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Global credit and domestic credit booms[1]

US dollar credit is growing quickly outside the United States, especially in Asia, and in some economies it has outpaced overall credit growth. Cross-border sources of credit bear watching in view of their record of outgrowing overall credit in credit booms. Foreign currency and cross-border sources of credit raise policy issues.

JEL classification: E5, F3.

As emerging market central banks tighten monetary policy, they face the challenge of borrowers obtaining credit from abroad or in lower-yielding currencies such as the US dollar. While such credit may not account for a high share of overall credit in larger economies, it can still contribute to unwelcome credit growth. For example, foreign currency credit to non-financial businesses and households in China more than doubled in the two years to March 2011. (Foreign currency credit to mainland-related borrowers in Hong Kong SAR is showing a similar trend.) Despite its small overall share, this credit growth would raise concerns if sustained.

This special feature addresses the international dimension of credit, defined here to comprise two different but related components: foreign currency credit to residents, regardless of the lender's location; and cross-border (external) credit, regardless of the currency of denomination.[2] We measure these components by combining BIS international financial statistics and national sources (see box) and we identify regularities in their behaviour, both in the aggregate and in individual countries. Some findings stand out.

First, a good part of global credit denominated in US dollars is extended to residents outside the United States, reflecting the currency's international role. The same is true of the euro and the euro area, albeit to a lesser degree than for the dollar. Since the crisis, US dollar credit has grown faster outside the

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[2] See Borio and Lowe (2002) and Schularick and Taylor (2009) for domestic credit and Alessi and Detken (2009), Borio and Drehmann (2009), Bruno and Shin (2011) and Cetorelli and Goldberg (2011) for analyses that pay attention to international components. Since credit is a possible proxy for "liquidity", our focus on its international dimension can help shed light on "global liquidity" – see Caruana (2011) and Bruno and Shin (2011).

United States, but in only a few economies is it contributing disproportionately to rapid credit growth.

Second, cross-border credit bears watching by national authorities in view of its history of outgrowing overall credit in economies experiencing credit booms. Private borrowers obtain credit directly from abroad or indirectly gain access to the credit that local banks obtain from abroad, notably from other banks.

This special feature is organised in three parts. First, we estimate global credit in key currencies and its contribution to overall credit growth in particular countries. Second, we measure external sources of credit in domestic credit booms. Finally, we draw implications for the policy challenges facing the authorities. We highlight the policy constraints that international forms of credit create, how BIS statistics can help monitor these types of credit, and how Basel III's new countercyclical capital buffer and international coordination can help address some of the associated risks.

Global credit in international currencies

While most currencies are little used outside their country of issue, the US dollar's and the euro's domain of use, if not the yen's, extends well beyond their home territory (Graph 1). Moreover, credit denominated in a particular currency can grow at very different rates at home and abroad, even with a single overnight rate and benchmark swap yield curve.

Much US dollar credit is extended to borrowers outside the United States …

Non-US residents have borrowed sizeable amounts of US dollars. The stock of dollar credit to borrowers outside the United States amounted to $5.8 trillion (Graph 1, top left-hand panel), or 12% of global (ex-US) GDP. Except in cases like Cambodia, where most bank credit is in dollars, lower shares are the norm. The dollar share of total credit to non-financial private borrowers ranges from single-digit percentages in Brazil, China, India, Korea and Thailand to between a fifth and a third in the Philippines, Hong Kong SAR and Mexico (Table 1).

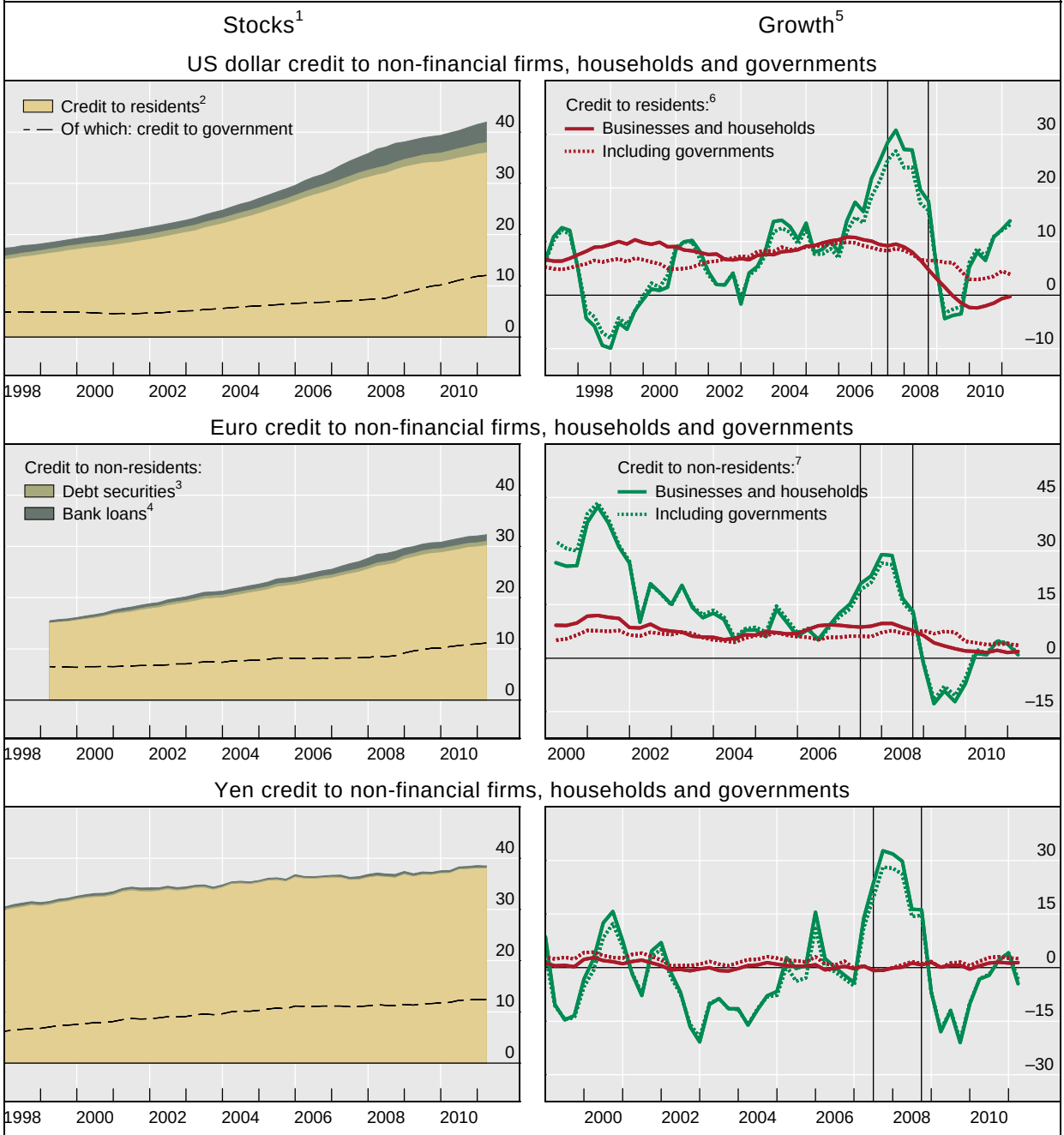
Credit extended in euros to borrowers outside the euro area, amounting to €2.1 trillion (Graph 1, middle panels), is more concentrated than its US dollar counterpart. In particular, many mortgages and business loans in central and eastern Europe are written in euros (or Swiss francs). In September 2007, foreign currency credit stood at a quarter or a third of total bank credit in the Czech Republic and Poland, more than half in Hungary and about 90% in the Baltic states.[3]

