

Foreign banks and credit conditions in EMEs

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Abstract

A large literature assesses the benefits that foreign banks bring to emerging market economies (EMEs), drawing evidence from datasets that track the ownership of banks located in a particular country. Similarly, previous work has demonstrated that cross-border credit – both direct cross-border credit and indirect cross-border credit that is routed via resident banks – fuelled the boom-bust credit cycle in EMEs around the 2007–09 financial crisis. This paper explores this credit cycle from a different perspective, using a dataset that simultaneously delineates between bank ownership and the location of the borrowers. This helps to isolate the share of total bank credit – which includes domestic credit and cross-border credit to non-banks – that is provided by foreign banks, a measure that is not possible to construct using the standard ownership datasets. The results suggest that cross-border credit did exacerbate the credit cycle, but that foreign banks did not necessarily have a destabilising effect since their local operations (ie local lending funded in the local currency) were a source of stability. In short, what matters is the type of bank claim rather than bank ownership.

Keywords: International banking, foreign banks, Global Financial Crisis, BIS international banking statistics

JEL classification: F34, G01, G21

¹ Bank for International Settlements.

1. Introduction

The experience of the 2007–09 financial crisis put a spotlight on the destabilising effects of international credit flows. Rapid growth in international credit, primarily cross-border credit, contributed greatly to a rise in credit-to-GDP ratios in those countries that were hit hardest once the crisis was under way.

International bank credit, broadly defined, is credit that is backed by liabilities outside the borrower country. Such credit can be extended directly cross-border, or can be booked by banks in the borrower country and backed by cross-border liabilities. Either way, the support for this credit comes from something other than the domestic deposit base. Previous work, most notably Borio et al (2011), Avdjiev et al (2012) and CGFS (2012), dissects the dimensions of international bank credit and shows how it contributed to credit booms in the years before the global financial crisis. As noted in Avdjiev et al (2012), “international credit bears watching because, in many boom-bust credit cycles in the past, such credit tended to grow faster than overall credit during the boom”.²

But is “international credit” synonymous with “foreign bank credit”? How are these concepts similar, how are they different? This paper builds on the earlier work mentioned above by investigating the role that foreign banks played in facilitating credit booms in emerging market economies (EMEs). *Direct* cross-border credit – where banks outside the borrower country extend credit to non-banks inside the country – is, almost by definition, extended by foreign banks. Thus, in those countries where direct cross-border credit drove the domestic credit boom, foreign banks obviously have a central role (Hills and Hoggarth (2013)). But *indirect* cross-border credit – whereby banks in the borrowing country fund their domestic credit to non-banks with cross-border liabilities – was the driving factor in many countries. And in these countries, both foreign and domestic banks are potentially culpable.

To lay the groundwork, in Section 2 we use the BIS international banking statistics (IBS) to first review the dimensions of international credit to non-banks in a particular borrower country. In addition to the direct and indirect channels mentioned above, we also examine the share of credit denominated in foreign currencies.

We then introduce a measure of foreign bank participation in borrower countries, defined as the share of total bank credit to non-banks that is extended by foreign-owned banks, whether they are located in the borrower country or abroad. This measure differs from those used in previous studies on foreign bank ownership. First, its starting point is *total* bank credit to non-banks in a country, which places the focus squarely on the borrower. By contrast, most existing work places the focus on the banking sector in a particular country and the share of banks that are foreign owned. While this has the advantage of capturing the full balance sheet of these foreign banks’ local operations, such measures suffer from two problems. First, the lack of granularity in the data means that the share of credit directed to resident borrowers cannot be isolated. Second, these measures by construction miss the cross-border credit extended by foreign banks outside the country to non-banks in the country.

From there, we investigate two main questions using a sample of 30 EMEs. First, what characteristics explain the differences in foreign bank participation rates across countries? In Section 3, we link our measure of foreign bank participation to country

² See also Domanski et al (2011).

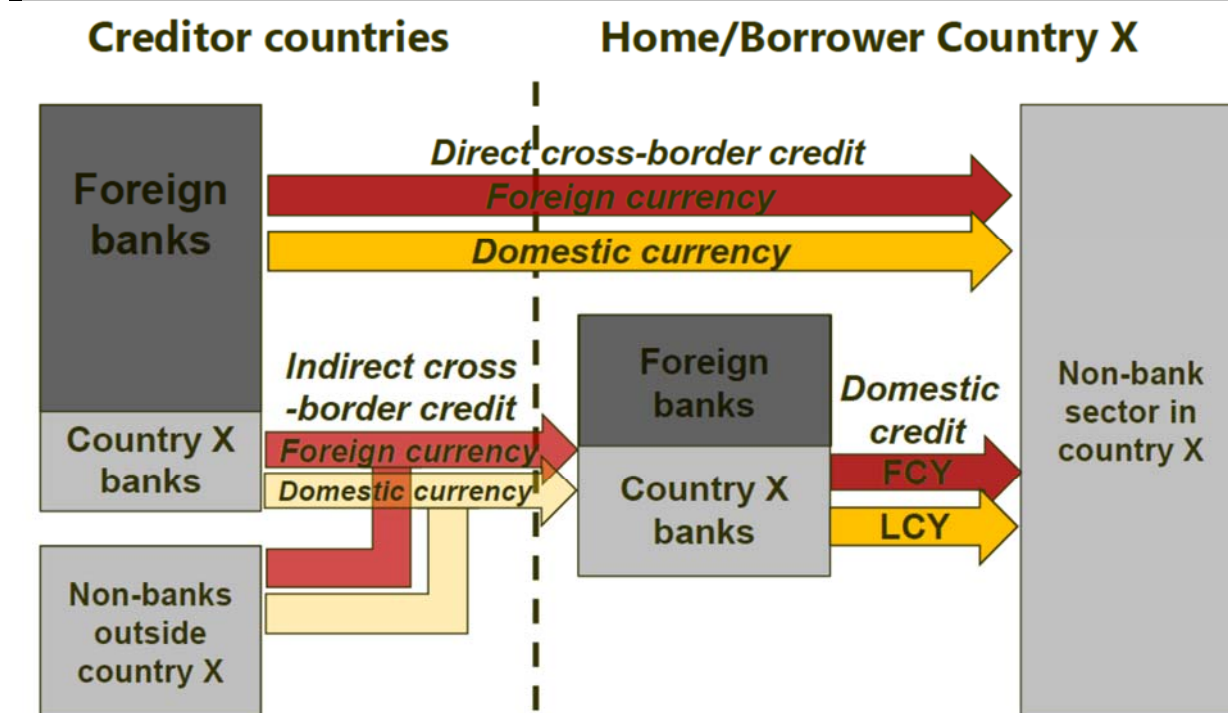
characteristics that capture market development, financial openness and size. Unsurprisingly, we find that countries with more open capital accounts, and with larger domestic financial sectors, tend to have a higher share of total bank credit that is provided by foreign headquartered banks.

Second, what role did foreign banks play in the credit booms pre-crisis and in the post-crisis busts? For this analysis in Section 4, we adopt the framework used in Avdjiev et al (2012) and examine the drivers of credit booms, defined as the change in a borrower country's credit-to-GDP ratio in the 2002–08 period. We find that countries with a higher foreign bank participation rate tended to have greater increases in their credit-to-GDP ratios in the pre-crisis period. However, much of this was driven by the role of international credit, or credit backed by liabilities outside the country and which proved to be highly unstable during the crisis. Evaluating the role of foreign banks *independent* of the type of credit, by simultaneously including measures of international credit and the foreign bank participation rate in the regression framework, yields a more nuanced view. The results of this exercise suggest that international credit, much of which was indeed provided by foreign banks, remained the key driver of credit booms. But foreign banks' local operations in borrower countries were a source of stability, particularly if these local operations were funded with local liabilities.

Section 5 concludes with some policy implications. Post-crisis regulatory initiatives have been targeted at making banks safer, and have provided policy makers with more tools to monitor, and counter if necessary, excessive growth in cross-border bank credit. For example, "jurisdictional reciprocity", a provision in the Basel III framework, can potentially help supervisory authorities take a coordinated approach in their application of capital buffers through the business cycle. The lessons learned from the 2002–10 boom-bust cycle in global bank credit may apply to overall credit growth cycles as well. Post-crisis, many internationally active creditor banks have reduced their global footprint. In response, corporations around the world, but particularly in EMEs, have taken advantage of low dollar borrowing costs in bond markets. The lessons from the bank-induced boom-bust credit cycle documented here should have a bearing on how policy makers think about the post-crisis surge in "non-bank-to-non-bank" capital flows via bonds, for which fewer regulatory tools are available.

2. The dimensions of international bank credit

To assess the role that foreign banks play in the credit cycle in particular countries, we combine various slices of the BIS IBS with national data on domestic bank credit (ie Domestic Credit from the IMF *International Financial Statistics*). Our approach follows closely that used in Avdjiev et al (2012), which detailed several of the dimensions of international credit shown in Graph 1. We build on that analysis, however, by extending the metrics considered to include *ownership*, with a focus on the foreign bank participation rate in selected EMEs. As discussed below, foreign banks can be a source of stability or can contribute to credit booms in borrower countries, depending on how these banks' operations are structured.



