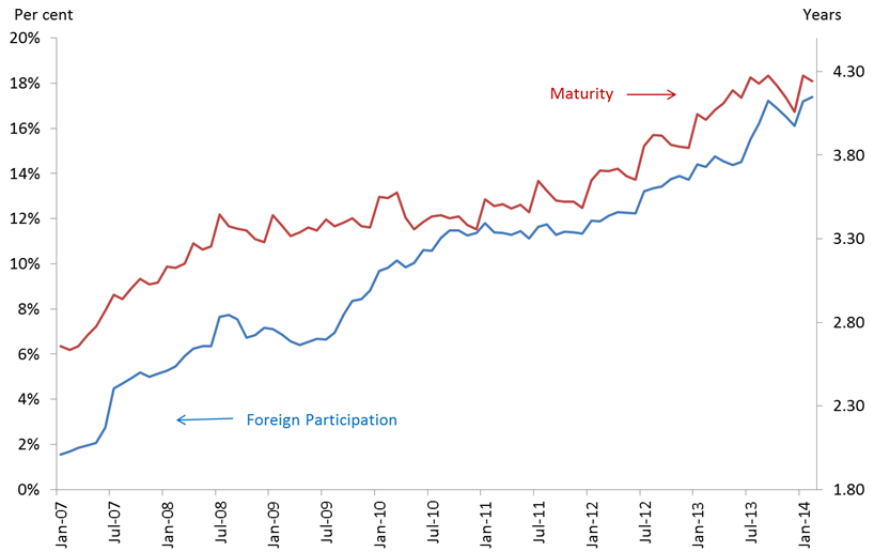
The asset class in EMEs that saw the largest net foreign inflows among all asset classes – by a very wide margin – was fixed income. Net inflows into this particular asset class were already a feature of the pre-crisis world, but they accelerated beginning in early 2010. In the case of Brazil, at one point, *net* capital inflows reached 6.1% of GDP (over 12 months), a very significant volume for what is still a relatively closed economy. Increased inflows coincided with non-conventional monetary policy actions in advanced economies that increased incentives for carry trade activities. Push factors clearly have been the dominant driving force for international capital flows. Indeed, a detailed study by Fratzscher (2012), which is based on a relatively comprehensive dataset, clearly shows that US monetary policy shocks have had a very strong effect on portfolio capital inflows across the globe,[2]

[2] With t-stats around 10.

whereas the effect of domestic monetary policy shocks in EMEs has generally not been significant, either from an economic or from a statistical viewpoint.

Financial globalisation has brought new opportunities and challenges to the table. Greater foreign participation in local bond markets tends to create opportunities for lengthening maturity structures in local markets, as foreign investors typically have longer investment horizons than local investors in EMEs and gravitate towards instruments with longer maturities and fixed rates. Indeed, the average maturity of domestic debt issued by the Brazilian Treasury increased from 3.84 years in December 2012 to 4.06 years at the end of 2013. In principle, however, greater foreign participation in local bond markets could also increase sensitivity to global rate changes and the risk of sudden outflows. Nevertheless, the level of foreign participation in Brazil's local sovereign debt markets is still relatively low, albeit growing, in comparison with other EMEs. To illustrate, as of November 2013 foreign investors held 16.6% of the federal government's debt instruments (see Graph 1). It is important to note that this figure – which was below 2% in January 2007 – includes the participation of foreigners in local investment funds.

Share of foreign participation and length of maturities in local debt markets Graph 1



Source: National Treasury of Brazil

Therefore, greater foreign participation has had the effect of increasing the sensitivity of the long end of the yield curve to global factors and to international risk cycles, with its risk-on and risk-off episodes (see Gourio et al (2013) and McCauley (2012)). Yet it is not clear whether US monetary policy has had strong effects on economic activity in EMEs with floating exchange rate regimes. While there is evidence of substantial effects of US monetary policy on foreign exchange markets and capital flows to EMEs, the empirical estimates of the effects on economic activity in EMEs appear to be surprisingly small. This suggests that floating exchange rates have been performing their function as shock absorbers

quite well.[3] Even though international spillovers must certainly be taken into account, monetary policy should keep focusing on the domestic policy objective.

Monetary policy transmission and the term spread in EMEs[4]

With the binding zero lower bound in AEs since the financial crisis, the term spread has gained in importance as a transmission channel of monetary policy. Although EMEs may influence the domestic term spread through domestic policy rates, it may also be the case that the foreign term spread acts as an additional influence on the domestic yield curve. This section examines the relative importance of domestic policy and foreign factors in influencing the term spread in a group of emerging market economies. It updates the vector autoregression exercise in Moreno (2008), substituting term spreads in the foreign and domestic economies for the long-term yields (Tables 1 and 2).