… and is growing rapidly

Since the global financial crisis, US dollar credit to non-US residents has resumed robust growth, in contrast to its euro and yen counterparts (Graph 1, right-hand panels). Credit to non-residents in US dollars, euros and yen, after growing at high rates in the run-up to the turmoil, actually shrank for several quarters subsequently. The resumption of double-digit growth of US dollar

[3] Brown et al (2009) provide estimates of foreign currency lending by domestic banks in the region, to which McCauley (2010) adds cross-border loans to non-banks in foreign currency.

Global credit in dollars, euros and yen



[1] In trillions of US dollars. [2] Credit to non-financial sector residents of the United States/euro area/Japan from national flow of funds, excluding identified credit to these borrowers in non-domestic currencies (ie cross-border and locally extended loans and outstanding international bonds in non-domestic currencies). [3] Outstanding debt securities issued by non-financial non-residents of the United States/euro area/Japan. [4] Cross-border and locally extended loans to *non-banks* outside the United States/euro area/Japan. For China and Hong Kong SAR, locally extended loans are derived from national data on total local lending in foreign currencies on the assumption that 80% are denominated in US dollars. For other non-BIS reporting countries, local US dollar/euro/Japanese yen loans to non-banks are proxied by all BIS reporting banks' gross cross-border US dollar/euro/Japanese yen loans to banks in the country. [5] Year-on-year growth, in per cent. The vertical lines represent the start of the recent financial crisis at end-Q2 2007 and the collapse of Lehman Brothers at end-Q3 2008. [6] Total credit to the non-financial sector in the United States/euro area/Japan (dotted lines) and total credit excluding credit to government sector in the United States/euro area/Japan (solid lines). [7] Total credit to the non-financial sector outside the United States/euro area/Japan (dotted lines) and total credit excluding credit to governments (solid lines).

Sources: People's Bank of China; Hong Kong Monetary Authority; ECB; Bank of Japan; Board of Governors of the Federal Reserve System; BIS international debt statistics and locational banking statistics by residence. Graph 1

credit to non-US residents stands in sharp contrast to private credit growth in the United States as well as to that of the euro and yen counterparts. From the first quarter of 2009 to the first quarter of 2011, dollar credit to non-financial private borrowers in the rest of the world actually grew by $1.1 trillion.

China has experienced rapid overall credit growth and even more rapid foreign currency credit growth. Dollar and other foreign currency credit to the non-financial private sector more than doubled in two years to reach an estimated $0.5 trillion in March 2011 (Table 1) while overall credit rose by a half. In addition, banks in Hong Kong SAR in 2010 increased their loans to non-bank mainland firms, including affiliates in the territory, by 47% – a rise that the Hong Kong Monetary Authority (2011) has dubbed "unsustainable". Thailand and the Philippines also saw dollar credit growth outpace overall credit growth.

Elsewhere, the rate of expansion of foreign currency credit relative to overall credit has not been as high. In other Asian economies, foreign currency credit grew in tandem with overall credit, as in Indonesia or Korea, or did not keep up with it, as in India and Malaysia. In Latin America, dollar credit grew by less than overall credit in Mexico and by markedly less in Brazil.

Where do the dollars lent to borrowers in the rest of the world come from? It may be natural to look for funds flowing out of the United States through the interbank channel, the main link between global dollar money markets. Indeed, some observers imagine that the excess reserves in the US banking system created by the Federal Reserve to pay for large-scale bond purchases are "spilling" into the rest of the world, financing dollar credit there. In fact, in the first quarter of 2011, when such Treasury bond purchases boosted bank reserves by $409 billion, banks in the country *increased net liabilities* to the

Total and US dollar credit to the non-financial private sector in selected countries

	UK	XM	HK	CN	IN	ID	KR	TH	MY	PH	BR	MX
Total credit[1]	4,839	21,859	558	8,356	985	208	1,105	345	307	73	1,347	270
US dollar credit[2]	817	873	133	448	85	24	110	16	23	15	107	98
Over GDP[3]	35.5	7.1	58.0	7.4	5.4	3.3	10.6	5.0	9.5	7.9	4.9	9.2
Over total credit[4]	16.3	4.0	23.9	5.4	8.6	11.6	10.0	4.6	7.4	20.9	8.0	36.4
Total credit growth 2009[5]	*10.4*	*10.8*	*60.5*	*52.8*	*60.7*	*70.1*	*31.9*	*41.4*	*42.2*	*25.9*	*88.0*	*20.4*
Dollar credit growth 2009[5]	*17.7*	*10.3*	*62.0*	*111.7*	*37.7*	*69.2*	*35.0*	*1,382*	*31.4*	*196*	*32.7*	*13.6*
Contribution[6]	*2.8*	*0.4*	*14.7*	*4.3*	*3.8*	*8.1*	*3.4*	*6.1*	*2.5*	*17.4*	*3.7*	*5.2*

BR = Brazil; CN = China; HK = Hong Kong SAR; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PH = Philippines; TH = Thailand; UK = United Kingdom; XM = euro area.

[1] Total credit to non-financial private sector borrowers. [2] For those countries which are reporters in the BIS banking statistics, estimates are constructed as the sum of (i) BIS reporting banks' cross-border loans to non-bank residents, (ii) resident banks' loans to resident non-banks and (iii) outstanding international debt securities issued by non-bank private sector residents, each in the respective currency. For non-BIS reporting countries (China, Indonesia, the Philippines and Thailand), the third component is not available in the BIS banking statistics. For China, locally extended US dollar credit is estimated from national data; for other non-reporters, it is proxied by BIS reporting banks' net cross-border claims on resident banks in the respective currency on the assumption that credit is onlent to non-financial private sector residents. In billions of US dollars. [3] Stock over nominal GDP of the country, in per cent. [4] Contribution of US dollar credit growth to total growth since end-Q1 2009 in credit to non-bank private sector borrowers, in per cent. [5] Percentage change in outstanding stocks between end-Q1 2009 and end-Q1 2011 (for the United Kingdom, end-Q4 2010). [6] Contribution in percentage points of US dollar credit growth to growth of total credit to non-financial private sector borrowers.