The BIS IBS are particularly well suited for this exercise because they contain various breakdowns that are not generally available in other sources of data used to examine the role that foreign banks play (eg Bankscope and SNL Financial). In particular, for banks' claims (ie assets) positions, the IBS contain information about the location (country) and sector of the counterparty. In addition, they also show banks' claims on a particular country separately by location of the booking office. Thus, banks' cross-border claims on counterparties in country X can be identified separately from their claims booked by their affiliates (ie branches and subsidiaries) located in the borrower country (ie "local" claims).³

With this starting point, we use slices of the BIS IBS (both the BIS consolidated banking statistics (CBS) and the BIS locational banking statistics (LBS)) to derive estimates of the various "dimensions" of international credit. The first two focus on the extent to which credit to non-banks is supported by funding from outside the country. This takes the form of *direct cross-border credit*, whereby banks outside the country lend cross-border to non-banks inside the country, and *indirect cross-border credit*, whereby banks inside the country finance their domestic credit by funding it with cross-border liabilities. In both cases, the funding that supports the credit to non-banks is sourced outside the borrower country.

To be concrete, we construct the following ratios:

³ It is important to note that the BIS IBS are not at the level of individual banks. Rather, they are aggregated either by location of booking office (eg banks in the United Kingdom, tracked in the BIS Locational Banking Statistics (LBS)) or by nationality of the parent banks (eg UK-headquartered banks, tracked in the BIS Consolidated Banking Statistics (CBS)).

- a. Direct cross-border (XB) bank credit share: Share of cross-border credit to non-banks in total bank credit to non-banks. Total bank credit to non-banks is domestic credit, as reported in the IMF *International Financial Statistics*, plus total cross-border credit to non-banks in the country, from the LBS.

$$\text{Direct XB Share} = \frac{XB^{NB}}{DC + XB^{NB}}$$

- b. Direct plus indirect cross-border bank credit share: Share of direct cross-border bank credit to non-banks and net cross-border borrowing by banks in the country to total bank credit to non-banks in the country. This latter piece is the amount of domestic credit extended by banks in the country that is financed by cross-border liabilities; in other words, credit to non-banks in the country *via banks in the country*.

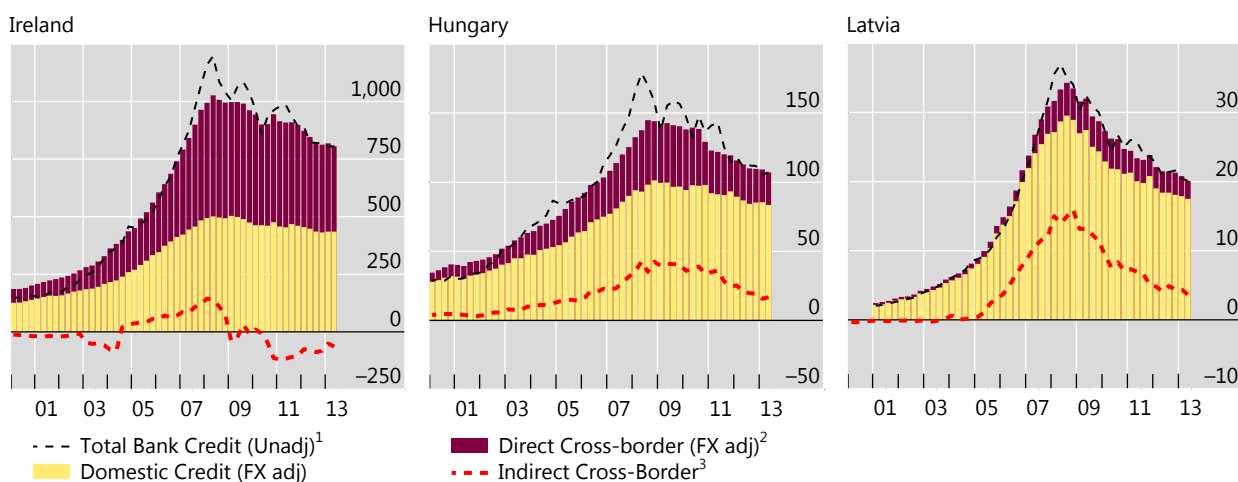
$$\text{Direct + Indirect XB Share} = \frac{XB^{NB} + \text{NetXB bank liab}}{DC + XB^{NB}}$$

Several country cases in Graph 2 highlight to varying degrees the roles that direct and indirect cross-border credit played in the run-up to the 2007–09 financial crisis. As Avdjiev et al (2012) make clear, a focus on only one piece is clearly incomplete. Direct cross-border credit to non-banks in Ireland (left-hand panel) accounted for more than half of the stock of total bank credit to non-banks in the country by 2008. In Hungary and Latvia (centre and right-hand panels), indirect cross-border credit played a more important role (dashed red lines). Foreign banks channelled funds (interoffice) cross-border to their subsidiaries in these countries, which in turn extended foreign currency loans to residents (McCauley (2010)).

Direct and indirect bank credit to non-banks in selected European countries¹

In billions of US dollar at constant end-Q2 2013 exchange rates¹

Graph 2



¹ The stacked bars indicate total bank credit expressed in US dollars at constant end-Q2 2012 exchange rates, and thus exclude changes in stocks due to movements in exchange rates. The dotted black line shows unadjusted total bank credit converted into US dollars at contemporaneous exchange rates. ² BIS reporting banks' cross-border claims on non-banks located in the country in the panel title. ³ Net cross-border borrowing (liabilities minus claims) by banks located in the country. For non-BIS reporting countries (Hungary and Latvia), BIS reporting banks' net cross-border claims on banks in the country.

Sources: IMF, *International Financial Statistics*; BIS locational banking statistics; BIS consolidated banking statistics; authors' calculations.

This highlights the importance of *foreign currency credit*, which introduces vulnerabilities for both the borrower country, which may face difficulty in repaying this credit if the domestic currency depreciates, and for the creditor banks, which absorb much of the associated losses. Importantly, this vulnerability can arise regardless of whether the credit is locally-booked or extended cross-border. Previous work has focused primarily on foreign currency-denominated *cross-border* bank credit, which is available directly in the BIS LBS. The difficulty has always been getting reasonable estimates of the share of foreign currency credit in domestic credit. For some countries (ie those that report in the BIS LBS), we are able to measure the foreign currency component of domestic bank credit relatively precisely. For others, the approach taken here is to estimate this share using various combinations of the BIS IBS, as described in the Appendix. These estimates are not perfect, but they are arguably more complete than assuming that domestic credit is denominated in the domestic currency, a common but very strong assumption. With this caveat in mind, the third dimension of international credit that we explore is:

- c. **Foreign currency share:** The share of total bank credit that is denominated in currencies other than the currency of the host country. See the Appendix for a description of how the numerator is constructed.

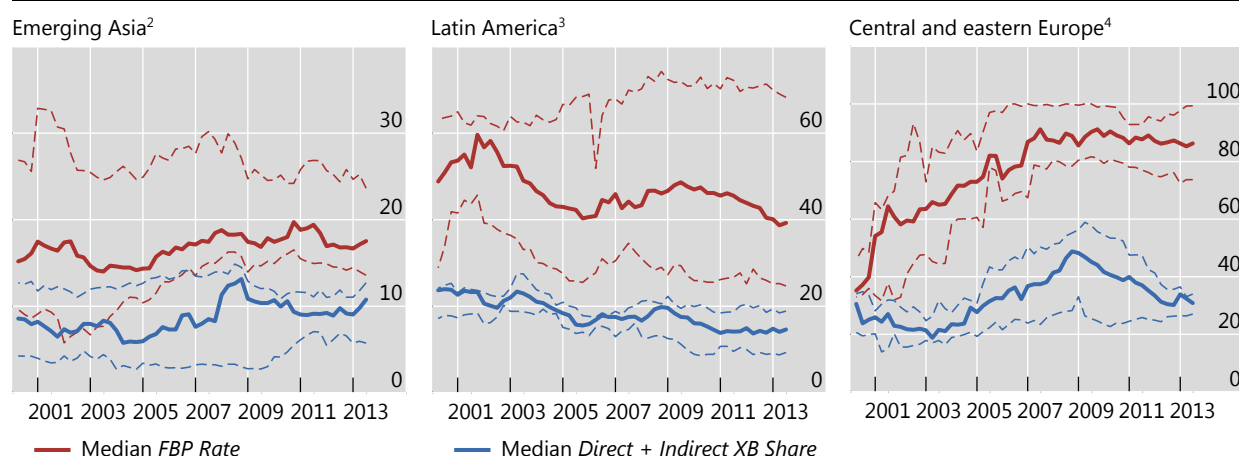
$$FRN\ Cur\ Share = \frac{Frgn\ Curr\ Credit}{DC + XB^{NB}}$$

Finally, we introduce our key metric of interest in this paper, the foreign bank participation rate (*FBP Rate*) (Graph 3). The focus of the first two ratios above is the national border of the borrower country; they track the extent to which credit is booked and/or funded outside the country. By contrast, the *FBP Rate* focuses squarely on the ownership of the banks that extend credit, regardless of whether the booking office is located inside or outside the country (McGuire and Tarashev (2005a, 2005b)).