Consider a vector autoregression with the following three variables for each EME: the term spread in the United States, the domestic policy rate and the domestic term spread. Both the foreign and the domestic term spreads are measured as the yield differential for domestic currency sovereign bonds at 10 years and 3 months maturity. The data are sampled weekly from May 2007 to February 2014, and all the results are checked for the post-crisis – defined as starting in May 2009 – subsample. All the variables are first differenced before estimation. We do not impose exogeneity of the foreign policy rate based on Granger causality tests.

When necessary we use recursive identification, with the foreign spread first, the policy rate second and the domestic spread last. This assumes that the policy rate does not respond to exogenous shocks to the domestic term spread within the same week. Intuitively, this assumes that most of the exogenous shocks to the term spread are shocks to long-term rates. Also, as suggested in Moreno (2008), monetary policy reaction to any shifts in long rates would not be immediate.

The results for the full sample are summarised in Table 1. There is strong evidence of Granger causality from the domestic policy rate to the domestic term spread (14 out of 18 economies), with the exception of Brazil, Indonesia, Peru and the Philippines. There is also evidence of Granger causality from the foreign term spread to the domestic term spread (11 out of 18 economies), with the exception of Chile, Colombia, Hungary, Malaysia, Peru, Russia and Thailand. Nevertheless, most of the forecast error variance of the domestic term spread (around 90%) is explained by its own innovations, with a small role for the policy rate (around 5%) and the foreign term spread (around 3%).

[3] A recent study conducted at the Federal Reserve Board (for Argentina, Brazil, Mexico, Peru, South Africa and Turkey) suggests that while global financial risk shocks explain about 20% of movements in risk spreads and economic activity in EMEs, US interest rate shocks have a negligible effect on macroeconomic fluctuations in EMEs (Akinci (2013)).

[4] This section was prepared by João Barata R B Barroso.

Results for the full sample

May 2007–Feb 2014 Table 1

	Granger causality for domestic term spread			Forecast error variance decomposition of domestic term spread (long run)				Impulse domestic term spread		
	US term spread	Policy rate		US term spread	Policy rate	Domestic term spread		US term spread	Policy rate	Lags
South Africa	**0.066**	**0.016**		1.95	0.88	97.17		–	neg	10
Turkey	**0.034**	**0.000**		0.41	13.01	86.58		pos	neg	5
Brazil	**0.000**	0.225		6.93	3.91	89.16		pos	neg	8
Chile	0.980	**0.007**		2.12	0.63	97.25		–	neg	5
Colombia	0.142	**0.001**		3.19	5.89	90.92		pos	neg	13
Mexico	**0.000**	**0.000**		4.98	1.70	93.32		pos	neg	5
Peru	0.888	0.297		1.97	0.61	97.42		–	neg	5
Korea	**0.096**	**0.004**		4.65	9.13	86.22		pos	neg	12
Philippines	**0.014**	0.387		2.27	0.44	97.29		pos	pos	6
India	**0.052**	**0.000**		2.82	3.71	93.47		–	neg	12
Indonesia	**0.000**	0.366		2.04	4.06	93.90		pos	neg	5
Malaysia	0.475	**0.000**		5.02	5.99	88.98		pos	neg	8
Thailand	0.284	**0.000**		8.87	10.07	81.06		pos	neg	8
Chinese Taipei	**0.000**	**0.000**		8.84	10.18	80.98		pos	neg	12
Hungary	0.125	**0.000**		6.18	6.65	87.18		–	neg	6
Poland	**0.001**	**0.000**		1.49	5.41	93.10		–	neg	9
Czech Republic	**0.022**	**0.007**		5.37	3.49	91.14		pos	neg	7
Russia	0.376	**0.000**		2.34	11.16	86.50		–	neg	13
#signf.	11	14	Med.	3.01	4.74	91.03	#signf.	11	18	
#total	18	18	Avrg.	3.97	5.39	90.65	#total	18	18	

NB: The ordering is by region and, within region, alphabetically according to the name in Portuguese.