Sources: People's Bank of China; Hong Kong Monetary Authority; IMF, *International Financial Statistics*; national flow of funds statistics; BIS locational banking statistics by nationality; BIS international debt securities statistics. Table 1

rest of the world's banks by $209 billion.[4] If anything, interbank *inflows* helped to fund the build-up of excess reserves in the United States, rather than these reserves inducing *outflows* to fund dollar credit to the rest of the world.

Dollar intermediation takes place outside the United States

The reason is simple: US dollar funding can be sourced from beyond US shores, even if dollar payments clear onshore. For one, non-banks deposit dollars outside the United States. Indeed, such bank deposits by non-US residents rose by $363 billion from March 2009 to March 2011. In addition, non-US residents can purchase dollar bonds issued by non-US borrowers. For example, official reserve managers no doubt invested some of the recent increase in official US dollar reserves in highly rated US dollar bonds issued by non-US residents.

External credit and domestic credit booms

Cross-border credit grows faster than total credit during credit booms …

The recent rapid expansion in foreign currency credit bears watching because, in many economies that experienced a credit boom and bust, external (cross-border) credit tended to grow faster than overall credit during the boom.[5] To be sure, there is no one-to-one relationship between the foreign currency credit examined above and the cross-border credit on which this section focuses. Foreign currency credit to residents may be funded by foreign currency deposits or securities held by residents, thus crossing no border. Conversely, cross-border funding may be denominated in domestic currency, as has been typically the case, for instance, in the United States or euro area countries. But in countries where cross-border funding is denominated mainly in foreign currency, the two forms of credit tend to go hand in hand.

… in small economies …

Before the recent financial crisis, external credit outpaced overall credit growth in some small European countries. Graph 2 juxtaposes overall credit to resident households and businesses (red line) with various forms of external credit: direct cross-border credit to them in the form of cross-border loans (orange shaded area) and securities (tan shaded area); and indirect cross-border credit to domestic banks, obtained largely through the interbank market, and which can be onlent to domestic final borrowers. In turn, this indirect credit is measured on a gross basis, or net of lending by domestic banks to non-residents. Gross amounts (dotted green line) are more representative of the overall funding obtained abroad, regardless of its subsequent use. Net amounts (dashed green line) provide a lower bound of the extent to which foreign funding supports credit expansion to domestic private borrowers. In all of the countries in Graph 1, the cross-border components grew faster than overall credit to residents during the boom (bottom panels).

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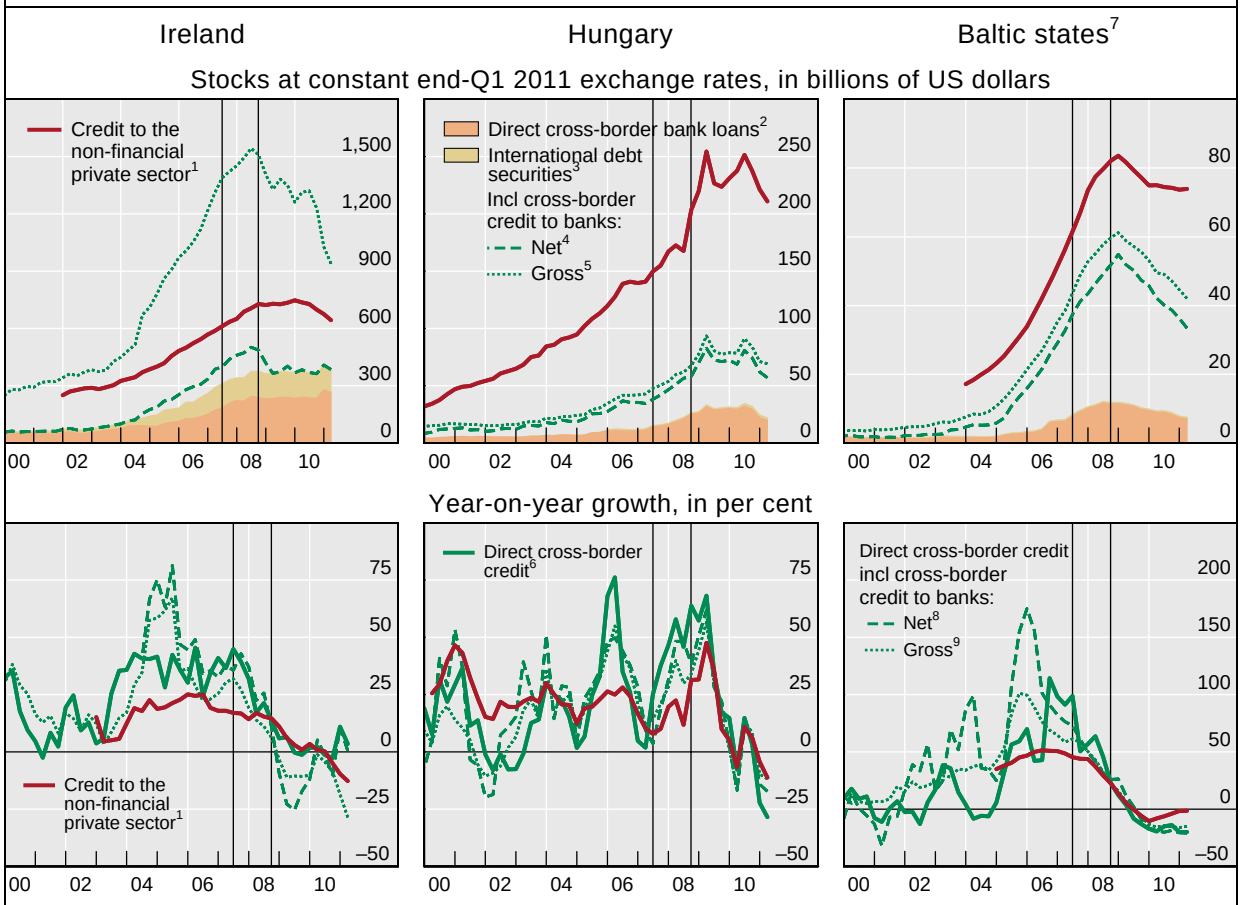
[4] The US flow of funds shows that at end-2010 the US banking system had a small net *liability* of $19 billion to banks outside the country.

[5] Note that a comparison of cross-border with overall credit growth differs from a comparison of external claims with GDP, as in Lane and Milesi-Ferretti (2007). By comparing in the graphs the external component with the total rather than with the purely domestic one, we *underestimate* the difference in the behaviour of the purely domestic and external elements, especially where the external component is a large fraction of the total.

Credit to the non-financial private sector in selected European countries



The vertical lines indicate end-Q2 2007 and end-Q3 2008.

[1] Total liabilities of non-financial private sector borrowers, as reported in the flow of funds statistics. [2] BIS reporting banks' direct cross-border loans to *non-banks* (ie includes loans to non-bank financial entities). [3] Issues of international debt securities by non-financial private sector residents of the country. [4] For Ireland, net cross-border borrowing (liabilities minus claims) if positive from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). For non-BIS reporting countries (Hungary and the Baltic states), BIS reporting banks' net cross-border claims on banks in the country are used. [5] For Ireland, gross cross-border borrowing from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). For non-BIS reporting countries (Hungary and the Baltic states), BIS reporting banks' gross cross-border claims on banks in the country are used. [6] Sum of cross-border bank loans and international debt securities outstanding. [7] Estonia, Latvia and Lithuania. [8] Including net cross-border borrowing (if positive) by banks in the country, on the assumption that this cross-border credit is passed on to non-banks in the country. [9] Including gross cross-border borrowing by banks in the country.