Median foreign bank participation rates and international credit shares¹

In per cent

Graph 3



¹ Solid lines depict the median value of the indicator listed in the legend while dashed lines of the same colour depict the upper and lower quartile values. ² Emerging Asia includes China, Chinese Taipei, India, Indonesia, Korea, Malaysia, the Philippines and Thailand. ³ Latin America includes Argentina, Brazil, Chile, Colombia, Mexico and Peru. ⁴ Central and eastern Europe includes Bulgaria, the Czech Republic, Estonia, Hungary, Lithuania, Poland, Slovenia, Slovakia, Romania and Turkey.

Sources: IMF, *International Financial Statistics*; BIS consolidated banking statistics.

- d. Foreign bank participation rate (*FBP Rate*): The denominator is that used above: total bank credit to non-banks in a borrower country. The numerator is the amount of this total credit that is booked by banks headquartered outside the borrower country. This includes foreign banks' international claims on non-banks ($INTL^{NB}$), comprised of cross-border claims (in all currencies) plus claims extended by bank affiliates inside the borrower country and denominated in non-local currencies; as well as these affiliates' locally-extended claims in the local currency (LL). For this latter piece, the parameter α denotes the estimated share of LL to the non-bank sector.⁴

$$FBP\ Rate = \frac{INTL^{NB} + \alpha * LL}{DC + XB^{NB}}$$

The *FBP Rate* differed markedly across regions in mid-2013, with wide variation across countries within each region. Asia-Pacific EMEs stood out with relatively low median *FBP Rates* (Graph 3, left-hand panel). As shown in Graph 4, the *FBP Rate* for China remained at below 3% until mid-2013, just slightly higher than a decade ago. Similarly, Chinese Taipei, Korea and Thailand all had *FBP Rates* below 20% in recent years. Central and eastern Europe, by contrast, had a higher median rate, near 80% (Graph 3, right-hand panel), with the Czech Republic, Hungary and Poland the main drivers (Graph 5). Latin America (Graph 3, centre panel) has its share of countries with relatively high rates (eg Mexico and Chile, Graph 5), but also countries with relatively low rates (eg Brazil).

How do *FBP Rates* in EMEs compare with the other dimensions of international credit discussed above? Graph 4 plots the four metrics for nine Asia-Pacific EMEs, and Graph 5 for nine EMEs in Latin America (top row), eastern Europe (middle row) and elsewhere (bottom row). For several of these economies, both the level and the evolution of the *FBP Rates* are similar to those for the other metrics. This is particularly true for Hungary, India, Indonesia and Russia, and to a lesser extent for the Philippines and Turkey. But in many others, the level of the *FBP Rate* is substantially higher than either the foreign currency share of credit (*FRN Cur Share*), or the share of direct and indirect cross-border credit in total credit (*Direct+Indirect XB Share*). This mainly reflects the fact that foreign banks in these countries have relatively large local operations that extend credit in the local currency. This drives up the *FBP Rate* but, if these foreign banks' local credit is also funded locally and in the local currency, then there is no contribution to either foreign currency credit or cross-border credit. As shown in McGuire and von Peter (2016), local currency credit that was also locally funded proved to be a source of stability in the wake of the financial crisis.

Across key developed countries (Australia, Japan and New Zealand) and financial centres (Hong Kong SAR and Singapore) in Asia-Pacific, *FBP Rates* are more varied (Graph 5, bottom row, and Graph 6). Australia (around 20% at end-2015) and Japan (<5%) are in line with the EMEs in the region. By contrast, New Zealand, where

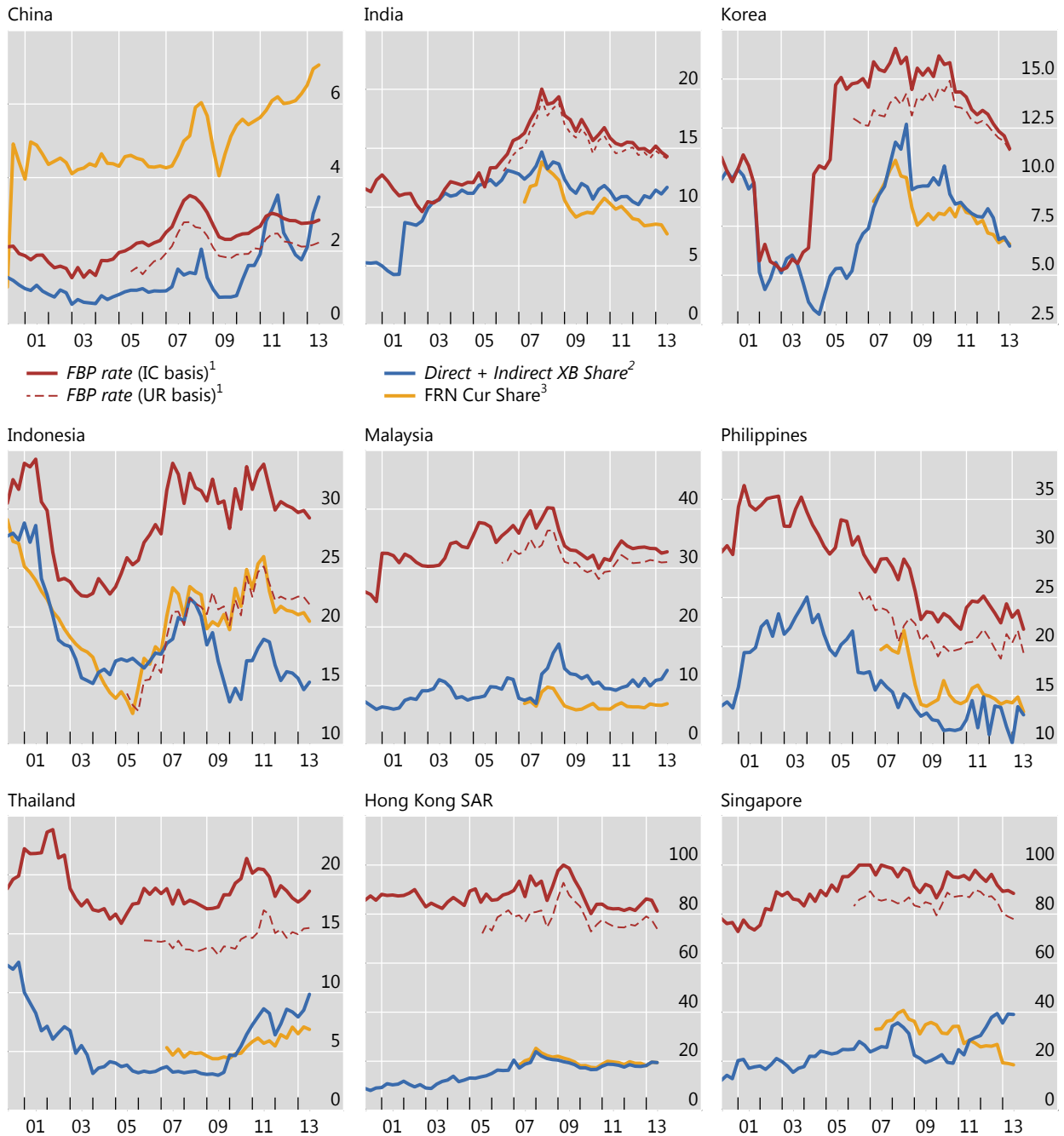
⁴ Using the CBS, there are two ways to construct the *FBP Rate*. The CBS on an ultimate risk basis (UR basis) provide a complete breakdown of foreign claims by counterparty sector, and thus total foreign claims on non-banks can be isolated in the numerator. Unfortunately, the CBS (UR basis) start only in 2005. By contrast, the CBS on an immediate risk basis (IR basis) used in this paper have a counterparty sector breakdown for international claims ($INTL$), but not for local claims in local currencies ($LCLC$), and thus not for total foreign claims ($FC = INTL + LCLC$). To estimate α , we use the share of claims on non-banks in total international claims. A comparison of the two versions of the *FBP Rate* post-2005 shows that they are very similar.

Australian banks have a large presence, and the financial centres of Hong Kong and Singapore all have exceptionally high *FBP Rates*, above 80%.