Results for the post-crisis sample

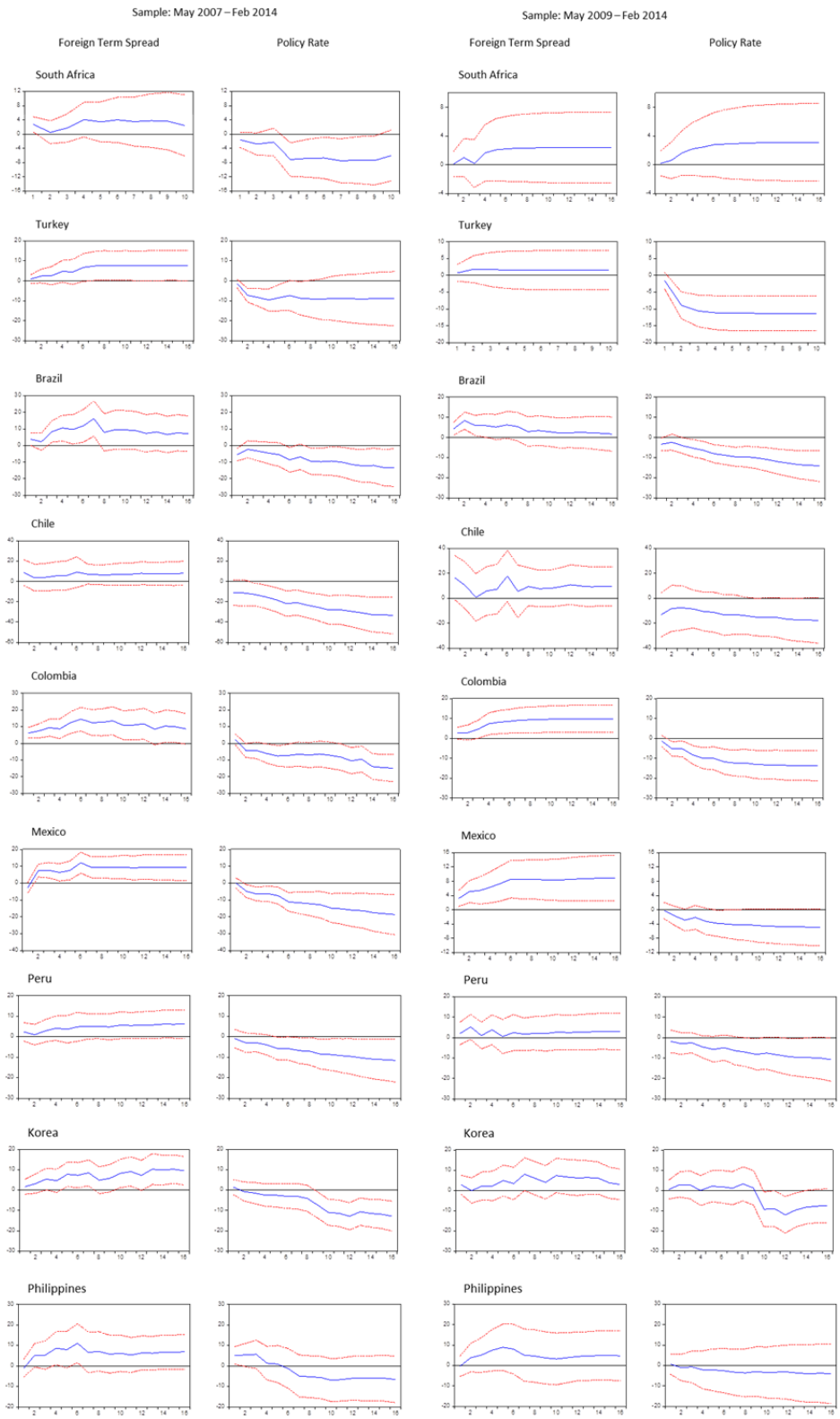
May 2007–Feb 2014 Table 2

	Granger causality for domestic term spread			Forecast error variance decomposition of domestic term spread (long run)				Impulse domestic term spread		
	US term spread	Policy rate		US term spread	Policy rate	Domestic term spread		US term spread	Policy rate	Lags
South Africa	0.160	0.460		8.02	6.67	85.31		–	–	3
Turkey	0.707	**0.000**		2.83	9.22	87.95		–	neg	1
Brazil	0.128	**0.024**		10.95	4.86	84.20		pos	neg	7
Chile	0.820	0.880		0.52	0.80	98.68		–	–	6
Colombia	0.376	**0.005**		8.07	8.30	83.63		pos	neg	3
Mexico	0.205	**0.085**		13.96	5.15	80.89		pos	neg	5
Peru	0.463	0.498		0.69	0.66	98.65		–	neg	5
Korea	0.428	**0.008**		4.37	3.26	92.38		–	neg	11
Philippines	0.542	0.982		4.63	3.53	91.84		–	–	6
India	0.763	0.886		6.93	10.49	82.58		–	–	11
Indonesia	0.174	**0.100**		9.81	1.29	88.90		–	–	4
Malaysia	0.435	**0.006**		3.88	7.81	88.30		pos	neg	10
Thailand	**0.024**	**0.015**		4.07	15.00	80.93		pos	neg	6
Chinese Taipei	**0.001**	**0.010**		16.18	10.22	73.60		–	neg	12
Hungary	**0.021**	**0.006**		8.54	8.76	82.70		–	neg	5
Poland	0.474	**0.005**		8.76	9.36	81.88		pos	neg	4
Czech Republic	**0.019**	**0.016**		4.87	4.90	90.23		pos	neg	3
Russia	0.995	**0.000**		2.95	12.25	84.81		–	neg	12
#signf.	4	13	Med.	5.90	7.24	85.06	#signf.	7	13	
#total	18	18	Avrg.	6.67	6.81	86.53	#total	18	18	

NB: The ordering is by region and, within region, alphabetically according to the name in Portuguese.