Sources: IMF, *International Financial Statistics*; BIS locational banking statistics; BIS international debt securities statistics. Graph 2

The case of Ireland is particularly striking (left-hand panels). Direct cross-border credit to non-banks in Ireland grew at roughly 40% year on year in the three years prior to the crisis, well above the rate for overall credit to businesses and households. Moreover, in 2004 banks in Ireland began to draw on net cross-border financing (dashed green line, top left-hand panel) to support their domestic lending. Combined, these two cross-border components amounted to more than half of the 2008 debt of businesses and households in Ireland. (*Gross* cross-border bank liabilities (dotted green line) considerably exceed *net* liabilities because banks in Ireland channelled credit abroad.)

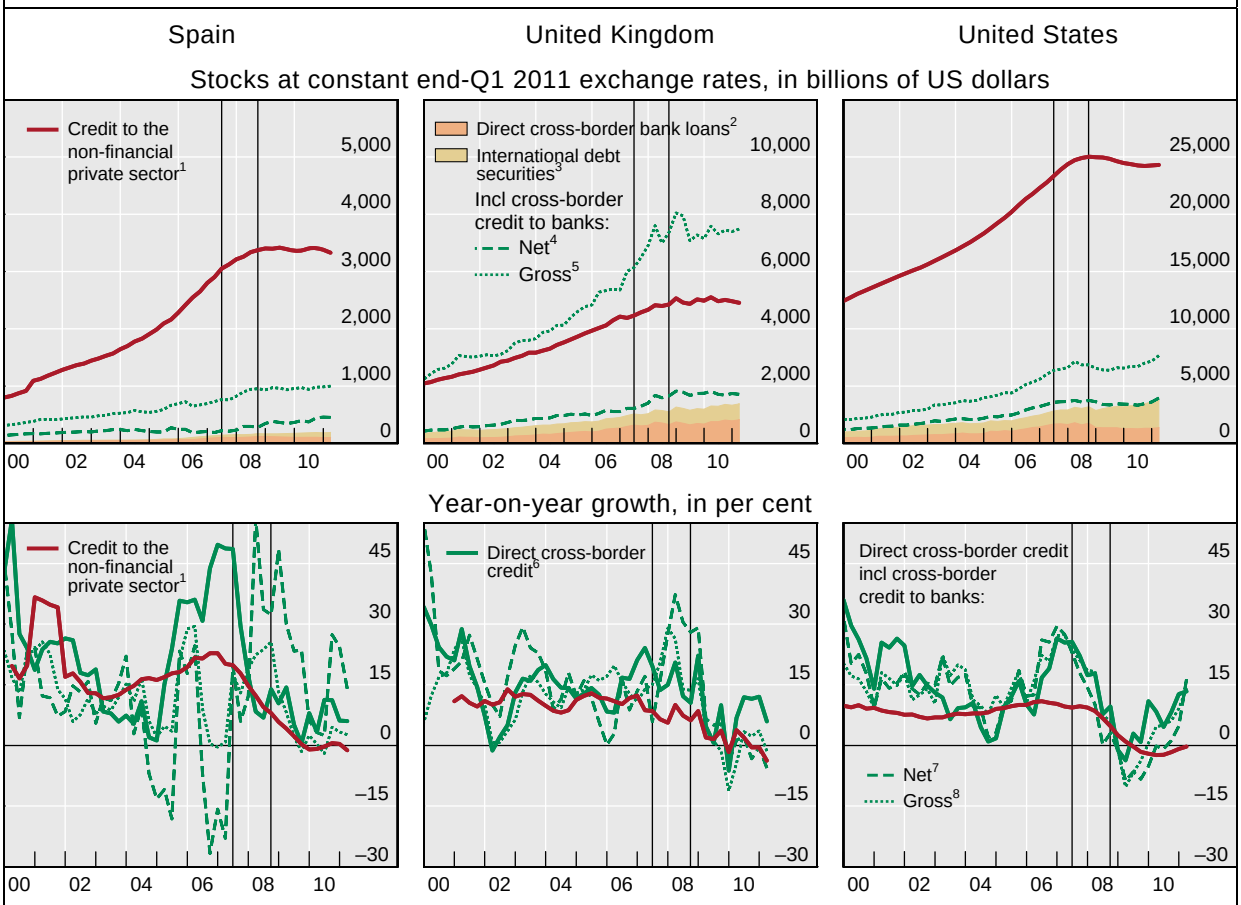
In contrast to Ireland, where the direct cross-border component loomed large, the indirect one dominated in the Baltic states. There, foreign-owned banks won very high market shares by borrowing euros in London and

funnelling the proceeds to their Baltic subsidiaries, which in turn extended euro-denominated loans to households and businesses (Graph 2, right-hand panels). Hungary (Graph 2, centre panels) represents an intermediate case: both direct cross-border lending to businesses and inter-office funding of foreign currency mortgages extended by local subsidiaries were important.

... and also in large economies

During credit booms, external sources of credit can gain importance in large economies as well as small ones. The Spanish, UK and US economies experienced a relatively rapid growth of cross-border credit (Graph 3, bottom panels) during their pre-crisis credit booms. In these large economies, the cross-border fraction of total credit is much lower, no more than 10–25%. (As in Ireland, the very large gross cross-border liabilities of banks in the United Kingdom, which actually exceed total credit to households and businesses, arise from the country's status as an international financial centre.)