Dimensions of international credit to non-banks in Asia-Pacific

In per cent

Graph 4



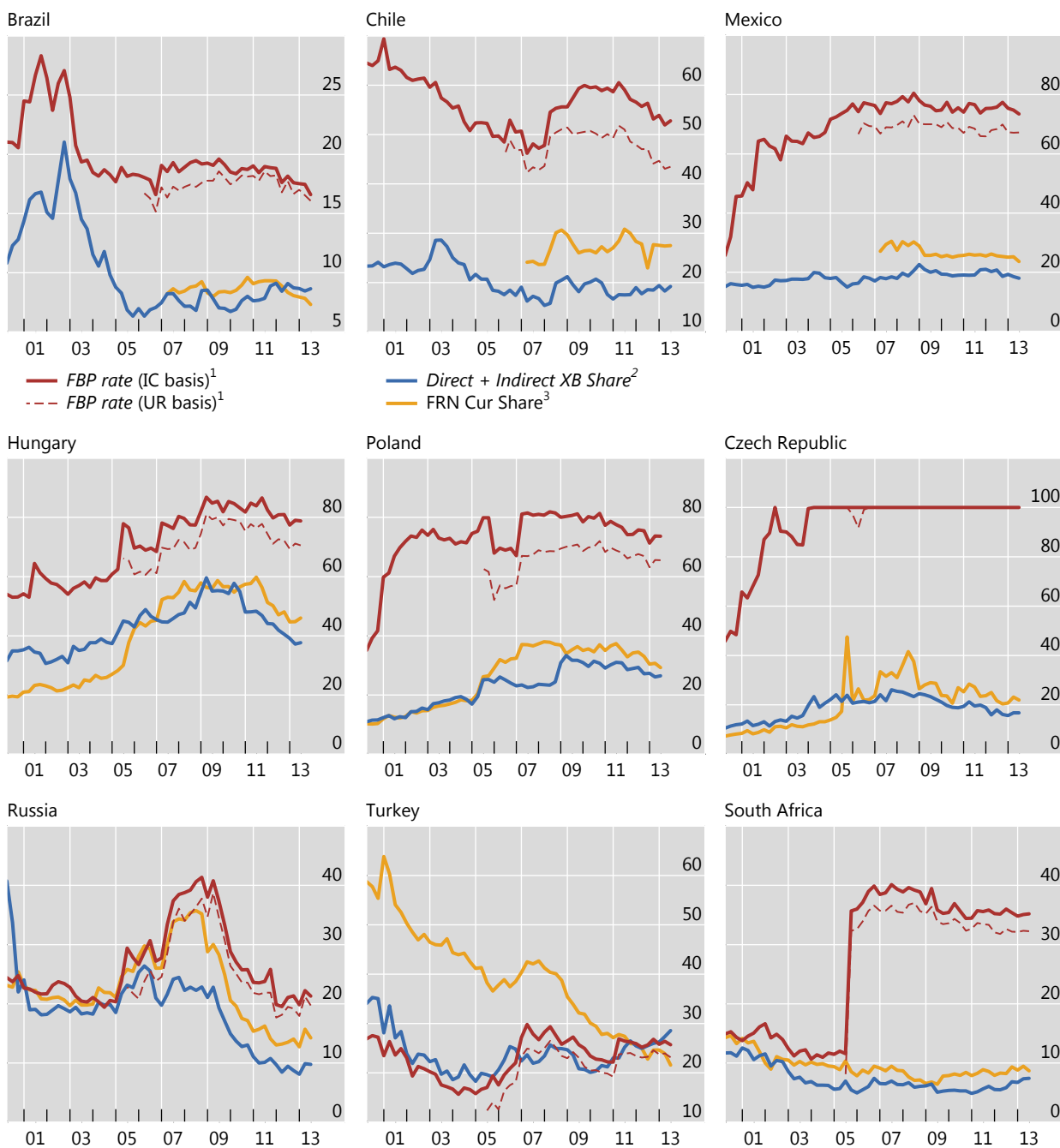
¹ The solid red line is the *Foreign Bank Participation Rate (FBP Rate)* based on the BIS Consolidated Banking Statistics (immediate counterparty (IC) basis). The dashed red line is the *FBP Rate* based on the BIS CBS (UR basis). See footnote 4 for a discussion of the differences in these rates. ² The ratio of BIS reporting banks' cross-border claims on non-banks located in the country *plus* net cross-border borrowing by banks located in the country (if positive) to total bank credit to non-banks in the country. Total bank credit is the sum of domestic credit to non-banks plus cross-border credit to non-banks. ³ Estimated share of total bank credit to non-banks that is denominated in currencies other than the domestic currency.

Sources: BIS consolidated banking statistics (IC basis and UR basis); BIS locational banking statistics; national data; authors' calculations.

Dimensions of international credit to selected emerging market economies

In per cent

Graph 5



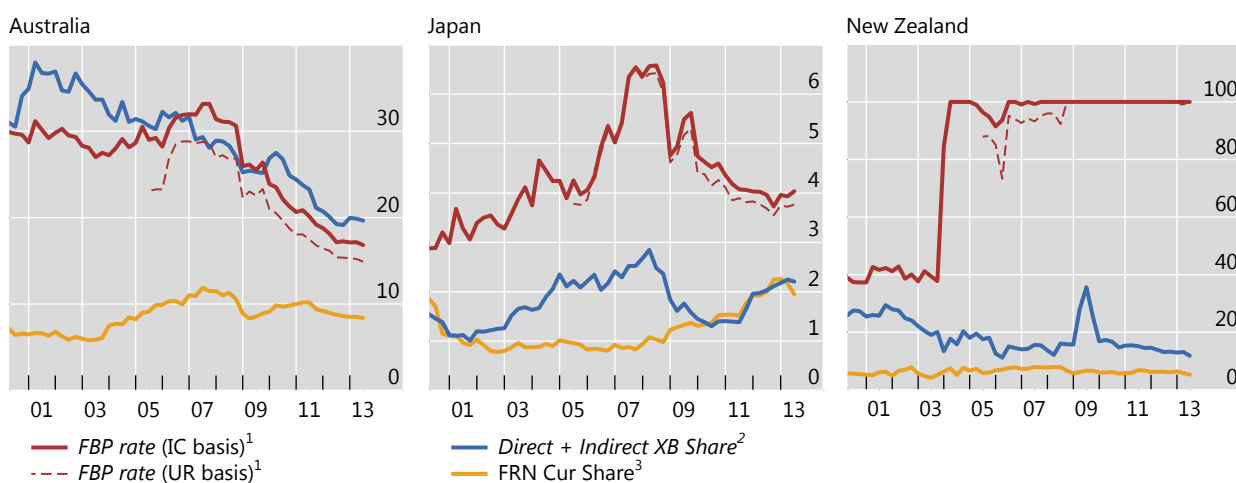
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Sources: BIS consolidated banking statistics (IC basis and UR basis); BIS locational banking statistics; national data; authors' calculations.

Dimensions of international credit in selected developed economies

In per cent

Graph 6



¹ The solid red line is the *Foreign Bank Participation Rate (FBP Rate)* based on the BIS Consolidated Banking Statistics (IC basis). The dashed red line is the *FBP Rate* based on the BIS CBS (UR basis). See footnote 4 for a discussion of the differences in these rates. ² The ratio of BIS reporting banks' cross-border claims on non-banks located in the country plus net cross-border borrowing by banks located in the country (if positive) to total bank credit to non-banks in the country. Total bank credit is the sum of domestic credit to non-banks plus cross-border credit to non-banks. ³ Estimated share of total bank credit to non-banks that is denominated in currencies other than the domestic currency.

Sources: BIS consolidated banking statistics (IC basis and UR basis); BIS locational banking statistics; national data; authors' calculations.

3. Foreign bank participation in EMEs

While there is an extensive literature on the role of foreign banks in EMEs (see Claessens and van Horen (2014) and references therein), our measure of foreign bank participation differs in a few important aspects. Many studies that focus on the ownership dimension of international banking have focused on the effect of foreign bank entry (eg Claessens et al (2001), De Haas and Van Lelyveld (2006), Claessens and van Horen (2014)), including cross-border mergers (Focarelli and Pozzolo (2001), Buch and DeLong (2004)). In these studies, ownership is the determining factor.⁵

Foreign bank activity measured in this way, however, does not capture the full extent of foreign banks' role in providing credit to non-banks in the host country. Specifically, standard ownership-based measures (a) miss the cross-border credit to non-banks in the country provided by foreign banks located outside, and (b) overstate the amount of credit that the resident offices of foreign banks provide to resident non-banks, since some of these banks' credit goes to borrowers outside

⁵ On the other side of the spectrum, a large number of other multi-country studies have focused solely on cross-border lending (see McGuire and Tarashev (2008), Čihák et al (2011), Popov and Udell (2012), Kalemli-Ozcan et al (2013), and references therein). Many of these studies do not capture the larger part of foreign bank activity which is conducted locally (see Graphs 4–6). Important exceptions are studies which look at financial shock transmissions through international banks (for instance Cetorelli and Goldberg (2011)) or modes of foreign bank activity (García-Herrero and Martínez Peria (2007), Buch et al (2011), Cetorelli and Goldberg (2012)).

the country. In other words, they do not simultaneously isolate the nationality of the creditor bank and the location of the non-bank borrower.