Impulse response of domestic term spread

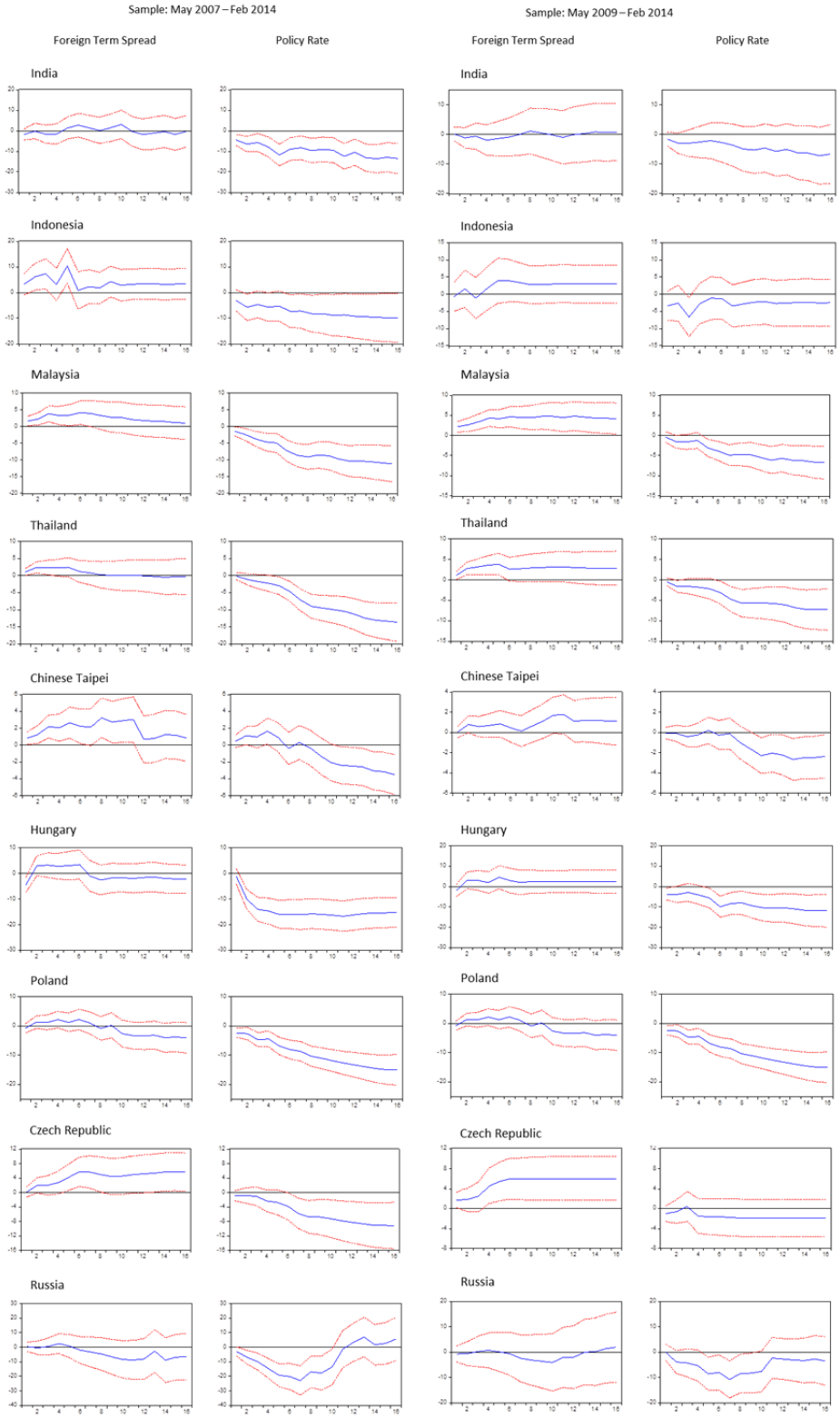
Graph 2



Source: Authors' calculations

Impulse response of domestic term spread

Graph 3



Source: Authors' calculations

The impulse responses (also shown in the leftmost columns of Graphs 2 and 3), suggest that the domestic term spread decreases after a domestic monetary policy shock, which is consistent with an ongoing tightening cycle for the average policy shock. The only exception to this pattern is seen in the Philippines, which has the opposite impact response and a non-significant response in later weeks. The response of the domestic term spread to an increase in the foreign term spread is usually positive and significant, with the exception of Chile, Hungary, India, Peru, Poland, Russia and South Africa. Most of the significant effects happen in the next four to six weeks, with the response after that non-significant in general.