Credit to the non-financial private sector in selected advanced countries



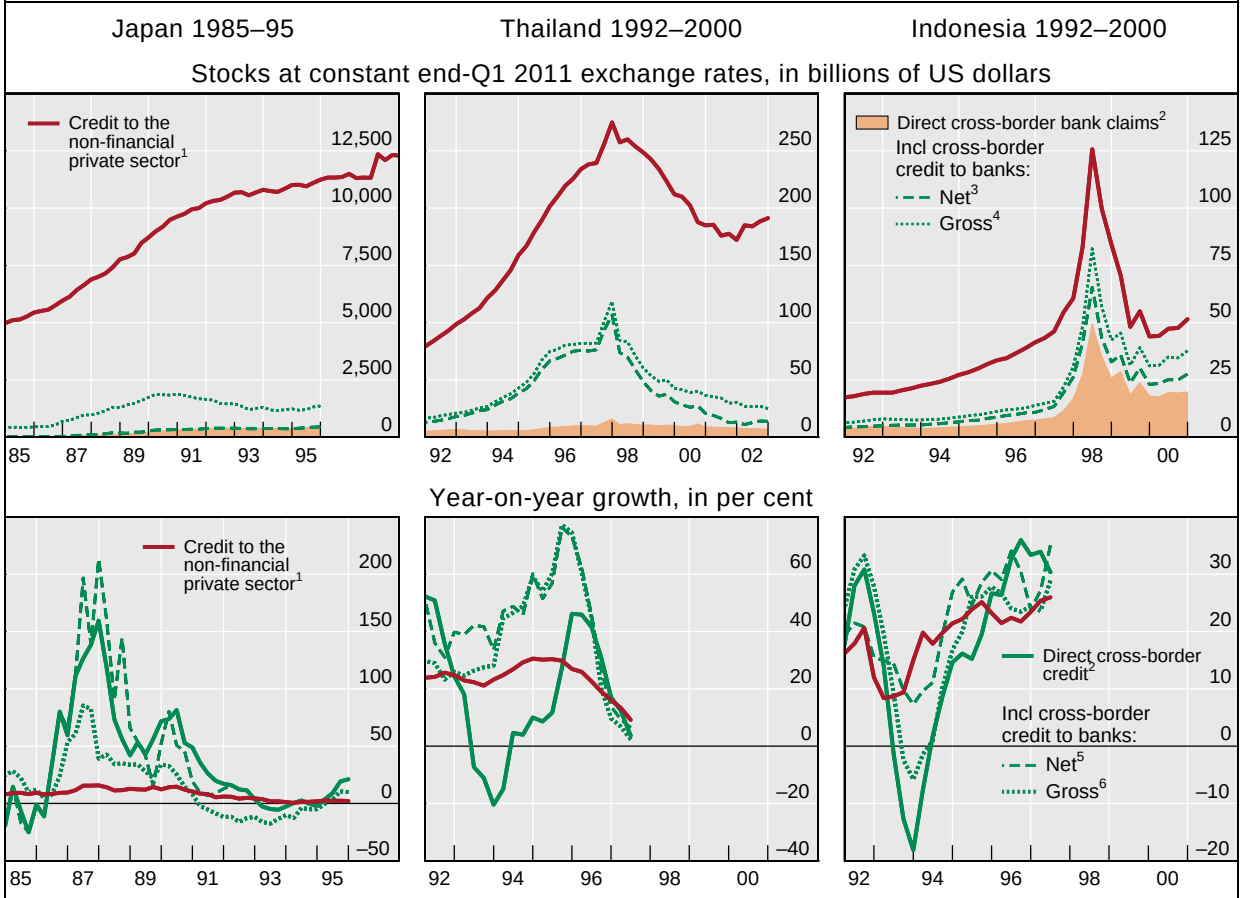
The vertical lines indicate end-Q2 2007 and end-Q3 2008.

[1] Total liabilities of non-financial private sector borrowers, as reported in the flow of funds statistics. [2] BIS reporting banks' direct cross-border loans to *non-banks* (ie includes loans to non-bank financial entities). [3] Issues of international debt securities by non-financial private sector residents of the country. [4] Net cross-border borrowing (liabilities minus claims) from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). [5] Gross cross-border borrowing from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). [6] Sum of cross-border loans and international debt securities outstanding. [7] Including net cross-border borrowing (if positive) by banks in the country, on the assumption that this cross-border credit is passed on to non-banks in the country. [8] Including gross cross-border borrowing by banks in the country.

Sources: IMF, *International Financial Statistics*; BIS locational banking statistics; BIS international debt securities statistics. Graph 3

The earlier credit booms in Asian economies displayed the same regularity. Japan in the 1980s and Thailand and Indonesia in the 1990s also saw cross-border credit growth outpace overall credit growth to the private sector (Graph 4). Again, cross-border credit was relatively small in the largest economy, Japan. But in Thailand and Indonesia, the cross-border components of credit were very substantial. Differences in the composition of cross-border credit in Thailand and Indonesia reflected regulatory differences. In Thailand, tax and other policy sought to establish Bangkok as a financial centre but only succeeded in favouring interbank inflows (dashed green line in Graph 4, top centre panel) that funded domestic dollar lending. By contrast, in Indonesia

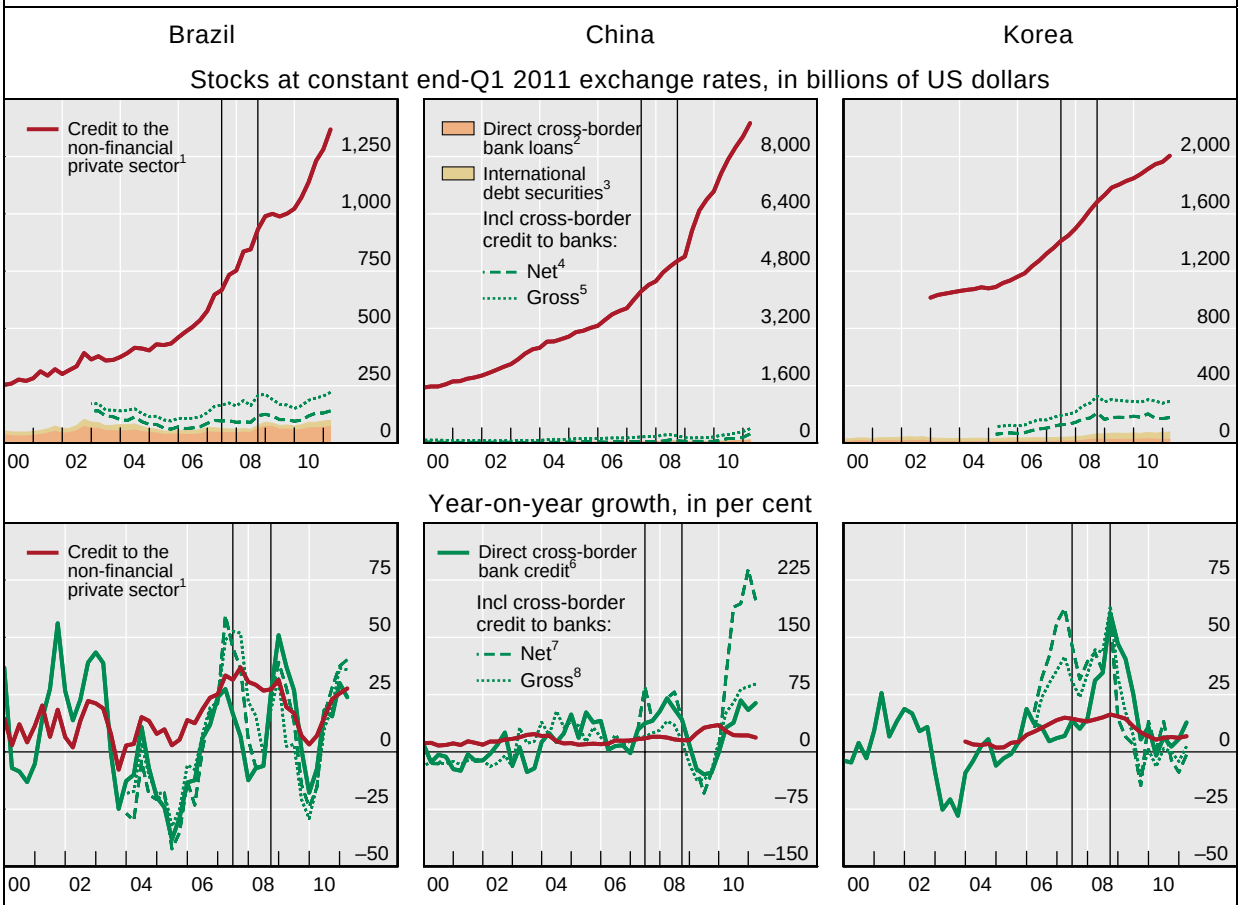
Credit to the non-financial private sector: Asia in the 1990s