The *FBP Rate* measure introduced above captures both of these dimensions. It thus allows us to examine how foreign banks, whether located inside or outside the country, contribute to credit growth to borrowers inside the country. As a first check, and to convey the basic features of the *FBP Rate*, we conduct regression analysis to better understand what drives the variation in this measure across our sample of 30 EMEs.⁶ In particular, we are interested in how the *FBP Rate* correlates with widely-used measures of financial openness and financial development in EMEs. With annual data from 2002 to 2011, we run a linear panel regression of the form:

$$FBPRate_t^i = \mu + \beta \cdot FinOpenness_{t-1}^i + \gamma \cdot FinDevelopment_{t-1}^i + \varepsilon_t^i$$

where i denotes the borrower country and t denotes the year. For financial openness (*FinOpenness*) our main proxies are the Chinn-Ito index of capital account openness (Chinn and Ito (2008)), net inward FDI relative to GDP, and various measures of economic freedom from the Heritage Foundation.⁷ These latter measures are meant to capture the ease of conducting financial activity (eg the rule of law, regulatory efficiency, market openness), and include a measure of the cost to new firms of entering the financial industry (*financialFreedom*). Our indicators of financial development are the size of financial markets as well as the size of assets in the life insurance sector.⁸ In each regression, we also control for the size of the economy.

The results of this exercise are presented in Table 1, and confirm our intuition that greater openness is associated with higher *FBP Rates*. The coefficient on the Chinn-Ito index, for example, is in all specifications positive and highly statistically significant. The coefficients on other variables that indicate openness (eg the net inward FDI-to-GDP ratio and the measures of economic freedom) all tell a similar story. These measures go a long way in explaining the variation in *FBP Rates* across the sample, as evidenced by the relatively high R-squared values in virtually all model specifications.

While the above factors are clearly relevant for the level of foreign bank participation, they are not necessarily informative about how foreign banks influence credit conditions in EMEs. Higher foreign bank participation may lead to deeper credit markets, but may also mean that international financial shocks have a stronger negative impact on credit conditions. We assess in the next section the role of foreign banks, in particular in relation to the other dimensions of international credit, in the credit boom-bust cycles in EMEs around the financial crisis.

4. The role of foreign banks in boom-bust credit cycles

Many EMEs experienced rapid credit growth in the run-up to the 2007–09 global financial crisis, and a rapid credit contraction thereafter. To what extent did foreign headquartered banks contribute to this boom-bust cycle? To what extent were they a source of stability? Answering this question requires assessing the role of foreign banks independently from that of the other dimensions of international credit. In this

⁶ See the Appendix for the list of countries.

⁷ See <http://www.heritage.org/index>.

⁸ All of these indicators are taken from the World Bank's *Financial Structure and Development* dataset.

section, we use regression analysis to test whether the nationality of the creditor banks exacerbated or mitigated credit booms over and above the role played by measures of cross-border (direct and indirect) credit.

Characteristics of foreign bank participation in EMEs¹

Dependent variable: *FBP Rate*; annual data 2002–2011

Table 1

Model	(1)	(2)	(3)	(4)		(5)	(6)
Chinn-Ito index ²	56.96*** (14.23)	61.47*** (16.53)	57.47*** (13.35)	45.98*** (9.74)	Public bonds-to-GDP ratio ⁶	0.29* (1.86)	0.10 (1.06)
Net inward FDI-to-GDP ratio ³		0.59*** (2.70)	0.57*** (2.76)	0.43** (2.53)	Private bonds-to-GDP ratio ⁷	-0.34*** (-4.37)	-0.55*** (-7.02)
Overall economic freedom ⁴			0.34* (1.81)		Stock market capitalisation ⁸	0.04 (0.80)	0.10*** (3.02)
Property rights index ⁴				-0.16* (-1.82)	Life insurance premia ⁹	-2.20*** (-3.13)	-1.24** (-2.32)
Freedom from corruption index ⁴				-0.02 (-0.15)	Chinn-Ito index		56.60*** (10.16)
Business freedom index ⁴				-0.24* (-1.91)	Net inward FDI-to-GDP ratio ³		0.27 (1.47)
Monetary freedom index ⁴				-0.04 (-0.45)	Overall economic freedom ⁴		1.64*** (5.53)
Trade freedom index ⁴				0.35*** (3.60)			
Investment freedom index ⁴				0.27*** (2.73)			
Financial freedom index ⁴				0.48*** (5.13)			
log GDP ⁵	-5.80*** (-5.90)	-5.08*** (-5.57)	-4.84*** (-5.18)	-2.90*** (-3.09)	log GDP		0.87 (0.68)
Constant	43.99*** (6.66)	37.47*** (6.04)	17.82 (1.32)	-2.28 (-0.18)	Constant	44.48*** (10.64)	-90.64*** (-4.39)
No of obs.	348	312	312	312	No of obs.	236	229
Adj. R-squared	0.48	0.63	0.64	0.70	Adj. R-squared	0.07	0.64

Note: Values in parentheses are *t* statistics. Levels of statistical significance based on robust standard errors are indicated as follows: *** = 1%, ** = 5% and * = 10%.

¹ The table shows the results of panel regressions (models (1)–(6)) of the *FBP Rate* of country *i* year *t* on the various right-hand side variables listed in columns 1 and 6. All right-hand side variables pertain to borrower countries (ie are indexed by *i* and *t*). ² Capital account openness as measured by Chinn and Ito (2008), where the value for maximal openness is normalised to unity. It is based on binary dummy variables that codify restrictions on cross-border financial transactions reported in IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*. ³ Inward minus outward annual foreign direct investment (FDI) flows relative to annual nominal GDP. ⁴ Indices and subindices for economic freedom, where 0 denotes the lowest level and 100 the highest level of economic freedom. See the Appendix for a more detailed description of the individual indices. ⁵ Natural logarithm of annual nominal GDP in billions of US dollars. ⁶ Outstanding public domestic debt securities issued by the government as a share of GDP in per cent. ⁷ Outstanding private domestic debt securities issued by financial institutions and corporations as a share of GDP. ⁸ Ratio of stock market capitalisation to GDP in per cent. ⁹ Ratio of life insurance premia paid in a given country to GDP in per cent.

Sources: BIS international banking statistics; IMF, *World Economic Outlook*; IMF Direction of Trade Statistics; Heritage Foundation; Swiss Re, *Sigma*; World Bank Financial Structure and Development Dataset; authors' calculations.

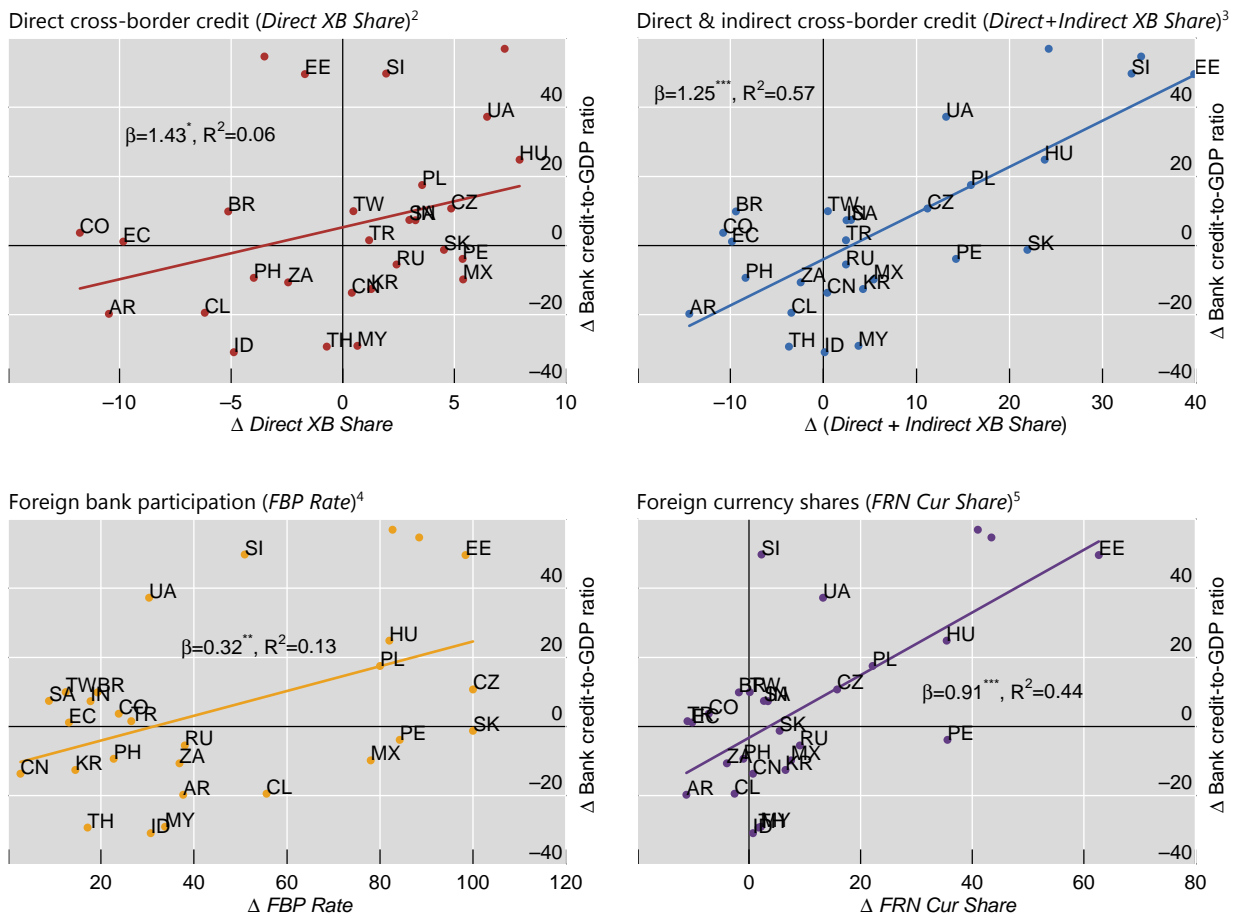
To assess the boom phase, we calculate the change in the ratio of total bank credit to GDP for each of the 30 countries in our sample over 2002–08, and then examine the drivers of the cross-sectional variation in this metric. Graph 7 shows this metric on the y-axis in each panel, and relates it to the dimensions of international

credit introduced in Section 2. As first shown in Avdjiev et al (2012), changes in the share of direct cross-border credit alone are not sufficient to explain the rise in credit-to-GDP ratios across the 30 EMEs in our sample (top left-hand panel). Adding the indirect share – ie cross-border net borrowing by resident banks to finance domestic credit – increases the explanatory power considerably (top right-hand panel).