The results for the post-crisis sample are summarised in Table 2. The strong evidence of Granger causality from the domestic policy rate continues (13 out of 18 economies), but there is much less evidence of causality from the foreign term spread to the domestic one (four out of 18 economies). However, the innovations to the domestic term spread play less of a role in the overall forecast error variance (around 86%), with a much larger role for the foreign term spread (around 7%) and the policy rate (around 7%). The average increase in the share explained by the foreign term spread is driven mostly by the results from Brazil, Chinese Taipei, Colombia, Hungary, Indonesia, Mexico, Poland and South Africa, for which the foreign term spread explains a significant share of the forecast error variance (around 10.5%). The average increase due to the domestic policy rate is driven by Chinese Taipei, Colombia, India, Russia and Turkey (around 10.5%).

As regards the impulse responses for the post-crisis period (see also the rightmost columns of Graphs 2 and 3), there is still robust evidence of a negative impact from the domestic policy rate. But significance is lost in some economies, such as Chile, India, Indonesia, the Philippines and South Africa. There is weaker evidence of a significant response of the domestic term spread to the foreign one, although a significant positive response is still observed in Brazil, Colombia, the Czech Republic, Malaysia, Mexico, Poland and Thailand; moreover, the effects are long-lasting, with significant effects still observed several months later.

We may summarise the exercise from this section as follows: there is robust evidence that the domestic term spread in EMEs responds negatively to the domestic policy rate and some evidence that it responds positively to the foreign term spread. A similar pattern is observed for the Granger causality of the shocks to the domestic term spread. Although the domestic policy shock and the foreign term spread shock account for a small share of the long-run forecast error variance of the domestic term spread, this share has increased in the post-crisis subsample. There is a lot of heterogeneity in the significance patterns of the results, but the direction and economic magnitudes are relatively homogeneous whenever the effects are significant.

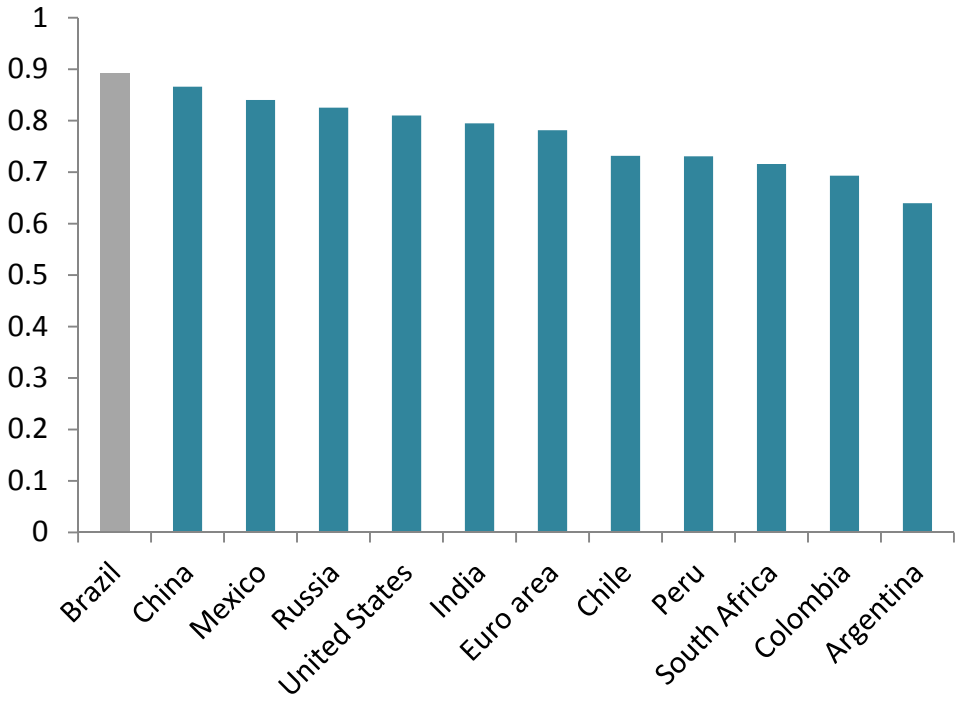
International transmission of unconventional monetary policies to Brazil

In view of asset return correlations, investing in Brazilian assets could mean, in many ways, taking a position in the whole emerging market asset class (see Graph 4). This fact is quite striking since Brazil has a relatively closed and isolated economy that is strongly affected by commodity prices, and participation by foreign investors in

local bond markets is low. Of course, the price and derivative exposure is several times higher than the quantity exposures. Amplification mechanisms in the domestic economy also matter, since fast expansion of the domestic credit market is usually a good indicator of tight financial constraints, and hence of the amplification potential of external shocks. These reasons may explain why domestic assets have shown a comparative advantage in synthesising other emerging market positions.