[1] Domestic credit to non-financial private sector residents plus BIS reporting banks' cross-border claims (loans and securities) on non-bank residents of the country minus BIS reporting banks' consolidated international claims on the public sector in the country. Note that international claims on the public sector include cross-border claims plus locally extended claims in foreign currencies, although the latter are likely to be small. [2] For Japan, BIS reporting banks' direct cross-border claims (loans and securities) on *non-banks* (ie includes loans to non-bank financial entities and governments). For Indonesia and Thailand, BIS reporting banks' international claims on the public sector are subtracted from this total. [3] For Japan, net cross-border borrowing (liabilities minus claims) if positive from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). For non-BIS reporting countries (Indonesia and Thailand), BIS reporting banks' net cross-border claims on banks in the country are used. [4] For Japan, gross cross-border borrowing from all sectors by banks located in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). For non-BIS reporting countries (Indonesia and Thailand), BIS reporting banks' gross cross-border claims on banks in the country are used. [5] Cross-border claims plus net cross-border borrowing (if positive) by banks in the country, on the assumption that this cross-border credit is passed on to non-banks in the country. [6] Cross-border claims plus gross cross-border borrowing by banks in the country.

Sources: IMF, *International Financial Statistics*; BIS locational banking statistics; BIS consolidated banking statistics. Graph 4

Credit to the non-financial private sector in selected emerging economies



The vertical lines indicate end-Q2 2007 and end-Q3 2008.

[1] For Korea, total liabilities of non-financial private sector borrowers, as reported in the flow of funds statistics. For others, domestic credit to non-financial private sector borrowers plus cross-border loans to *non-banks* (ie includes loans to non-bank financial entities) plus issues of international debt securities by non-financial private sector borrowers in the country. [2] BIS reporting banks' direct cross-border loans to *non-banks* (ie includes loans to non-bank financial entities). [3] Issues of international debt securities by non-financial private sector residents of the country. [4] BIS reporting banks' net cross-border claims on banks in the country plus direct cross-border bank loans (orange shaded area) plus outstanding international debt securities (tan shaded area). [5] BIS reporting banks' gross cross-border claims on banks in the country are used. [6] Sum of cross-border loans and international debt securities outstanding. [7] Including net cross-border borrowing (if positive) by banks in the country, on the assumption that this cross-border credit is passed on to non-banks in the country. [8] Including gross cross-border borrowing by banks in the country.

Sources: IMF, *International Financial Statistics;* BIS locational banking statistics; BIS international debt securities statistics. Graph 5

regulation limited resident banks' ability to lend foreign currency to local firms, so foreign banks lent directly to them from outside the country (shaded area in Graph 4, top right-hand panel).

Current cause for concern?

The same pattern threatens to emerge in some countries today (Graph 5). Credit has grown rapidly in Brazil and China since the crisis, with cross-border credit growing even more quickly for some quarters. Notably, this has occurred despite various restrictions that limit international financial integration in general, and the inflow of foreign currency into the local banks in particular. In Korea, for its part, following the trauma of international banks' withdrawing $56 billion in the fourth quarter of 2008, policies to prevent the build-up of short-term cross-border interbank debt (Baba and Shim (2010)) have been associated with more moderate overall credit growth.

Constructing currency-specific and country-specific credit aggregates

This special feature presents global credit aggregates for key currencies and aggregates for specific countries that juxtapose total credit with its cross-border components. BIS data are useful in removing foreign currency credit from the national flow of funds statistics for the United States, the euro area and Japan, as well as in constructing the international components of credit for individual countries.

Global currency-specific credit aggregates

To construct global credit aggregates in key currencies, we start with the total debt of *non-financial* residents (separately showing private and government borrowers) from the US, euro area and Japanese flow of funds statistics. To this we add the dollar/euro/yen debt of non-financial borrowers resident outside the United States/euro area/Japan. We adjust the national flow of funds total downwards by any identified foreign currency debt. For credit to US residents, our adjustment is limited to purging the BIS cross-border *non-dollar* loans to US non-banks and the *non-dollar* international bonds of US non-financial issuers.[①] For the euro area and Japan, we also purge foreign currency credit to residents extended by the domestic banking system. These exclusions reduce the US, euro area and Japanese flow of funds totals by 1%, 5% and 0.4%, respectively.

To construct the stock of credit to the rest of the world, for each currency, we aggregate cross-border bank loans to non-banks, locally extended loans to non-banks, and outstanding international bonds issued by non-financial borrowers. For instance, we sum dollar loans to UK non-banks booked in France and the United Kingdom and dollar bonds issued by UK non-financial firms.

An issue arises with consolidation across banks or financial firms more broadly. To be strictly comparable with the national flow of funds statistics, we would need to exclude bank loans to *non-bank financial* firms (finance companies, insurers, etc) *and* to include such non-bank financial firms' loans to businesses and households. However, BIS international banking data allow us to exclude only the bank loans to banks. By contrast, the BIS international securities data allow us to exclude all financial issuers. While this approach aligns our debt aggregates as closely as possible with the national flow of funds, we understate credit in the given currency to the rest of world if bank loans to non-bank financial firms fall short of the non-bank financial firms' loans to businesses and households. If we were to exclude only the dollar (euro or yen) debt securities of banks, rather than those of all financial issuers, we would add another $1.6 trillion (€332 billion or ¥15 trillion).

An issue also arises with the use of currency derivatives. We *understate* dollar/euro/yen credit to the rest of the world if non-financial firms there use derivatives to transform local currency debt into dollars, euros or yen. For instance, Korean shipbuilders seek to lock in profits on dollar-invoiced exports by hedging the dollar/won rate. One approach is to issue a dollar bond, which would be captured in our aggregate, and immediately to sell the dollars against won. Another approach is to contract to sell dollars forward against won, effectively converting existing won debt into US dollar debt, which would not be captured in our dollar aggregate. Likewise, if non-financial firms in the rest of the world systematically enter cross-currency swaps with financial firms to transform domestic debt into dollars, euros or yen, then we also understate dollar, euro or yen debt.