International credit and foreign banks during the boom period (2002–08)¹

In per cent

Graph 7



¹ The y-axis in all panels shows the change in the ratio of total bank credit (including credit to governments) to GDP over the 2002–08 period. Total bank credit is the sum of domestic credit and cross-border bank credit to non-banks in the country. The lines indicate OLS predicted values. The regression coefficient β for each line is shown in the panel, with significance levels denoted as *** for 1%, ** for 5%, and * for 10%. ² The x-axis shows the change in the ratio of direct cross-border credit over total bank credit to non-banks. ³ The x-axis shows the change, over the 2002–08 period, in the ratio of direct cross-border credit plus net cross-border borrowing by banks in the country (if positive) to total bank credit to non-banks. ⁴ The x-axis shows the average foreign bank participation rate (*FBP Rate*) over the period 2002–08. ⁵ The x-axis shows the change in the estimated share of total bank credit denominated in foreign currencies over the 2002–08 period.

Sources: BIS international banking statistics; IMF, *International Financial Statistics*; authors' calculations.

Models (7) and (8) in Table 2 show that this basic result is robust to the inclusion of other control variables, in particular those used in the previous section. The key point is that cross-border credit, whether it was routed directly to non-banks or indirectly via resident banks, tended to be the *marginal* source of credit in EMEs, contributing greatly to rising credit-to-GDP ratios. As such, both forms of cross-

border credit bear watching by policy makers concerned about unsustainable credit growth.

Drivers of credit booms in EMEs (2002–08)¹

Dependent variable: change in bank credit-to-GDP ratio (2002–08)

Table 2

Model	(7)	(8)	(9)	(10)	(11)	(12)
Δ Direct XB Share ²	1.22** (2.09)					
Δ (Direct+Indirect XB Share) ³		1.09*** (4.90)			1.37*** (6.87)	
FBP Rate (average 2002–08) ⁴			0.07 (0.37)		–0.34*** (–4.03)	–0.29* (–1.89)
Δ FRN Cur Share ⁴				0.70*** (3.17)		0.92*** (4.21)
Bank credit-to-GDP ratio (end-2002) ⁶	–0.32*** (–4.29)	–0.26*** (–4.74)	–0.31*** (–3.38)	–0.25*** (–4.07)	–0.31*** (–6.67)	–0.28*** (–4.57)
Chinn-Ito index (end-2008) ⁷	18.69 (1.49)	–7.24 (–0.73)	15.14 (0.90)	1.22 (0.09)	3.85 (0.42)	10.97 (0.76)
Interest rate diff. (average 2002–08) ⁸	–1.29 (–1.63)	–0.92 (–1.30)	–1.51 (–1.60)	–0.75 (–0.84)	–1.25* (–1.80)	–0.91 (–1.02)
FX volatility (average 2002–08) ⁹	27.55** (2.19)	17.30* (1.86)	29.54* (1.99)	20.61* (1.73)	22.37** (2.57)	24.70* (2.06)
Constant	8.63 (0.82)	15.76 (1.53)	7.60 (0.54)	7.80 (0.75)	23.90** (2.67)	12.82 (1.33)
No of obs.	28	28	28	28	28	28
Adj. R-squared	0.42	0.69	0.35	0.55	0.75	0.58

Note: Values in parentheses are *t* statistics. Levels of statistical significance based on robust standard errors are indicated as follows: *** = 1%, ** = 5% and * = 10%.

¹ The dependent variable is the change in the ratio of total bank credit (including credit to governments) to GDP over the 2002–08 period. Total bank credit is the sum of domestic credit and cross-border bank credit to non-banks in the country. ² The change in the ratio of direct cross-border credit over total bank credit to non-banks. ³ The change in the ratio of direct cross-border credit plus net cross-border borrowing by banks in the country (if positive) to total bank credit to non-banks from 2002 to 2008. ⁴ Average of the *Foreign Bank Participation Rate* between 2002 and 2008. ⁵ Change in the estimated share of foreign currency credit in total bank credit from 2002 to 2008. ⁶ Total bank credit-to-GDP ratio at end-2002, as a measure of financial depth at the start of the sample period. ⁷ Capital account openness at end-2008 as measured by Chinn and Ito (2008), where the value for maximal openness is normalised to unity. It is based on binary dummy variables that codify restrictions on cross-border financial transactions reported in IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*. ⁸ The difference between short-term interest rates in each country and euro (for emerging European countries) and US dollar (for all other countries) short-term interest rates; average over the sample period. ⁹ Quarterly measure of exchange rate volatility generated from daily price data; average over the sample period. Eastern European exchange rates are measured against the euro; others against the US dollar.

Sources: BIS international banking statistics; IMF, *International Financial Statistics*; Bloomberg; authors' calculations.

But the question of whether foreign banks were or were not stabilising during this period remains. As noted above, direct cross-border credit is, almost by construction, provided by foreign banks. But indirect cross-border credit could pass through resident foreign banks or resident domestic banks. Moreover, foreign banks have large local claims positions in many EMEs (ie they contribute directly in domestic credit) that are mainly funded with local liabilities. Such locally-intermediated positions were found to be the most stable type of bank activity in the post-crisis period (Ehlers and Wooldridge (2015), McGuire and von Peter (2016)). Taken together, it is not clear *a priori* whether, overall, foreign banks contributed to, mitigated against, or had no effect on the rise in bank credit-to-GDP ratios in EMEs.

In a simple bi-variate regression (Graph 7, lower left-hand panel), the *FBP Rate* in the pre-crisis period (country average between 2002 and 2008) is positively related to the change in the credit-to-GDP ratio, albeit with considerably less explanatory power than the *Direct+Indirect XB Share* (top right-hand panel). By this measure, a greater presence of foreign banks seemed to contribute to the boom in total bank credit in the pre-crisis period. Note, however, that the *FBP Rate* is positively correlated with the (omitted) dimensions of international credit plotted in the top panels of Graph 7, and thus the result of this bi-variate regression may be biased.

To assess whether foreign bank participation had an effect on credit booms *independent of* the role of cross-border (direct and indirect) credit, we use a multivariate regression that includes both measures simultaneously, as well as additional controls (Table 2, Models (9) and (11)). With only the control variables (Model 9), the coefficient on the *FBP Rate* is statistically insignificant. However, a regression that simultaneously includes both the *FBP Rate* and the change in the *Direct+Indirect XB Share* (Model 11) tells a different story. Here, once the type of credit is explicitly controlled for, foreign bank participation seems to have had a dampening effect on credit booms in EMEs between 2002 and 2008.⁹ In other words, cross-border credit (direct + indirect) boosted credit-to-GDP ratios. But while foreign banks were the source of a much of this cross-border credit, their local operations, particularly if funded by local liabilities, were more stable.

Once the crisis was under way, credit growth in virtually every economy slowed, and cross-border credit actually contracted at an alarming rate.¹⁰ This went hand-in-hand with contractions in overall economic activity in many countries, as evidenced by negative GDP growth between 2007 and 2010. Did the presence of foreign banks help in mitigating these shocks? Were they a source of stability?

A priori, it is not clear that they would be, particularly given that the transmission of the crisis was largely through banks themselves. That is, the large internationally active banks that had piled into structured finance products (and that relied on unstable short-term dollar funding markets to do this) were hit hardest by the crisis. Shocks to their balance sheets elsewhere were the source of the shock to many EME borrower countries. At the same time, these global banks' local operations were, depending on the banking system, largely self-funding, and thus were insulated from the meltdown elsewhere on their consolidated balance sheets (McGuire and von Peter (2016)). As above, the relationship between the *FBP Rate* and the severity of the crisis in particular countries could go either way.

We assess this in Graph 8, which juxtaposes cumulative GDP growth (2008–10) against the level of the four different dimensions of international credit measured at end-2008 (x-axes).¹¹ Overall, a higher level of international credit at the onset of the

⁹ Including the foreign currency credit share and the *FBP Rate* yields similar results (Model (12)).