Correlation among EMEs stock prices

Corr(Δ%MSCI, Δ%Emerging MSCI (Jan 2003–Sep 2013) Graph 4



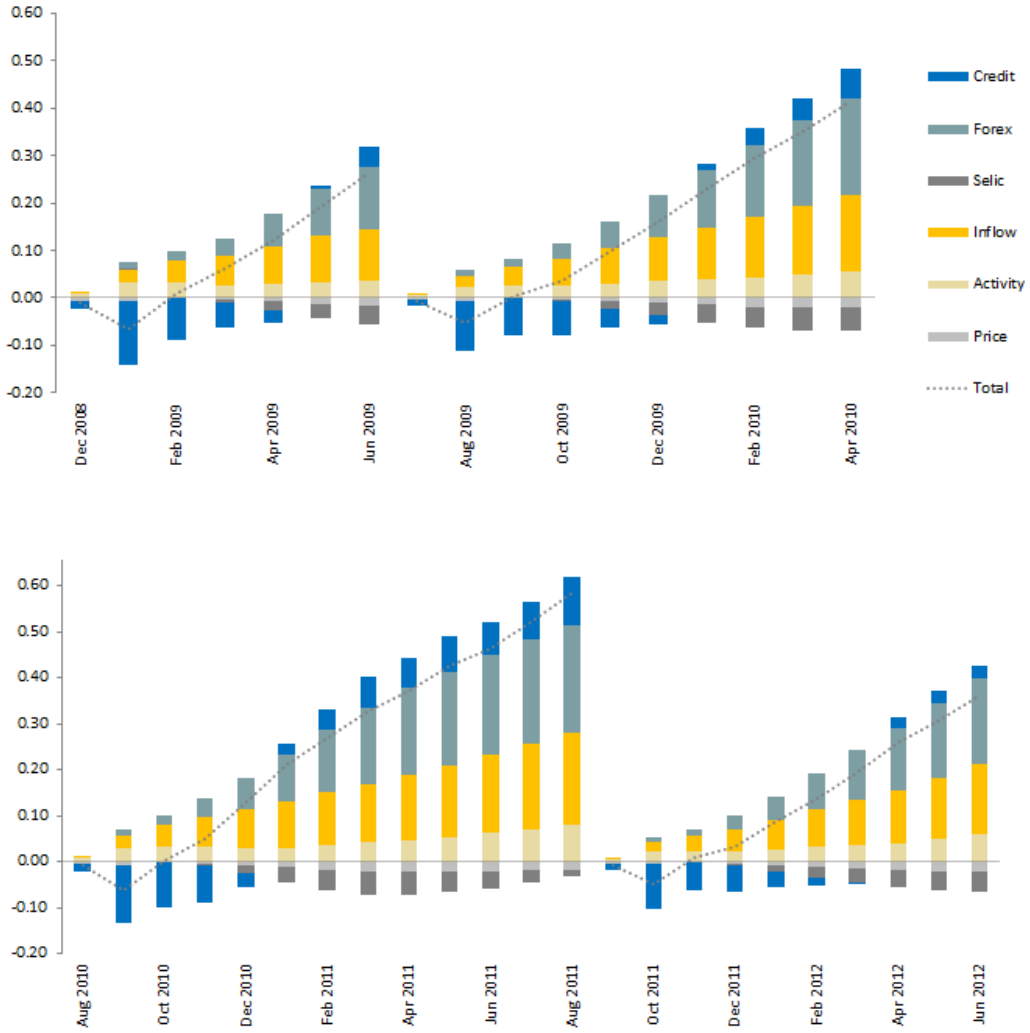
Source: Bloomberg

It may therefore be particularly relevant to consider Brazil's experience with the transmission of unconventional monetary policies from advanced economies, with a focus on price incentives driving different carry trade operations. Brazil's relatively open capital account, floating exchange rate regime and deep foreign exchange derivatives market have encouraged such operations. One may consider the approach in Barroso et al (2013), who use the historical correlation between international prices, capital inflows and domestic variables as the reference in constructing counterfactual scenarios for the domestic economy. Of particular interest are the effects on the term spread implied by the counterfactual scenarios.[5]

[5] The goal of quantitative easing policies has often been characterised as a qualitative goal for the term spread, especially in the case of the Federal Reserve. But the term spread responds to many structural shocks, and so it may summarise conflicting signals with respect to future developments. It appears that the sample was selected to reflect mostly liquidity shocks, and the robustness of the sample was thoroughly considered.

Of course, the quantitative results depend on the exact counterfactual scenario. What is interesting is that the qualitative results and the significance of the effects are robust to the specific scenario considered. These results point to the following responses to the Federal Reserve's implementation of unconventional monetary policies: higher capital inflows; exchange rate appreciation; stock market price increases; and a credit boom, with new credit extended mainly to households, stimulating retail sales and economic activity in general. According to a decomposition of the transmission channels proposed in Barroso et al (2013), capital inflows were consistently found to be the most important transmission channel of quantitative easing (QE) to other domestic variables (see Graph 5 for the case of domestic credit).