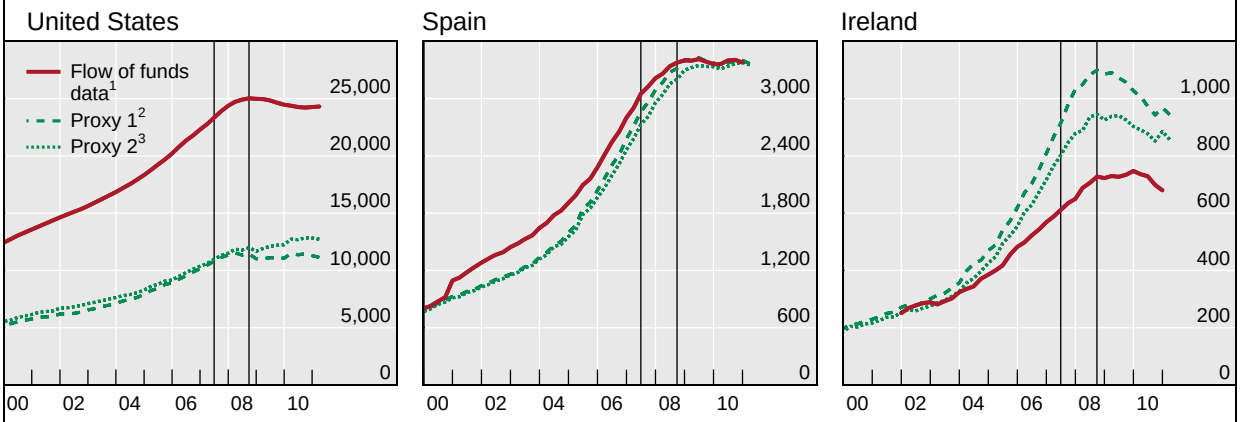
Country-specific credit aggregates

In the country-specific graphs, we juxtapose national flow of funds data (here, debt of non-financial *private sector* borrowers only), which in principle should include the international components of credit, with these components.[②] We focus on cross-border credit extension at *origination*, ie on the residence of those extending the *initial financing in the primary markets*. Such credit provides new funding for the credit boom, while, by contrast, the purchase by non-residents of an asset in the secondary market simply changes the ownership of an existing claim (see below).

Distinguishing international bonds from domestic bonds is not without difficulty, but alternative estimates of cross-border credit tell much the same story. The BIS international debt securities data capture primary market foreign currency bonds issued in a given country (eg dollar bonds in London, dubbed "eurodollar" bonds) and domestic currency bonds issued in the domestic market by non-residents ("foreign" bonds). In addition, domestic currency issues in the domestic market by residents are also counted as international issues if they are specifically targeted at non-resident investors. Such targeting is not easy to capture in practice. However, the results in Graphs 2–5 in the main text carry through with an alternative estimate based on banks' cross-border holdings of debt securities (see the two green lines in Graph A).

Credit to the non-financial private sector

At constant end-Q1 2011 exchange rates, in billions of US dollars



The vertical lines indicate end-Q2 2007 and end-Q3 2008.

[1] Total liabilities of non-financial private sector borrowers, as reported in the flow of funds statistics. [2] Domestic credit to non-financial private sector residents plus BIS reporting banks' claims (loans and securities) on non-bank residents of the country minus BIS reporting banks' consolidated international claims on the public sector in the country. Note that international claims on the public sector include cross-border claims plus locally extended claims in foreign currencies, although the latter are likely to be small. [3] Domestic credit to non-financial private sector residents plus BIS reporting banks' cross-border *loans* to non-banks to non-bank residents of the country plus outstanding international debt securities issued by non-financial private sector residents of the country.

Sources: IMF, *International Financial Statistics*; national data; BIS locational banking statistics; BIS consolidated banking statistics (immediate borrower basis); BIS international debt securities statistics. Graph A

Not all countries have comprehensive flow of funds statistics and hence a measure of *total* credit to non-financial private sector borrowers. For Brazil, China and Thailand, we construct proxies for total credit to non-financial private sector borrowers using domestic credit extended by the country's banking system, supplemented with BIS data.

Judging from three advanced economies that produce flow of funds, our proxies work best in bank-dominated financial systems. Graph A juxtaposes total credit to non-financial private sector borrowers from the flow of funds with two proxies constructed from national and BIS data. The first of these proxies is simply total credit (ie loans and holdings of securities) provided by banks (either in the country or abroad). The second is a combination of loans from banks and outstanding international bonds, which corresponds most closely to the concept of origination and is thus our preferred measure. In a financial system with well developed private bond markets (eg the United States, left-hand panel), our proxies fall well short of flow of funds totals. This reflects the significant provision of credit by finance companies and institutional bond investors. In contrast, in a low-tax economy with many non-bank financing subsidiaries as in Ireland (right-hand panel), our bank credit proxies overstate total borrowing: as mentioned above, the BIS banking data include credit to non-bank financial borrowers. In bank-centred financial systems, like that of Spain (centre panel), our proxies match the flow of funds measure well. The role of banks in the financial systems of emerging economies, such as those of China or Brazil, probably most resembles the Spanish case.

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① For this to be strictly correct, BIS data would have to distinguish between financial and non-financial counterparties to match the flow of funds data, not bank and non-bank. ② Whether in practice the national flow of funds data actually include credit extended to residents from outside the country is an open question. The United States illustrates this measurement challenge: the US flow of funds statistics may have understated the scale of offshore lending to US households and businesses in the years to 2007. While BIS statistics show that loans booked offshore to US non-banks peaked at more than $1.4 trillion, the US flow of funds shows an amount of foreign loans to non-financial businesses that is an order of magnitude smaller. To be sure, the BIS aggregate includes loans to non-bank financial firms. Still, if the US flow of funds missed a substantial sum of direct loans to non-financial corporations and partnerships, then business credit grew even faster in the boom. For an earlier analysis, see McCauley and Seth (1992).

The swelling of cross-border sources of credit during credit booms observed in most of these cases may reflect a broader regularity, namely the growing importance of wholesale funding during booms. The ratio of credit to retail deposits, and more generally to money, tends to increase during these episodes. As credit expansion outpaces the growth of retail deposits, credit intermediaries turn increasingly to wholesale funding.[6] And external sources loom large here, whether direct cross-border lending or interbank lending.[7]

Policy implications

The international dimension of credit poses significant policy challenges. Here we consider, in particular, how it may limit the ability of the authorities to monitor or constrain credit and, ultimately, to insulate their economies from the undesirable effects of low interest rates elsewhere.

It is often argued that countries experiencing strong capital inflows can insulate themselves by allowing their exchange rate to appreciate. A stronger exchange rate can no doubt reduce inflationary pressures and, to the extent that it reduces exports, dampen final demand. However, its restraining effect on the credit boom is less obvious, especially if the debt is denominated in foreign currency.

Can exchange rate appreciation insulate an economy from international credit?