¹⁰ See Avdjiev et al (2012) for a discussion of global bank credit growth in the wake of the crisis. In particular, while cross-border credit contracted, the growth in total bank credit in most countries actually remained positive (albeit at much lower rates) once the effect of currency valuations is taken into account. In a sample of 59 economies, only in six did total bank credit actually contract once these adjustments are made.

¹¹ In contrast to the analysis above, the metric on the y-axes here is cumulative GDP growth (2008–10) rather than the change in the credit-to-GDP ratio. The reason for this switch is that credit-to-GDP ratios send misleading signals once a crisis is under way, since both the numerator and the denominator may be contracting but at different rates. If credit is sticky, because loans cannot be

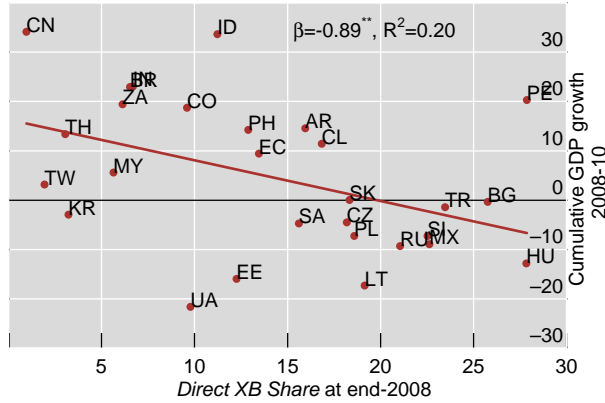
crisis was generally associated with lower GDP growth in its wake (top left-hand panel). As above, the *Direct+Indirect XB Share* seems to be most strongly associated with lower economic activity, although the *FBP Rate* and the *FRN Cur Share* at end-2008 are similarly strong predictors.

International credit and foreign banks during the bust period (2008–10)¹

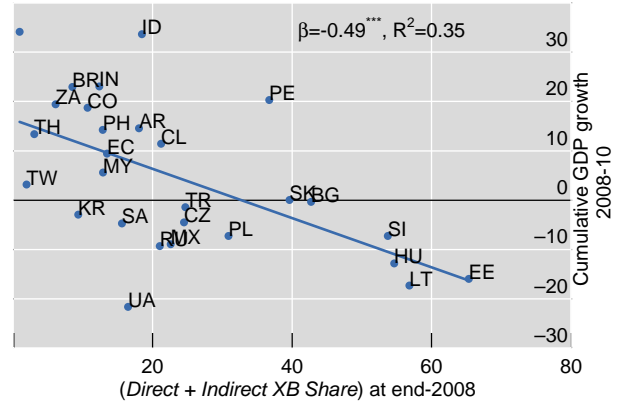
In per cent

Graph 8

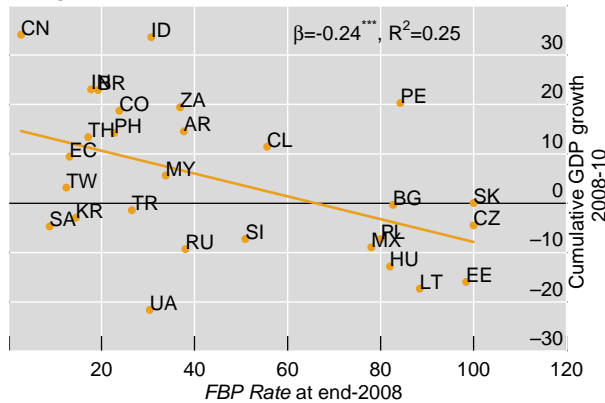
Direct cross-border credit (*Direct XB Share*)²



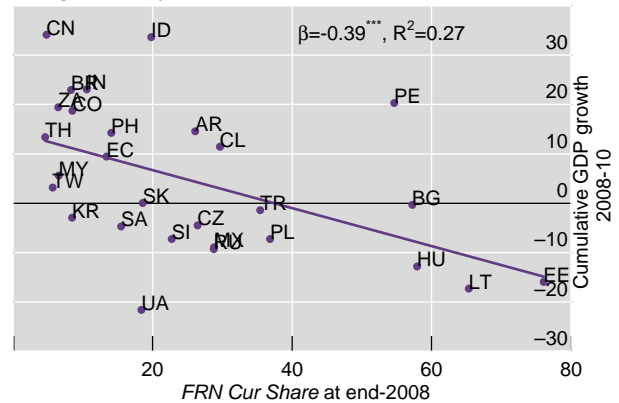
Direct & indirect cross-border credit (*Direct+Indirect XB Share*)³



Foreign bank participation (*FBP Rate*)⁴



Foreign currency shares (*FRN Cur Share*)⁵



¹ The y-axis in each panel shows the cumulative growth in GDP during the post-crisis period of 2008–10. The lines indicate OLS predicted values. The regression coefficient β for each line is shown in the panel, with significance levels denoted as *** for 1%, ** for 5%, and * for 10%. ² The x-axis shows the ratio of direct cross-border credit to total bank credit to non-banks (excluding governments) at end-2008. ³ The x-axis shows the ratio of direct cross-border credit plus net cross-border borrowing by banks in the country (if positive) to total bank credit to non-banks, at end-2008. ⁴ The x-axis shows the estimated *FBP Rate* at end-2008. ⁵ The x-axis shows the estimated share of total bank credit denominated in foreign currencies at end-2008.

Sources: BIS international banking statistics; IMF, *International Financial Statistics*; authors' calculations.

However, as shown in the multivariate regressions in Table 3, the destabilising role of foreign banks in the wake of the crisis is not so clear. A regression with the *FBP Rate* and controls (Model 15) indeed yields a negative coefficient that is significant at the 90% level. Taken at face value, a higher degree of foreign bank participation when the crisis started is associated with lower cumulative GDP growth later. This is consistent with stories that attribute the shock to EME borrowers to

called before they mature, and GDP growth takes a hit, credit-to-GDP ratios may well increase in response to a banking crisis.

supply shocks that hit those creditor banks that had invested heavily in the structured finance products that proved to be so toxic. Note, however, that in multivariate regressions that attempt to isolate the role of bank ownership from credit type, this result disappears. That is, in models that include the *Direct+Indirect XB Share* or *FRN Cur Share* measured on the eve of the crisis (Models 17 and 18), the coefficient on the *FBP Rate* is no longer significant. Claim type rather than ownership seems to have mattered more in the bust phase.

Post-crisis cumulative GDP growth in EMEs¹

Percentage changes and shares						Table 3
Model	(13)	(14)	(15)	(16)	(17)	(18)
<i>Direct XB Share</i> (end-2008) ²	-1.29** (-2.25)					
<i>Direct+Indirect XB Share</i> (end-2008) ³		-0.68*** (-3.63)			-0.72*** (-3.07)	
<i>FBP Rate</i> (end-2008) ⁴			-0.22* (-1.84)		0.03 (0.20)	-0.11 (-0.95)
<i>FRN Cur Share</i> (end-2008) ⁴				-0.46** (-2.48)		-0.34* (-1.99)
Bank credit-to-GDP ratio (2008) ⁶	0.34 (0.02)	11.92 (0.92)	-4.90 (-0.40)	4.24 (0.32)	11.95 (0.90)	5.99 (0.43)
Chinn-Ito index (2008) ⁷	-0.17* (-1.87)	0.01 (0.17)	-0.06 (-0.77)	-0.02 (-0.25)	0.02 (0.21)	-0.03 (-0.32)
Interest rate diff. (average 2008-10) ⁸	-0.21 (-0.21)	0.77 (0.83)	-0.53 (-0.59)	0.41 (0.39)	0.83 (0.85)	0.25 (0.23)
FX volatility (average 2008-10) ⁹	-4.92 (-0.93)	-9.19 (-1.68)	-3.62 (-0.65)	-7.22 (-1.28)	-9.60* (-1.94)	-6.03 (-1.16)
Constant	40.72*** (4.20)	16.37 (1.63)	28.50*** (3.08)	19.84* (1.92)	15.75 (1.41)	21.52* (1.90)
No of obs.	27	27	27	27	27	27
Adjusted R-squared	0.24	0.34	0.19	0.23	0.30	0.22

Note: Values in parentheses are *t* statistics. Levels of statistical significance based on robust standard errors are indicated as follows: *** = 1%, ** = 5% and * = 10%.

¹ The dependent variable is cumulative growth in GDP during the post-crisis period of 2008–10. ² The change in the ratio of direct cross-border credit over total bank credit to non-banks. ³ The ratio of direct cross-border credit plus net cross-border borrowing by banks in the country (if positive) to total bank credit to non-banks at end-2008. ⁴ *Foreign Bank Participation Rate* at end-2008. ⁵ Estimated share of foreign currency credit in total bank credit at end-2008. ⁶ Total bank credit-to-GDP ratio at end-2008, as a measure of the size of the boom. ⁷ Capital account openness at end-2008 measured by the Chinn-Ito index, where the value for maximal openness is normalised to unity. See the Appendix for more detail. ⁸ The difference between short-term interest rates in each country and euro (for emerging European countries) and US dollar (for all other countries) short-term interest rates; average over the period 2008–10. ⁹ Quarterly measure of exchange rate volatility generated from daily price data; average over the period 2008–10. Eastern European exchange rates are measured against the euro; others against the US dollar.