Propagation channels to domestic credit — Graph 5



Source: Authors' calculations

To give a quantitative, if arbitrary, idea of the results, consider the following scenario: had QE policies not been implemented by the Federal Reserve, the term

spread on US treasuries would have been 150 basis points higher.[6] In addition, if commodity prices and world trade volume were a bit lower, and emerging market spreads a bit higher, as predicted by a parsimonious vector autoregression model, the additional capital inflows resulting from QE2, for instance, would be of the order of US$ 100 billion. This result was associated with an additional 0.9% of GDP of non-earmarked credit to households, a fall of 5 percentage points in interest rates on reference loans, an increase of 12% of GDP in stock market value, and a nominal exchange rate appreciation of nearly 13%. Barroso et al (2013) estimate that the capital inflow channel accounts for 60% of the effects. Moreover, the capital inflow channel was the only channel that was consistently significant across variables and samples. Credit variables, including credit aggregates and interest rates, show a particularly acute sensitivity to the capital inflow channel.

Tapering and recent policy responses

The beginning of the discussion about the exit from accommodative monetary policies in advanced economies led to a repricing of risk and sell-off of emerging market assets. Since May 2013, many emerging market economies have seen depreciating exchange rates, increasing bond yields and credit default swaps and, in many cases, falling stock market prices. In the case of Brazil, the elimination in June 2013 of the financial transactions tax on incoming foreign fixed income investment and the continuous rise of the monetary policy target rate since April 2013 have helped to counteract the impact of Federal Reserve tapering.

The sell-off has manifested itself mostly in a search for protection, rather than in actual outflows. Most of the selling pressure has come from foreign investors seeking to hedge their portfolios against currency devaluation, Brazilian companies hedging their foreign exchange liabilities, and foreign companies hedging their exposure to local assets. Brazil's Central Bank responded by using accumulated buffers to reduce volatility, avoiding abrupt changes that could potentially threaten macroeconomic stability. In order to mitigate risk, the Central Bank announced a program of regular daily FX interventions through foreign exchange swaps and dollar credit line auctions through August 2013. It offered US$ 2 billion in foreign exchange swaps and US$ 1 billion in credit line auctions every week. This program was recently extended, with modifications, through the first half of 2014. The amount of foreign exchange swaps to be offered was reduced to US$ 1 billion per week, and US dollar credit line auctions will be held as needed.

Macroprudential policies

It is well known that periods of excessive inflows and exchange rate market pressure are usually followed by reversal and exposure to tail risks. Ideally, the domestic

[6] This is about 75 basis points higher than the announcement effects estimated in the literature, assuming that the non-observable scenario with an unconventional policy "turned off" actually deteriorates.

policies adopted under more favourable circumstances would build enough policy space to cope with higher volatility should it be needed in the future. For instance, the regulatory regime for capital flows may be strengthened during periods of particularly heavy inflows and relaxed when they suddenly dry up. In the five years since the financial crisis, EMEs have experimented with such policies, and it is possible to begin to take stock of their effectiveness. We consider capital controls, foreign exchange intervention and macroprudential policies in turn.

Capital control measures were introduced by many EMEs, including Brazil, Chinese Taipei, Indonesia, Korea and Thailand, particularly in late 2010 and early 2011 – that is, before the worsening of the euro crisis. The most recent research at the IMF suggests that such measures have discouraged not only portfolio flows but also total capital flows (Ahmed and Zlate (2013)).

Brazil's recent elimination of its capital inflow tax illustrates the effectiveness – in the other direction – of another type of policy. On 4 June 2013, as concern about tapering was increasing exchange rate volatility and stimulating capital outflows, Brazil reduced its Financial Transactions Tax (IOF) on foreign inflows into fixed income securities from 6% to 0%. The three-month moving average of net inflows by foreigners into fixed income securities went from US$ 0.8 billion in April to US$ 4.3 billion in July. At the same time, combined net stock and credit inflows by foreigners dropped from US$ 3.4 billion in April to US$ –2.3 billion in July. Therefore, the end of the IOF tax on capital inflows, along with the steepening of the domestic yield curve, apparently helped to offset capital outflows.

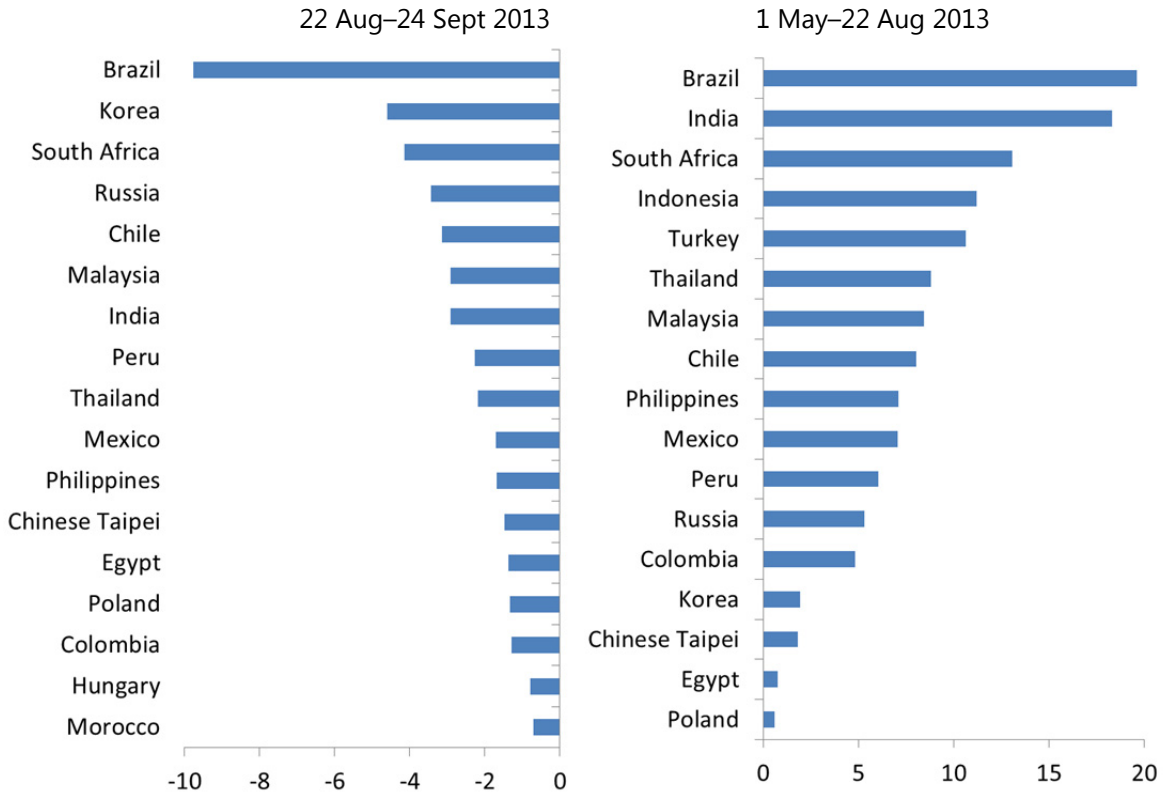
Emerging markets anticipated by a decade the macroprudential approach of accumulating international reserves to hedge against the effects of external shocks on the domestic financial system. International reserves should be sizeable to enable credible intervention when it is needed most.[7] Intervention policies may vary according to specific events. For instance: (i) swap instruments may address a futures market squeeze (margin calls, rollover risk or simply hedging demand); (ii) repo agreements directed at foreign trade may mitigate a credit squeeze; and (iii) intervention using international reserves directly may provide liquidity in a stressed spot market.

As mentioned above, the recent extensive use of swap instruments reflects the perception of high hedging demand. Since the future and the spot markets are linked by arbitrage, the intervention also alleviates depreciation pressures in the spot market. After depreciating almost 20% from 1 May to 22 August 2013, the Brazilian real appreciated almost 10% from 22 August to 24 September, attesting to the effectiveness of the policy along this dimension (see Graph 6). Also, the risk reversal indicator for the real decreased from 2.75 to 1.80, in absolute terms, right after the announcement of the FX intervention program, which shows that the policy reduced tail risk. Although other market events have since driven the exchange rate and tail risks, it is clear that there are effective tools available to address excessive volatility.

[7] A possible measure of reserve adequacy would consider severe scenarios of portfolio outflows and export contraction, say the 90% percentile of such contractions in absolute value. By this measure, international reserves in Brazil increased from one year in 2001 to four years in 2013, in year equivalents to a severe and protracted balance of payments crisis.

Exchange rate depreciations

Graph 6



Source: Authors' calculations

As regards macroprudential policies that target the banking sector specifically, the most recent research at the IMF suggests that they are effective in reducing procyclicality (Claessens and Ghosh (2012)). Macroprudential policies are effective in reducing growth in non-core liabilities most associated with capital flows. According to the same study, reserve ratios are most effective in dampening asset growth and leverage.

During the 2008–09 financial crisis, Brazil used reserve requirements to redistribute liquidity among financial institutions. Reserve ratios proved to be an effective tool in reducing cross-sectional financial instability resulting from the different sensitivity of individual financial institutions to external funding shocks or tighter domestic funding conditions, or simply from the exposure of their assets to the international environment. This is a tested tool that Brazilian policymakers can use if conditions require. In light of the growing integration of the global economy, the development of macroprudential tools in the context of international shocks is of the highest importance.

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