Sources: BIS international banking statistics; IMF, *International Financial Statistics*; Bloomberg; authors' calculations.

To summarise the results of this section, cross-border credit had a destabilising effect in the pre-crisis boom phase in EMEs. And in the bust phase, countries that were more heavily reliant on cross-border credit on the eve of the crisis suffered larger contractions in GDP growth in subsequent years. In both phases, foreign banks' local operations were a source of stability. On the one hand, foreign banks were (generally speaking) the sole source of pure direct cross-border credit, which drove up credit-to-GDP ratios. On the other hand, foreign banks had large local operations which

drove up foreign bank participation rates. In cases where these were locally funded with local currency (eg Spanish banks in Latin America), foreign banks were a stabilising force.

5. Conclusions and policy implications

What role do foreign banks play for credit conditions in EMEs? This paper builds on the earlier work by Avdjiev et al (2012) by investigating the role that foreign banks played in facilitating the pre-crisis credit booms and post-crisis credit busts across emerging economies. Our findings suggest that it is not bank ownership that matters per se, but rather the structure of bank credit and how it is funded. Direct and indirect cross-border credit shares were more relevant determinants of credit conditions in EMEs around the 2007–09 financial crisis than were foreign bank participation rates.

Our findings partially reconcile two seemingly contradictory strands of literature on the effect of foreign bank participation in EMEs. On the one hand, many studies find a largely positive effect of foreign banks on the efficiency of domestic banks and domestic credit supply. On the other hand, foreign bank credit, in particular cross-border credit, exacerbated credit booms and busts in EMEs around the financial crisis. Foreign banks have large local operations in EMEs, by which they extend credit in the local currency that is also funded locally. This proved to be a source of stability in the wake of the financial crisis.

What are the implications for policy authorities? First, policy makers should watch international bank credit flows closely. In doing so, they should bear in mind the tools available to assess what constitutes “excessive” flows. BIS work on the early warning properties of various “gap” variables, in particular the “credit-to-GDP gap”, has proven quite useful in this regard (Borio and Lowe (2002, 2004), Borio and Drehmann (2009)); such gap measures are now used to inform the calibration of countercyclical capital buffers (Drehmann, Borio and Tsatsaronis (2011), BCBS (2010)). The results in this paper show that monitoring both the direct and indirect channels of international bank credit is warranted.

Second, policy makers should keep abreast of the evolving regulatory toolkit available to dampen bank flows. The growth in international bank credit played a dominant role in the run-up to the 2007–09 financial crisis. And while domestic authorities have long had tools available to constrain the growth in domestic credit, they have not always had the tools to counter growth in cross-border bank credit coming in, since the creditor banks fall under the purview of supervisors elsewhere. Fortunately, some provisions in the Basel III framework may help in alleviating this problem. “Jurisdictional reciprocity”, as detailed in BCBS (2010), should help promote supervisory coordination across jurisdictions. That is, supervisors in a jurisdiction seeking to dampen cross-border bank credit into that jurisdiction can coordinate with supervisory authorities abroad in setting buffer requirements on the creditor banks’ cross-border positions.

Of similar vein is the post-crisis push in several jurisdictions for local capital requirements and “ring fencing” of banks’ operations. The longer-term implications of this move are widely debated. The results in this paper do suggest that the structure of bank credit rather than the ownership of the creditor banks matters. Yet, while such regulatory changes may make banks more stable, they do so possibly at

the expense of smaller cross-border transfers of capital. Policy makers should continue to examine these trade-offs.

Finally, policy makers should not lose sight of other challenges that have emerged in the post-crisis era. Since 2009, cross-border bank credit has taken a back seat to bond issuance. Many banks, in particular European banks hit hard by the crisis, have retreated from foreign markets. Rather than borrowing from banks, corporations outside the United States – particularly in EMEs – have taken advantage of lower US dollar borrowing costs by issuing dollar bonds, the bulk of which were purchased by non-banks (McCauley et al (2015a, 2015b)). Such “non-bank to non-bank credit” is by definition less affected by many of the post-crisis regulatory initiatives targeted at the banking sector. As a result, policy makers have a renewed interest in the effectiveness of capital controls to mitigate unwanted capital flows (IMF (2010, 2011a, 2011b)).

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Appendix: supplementary tables

	Name	ISO code		Name	ISO code
1	Argentina	AR	16	Mexico	MX
2	Bulgaria	BG	17	Malaysia	MY
3	Brazil	BR	18	Peru	PE
4	Chile	CL	19	Philippines	PH
5	China	CN	20	Poland	PL
6	Colombia	CO	21	Romania	RO
7	Czech Republic	CZ	22	Russia	RU
8	Ecuador	EC	23	Saudi Arabia	SA
9	Estonia	EE	24	Slovenia	SI
10	Hungary	HU	25	Slovakia	SK
11	Indonesia	ID	26	Thailand	TH
12	India	IN	27	Turkey	TR
13	Israel	IL	28	Chinese Taipei	TW
14	Korea	KR	29	United Arab Emirates	UA
15	Lithuania	LT	30	South Africa	ZA

Additional variable descriptions and sources

Table A2

Variable	Description	Source
Foreign currency share	The currency composition of banks' cross-border claims on non-banks in a country is captured in the BIS LBS, which break down cross-border claims into five major currencies (USD, EUR, JPY, GBP, CHF). The method for obtaining the currency breakdown of domestic credit to non-banks depends on the country. In the LBS, reporting countries provide the same breakdown for banks' local positions in foreign currencies, and thus the difference between this total and domestic credit is the amount in domestic currency. This yields the estimates for EMEs that themselves report the LBS (ie BR, CL, MX, KR, TR, ZA). For other EMEs, the foreign currency share of domestic credit is estimated as the difference between BIS reporting banks consolidated cross-border claims (UR basis) and their international claims (IR basis) (ie local claims in non-local currencies booked by foreign banks). Thus, the figures are incomplete for these countries because (a) there is no explicit currency breakdown for this piece, and thus assumptions are required to determine the USD, EUR, JPY, CHF and GBP shares; and (b) the positions of domestic banks' local foreign currency positions are not known. For (b), we assume for most countries that these banks' local positions are all in domestic currency.	BIS international banking statistics, national data, authors' calculations
Chinn-Ito index	Annual index measuring a country's degree of capital account openness, which considers the following four restrictions on external accounts: presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and the requirement of the surrender of export proceeds.	Chinn and Ito (2008); http://web.pdx.edu/~iito/Chinn-Ito_website.htm
Economic freedom	Annual index for economic freedom country. Index from 0 for lowest economic freedom to 100 for highest economic freedom based on 10 factors in four broad categories: rule of law (property rights, freedom from corruption), limited government (fiscal freedom, government spending), regulatory efficiency (business freedom, labour freedom, monetary freedom), and open markets (trade freedom, investment freedom, financial freedom). The overall score is an equally weighted average.	Heritage Foundation www.heritage.org/index
Property rights index	0–100 measure of the degree to which a country's laws protect private property rights and the government enforces those laws.	Heritage Foundation
Freedom from corruption index	0–100 measure based on Transparency International's Corruption Perceptions Index (CPI).	Heritage Foundation
Business freedom index	0–100 measure of the ability to start, operate, and close a business that represents the overall burden of regulation as well as the efficiency of government in the regulatory process.	Heritage Foundation
Monetary freedom index	0–100 measure of price stability and the prevalence of price controls.	Heritage Foundation
Trade freedom index	0–100 composite measure of the absence of tariff and non-tariff barriers on imports and exports of goods and services.	Heritage Foundation
Investment freedom index	0–100 measure of constraints on the flow of investment capital, where 100 indicates no constraint.	Heritage Foundation
Financial freedom index	0–100 measure of banking efficiency as well as independence from government control and interference in the financial sector. It also considers whether banks are free to extend credit, accept deposits, and conduct operations in foreign currencies.	Heritage Foundation
Public bonds-to-GDP ratio	The value of outstanding public domestic debt securities issued by government as a share of GDP in per cent; both measured in US dollars. Public domestic debt securities are calculated as the arithmetic mean of the current and the previous year. Based on the BIS international debt securities (IDS) statistics.	World Bank Financial Development and Structure dataset (WB FDS dataset)
Private bonds-to-GDP ratio	The value of outstanding private domestic debt securities issued by financial institutions and corporations as a share of GDP, both measured in US dollars. Private domestic debt securities are calculated as the arithmetic mean in the current and the previous year. Based on the BIS IDS statistics.	http://www.worldbank.org/en/publication/gfdr/data/financial-structure-database
Stock market capitalisation	Ratio of stock market capitalisation to GDP in per cent. Both measured in US dollars. Stock market capitalisation is measured as the arithmetic mean between the current and previous year of the market value of all listed stocks in a given market.	WB FDS dataset
Investment freedom index	Life insurance premium volume as a share of GDP (data from the Swiss Re Sigma).	WB FDS dataset