There are at least four reasons for this. First, as the domestic currency appreciates, it reduces the debt and cash flow burden of credit denominated in foreign currency, seemingly creating room for more borrowing. Second, if both borrowers and lenders have extrapolative expectations,[8] borrowers may denominate more of their debt in foreign currency, while lenders may anticipate a further strengthening of their customers' creditworthiness. Third, as long as this process continues, it puts further upward pressure on the currency. As domestic firms and households switch from borrowing in domestic to borrowing in foreign currency, they reduce the supply of assets denominated in domestic currency. If investors treat domestic and foreign currency assets as imperfect substitutes in their portfolios, this requires the domestic currency to appreciate.[9] Finally, foreign borrowing and monetary policy can interact

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[6] Why this wedge? Recall that credit and asset price booms reinforce each other, as collateral values and leverage increase. As a result, credit tends to grow fast alongside asset prices. By contrast, opposing forces work on the relationship between money and asset prices. Increases in wealth tend to raise the demand for money (wealth effect). However, higher expected returns on risky assets, such as equity and real estate, as well as a greater appetite for risk, induce a shift away from money towards riskier assets (substitution effect). This restrains the rise in the demand for money relative to the expansion in credit. See Borio and Lowe (2004).

[7] Wholesale funding, including that from abroad, enables less established lenders, with limited access to a retail deposit base, to gain market share during such booms. Examples include finance companies in the Nordic countries and Japan ("jusen") in the late 1980s and the shadow banking system in the United States in the 2000s.

[8] Such expectations are not necessarily irrational: uncovered interest parity may not hold over extended periods.

[9] Admittedly, in large emerging markets, foreign currency credit can be rather small in relation to domestic credit. However, foreign currency borrowing can still be quite large in relation to

perversely, as raising domestic policy interest rates may induce further switches into foreign currency debt, which is perceived as cheaper (Brzoza-Brzezina et al (2010)). To be sure, this process would come to an end once expectations changed from further currency appreciation to depreciation. But the required appreciation may be too costly for policymakers to tolerate, as it could be very sizeable and persistent.

More generally, the use of international currencies outside their borders means that the policies of the home monetary authorities have a direct influence on financial conditions in other jurisdictions. This constrains the room for manoeuvre of countries whose residents denominate a significant fraction of their debt (and assets) in foreign currency.

That said, our findings indicate that the contribution of foreign-currency or cross-border lending varies substantially across economies, and it is not that high for some of the larger ones. At least for these, the impact of international factors on domestic financial conditions may operate more through prices than quantities. In particular, the contribution of the international components to domestic credit booms may matter less than the response of monetary policy to exchange rate appreciation and the impact of capital flows on asset prices more generally.

Can the monitoring of international credit be improved?

Monitoring international credit stocks allows policymakers to assess their impact and to calibrate a response. However, monitoring direct cross-border credit, which is not channelled through the domestic banking system, presents challenges. Non-bank borrowers rarely report debts booked abroad accurately, and national reporting systems resist using data produced by others. Domestic reporting systems struggle to measure such debt, even in the presence of controls or required registration. Our analysis suggests that authorities could use BIS statistics to cross-check estimates of their residents' international debt, especially that owed by businesses directly to banks abroad.

There is also a daunting control challenge in the face of a credit boom. Imagine that the prudential authorities wish to tighten standards, such as loan-to-value ratios or minimum capital requirements, in order to protect the banking system from a credit boom (and possibly to restrain the boom). Tightening the standards induces circumvention, by encouraging direct cross-border lending. For example, US dollar loans booked by banks in Japan and by Japanese banks outside Japan shot up in the late 1980s to avoid the Bank of Japan's window guidance (restraints) on domestic yen lending (Fukumoto et al (2010)). Moreover, concerns that they might put their banks at a competitive disadvantage could inhibit the authorities from tightening in the first place.[10] Addressing this challenge calls for international coordination. But the supervisors of the foreign banks ("home" supervisors) may have little incentive to act if large multinational banks have relatively small exposures to the booming economy.

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the foreign exchange market at early stages of financial development, and can therefore exert an outsize effect on the exchange rate.

[10] This issue can also arise with respect to credit extended locally by foreign bank branches, rather than subsidiaries, since the local authorities may not have the ability to constrain them.

Can credit growth be constrained without putting domestic banks at a disadvantage?

The countercyclical capital buffer in Basel III addresses these challenges (BCBS (2010)). First, all the home authorities have agreed to apply the buffer (up to 2.5% of risk-weighted assets) to their multinational banks' exposures to the foreign ("host") jurisdictions. Second, the host authority can invoke the buffer in response to signs of a build-up of credit risks in its jurisdiction, with unusually strong credit booms acting as an agreed point of reference; home authorities may enforce thicker, but never thinner, buffers. This design can protect banks from credit cycles outside the home country, help to constrain credit booms, and address incentive and circumvention challenges.[11] This multilateral agreement might well serve as a model for the international coordination of macroprudential policy to mitigate the risks of credit booms (eg using loan-to-value ratios).

Conclusion

In globalised financial markets, it is crucial to understand the international dimension of credit. Building on previous work and combining the BIS international financial statistics and national sources, this special feature has sought to measure foreign currency and cross-border credit and to identify patterns in their behaviour, both in the aggregate and in individual countries.

For some key currencies, particularly the US dollar and, to a lesser extent, the euro, the domain of use extends well beyond the borders of the issuing jurisdiction. In larger countries, the stock of credit in foreign currency tends to be modest in relation to overall credit, but it can grow in an unwelcome fashion at times like these. In addition, cross-border credit bears watching because it has tended to grow faster than overall credit in many countries experiencing credit booms.

Further work in this area will become possible as emerging markets expand the coverage of their own credit aggregates, for example through the development of flow of funds statistics. The geography of global credit remains only partly mapped.

[11] That said, the scheme is by no means foolproof. For example, supervisors will need to guard against banks collaborating with borrowers to book loans to borrowers' financing subsidiaries outside the country to whose residents the countercyclical capital buffer has been applied.

References

Alessi, L and C Detken (2009): "Real time early warning indicators for costly asset price boom/bust cycles: a role for global liquidity", *ECB Working Paper Series*, no 1039.

Baba, N and I Shim (2010): "Policy responses to dislocations in the FX swap market: the experience of Korea", *BIS Quarterly Review*, June, pp 29–39.

Basel Committee on Banking Supervision (2010): *Guidance for national authorities operating the countercyclical capital buffer*, December.

Borio, C and P Lowe (2002): "Assessing the risk of banking crises", *BIS Quarterly Review*, December, pp 43–54.

——— (2004): "Securing sustainable price stability: should credit come back from the wilderness?", *BIS Working Papers*, no 157.

Borio, C and M Drehmann (2009): "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp 29–46.

Brown, M, M Peter and S Wehrmüller (2009): "Swiss franc lending in Europe", *Aussenwirtschaft*, no 64(2), pp 167–81.

Bruno, V and H S Shin (2011): "Capital flows, cross-border banking and global liquidity", processed, July.

Brzoza-Brzezina, M, T Chmielewski and J Niedźwiedzińska (2010): "Substitution between domestic and foreign currency loans in Central Europe: do central banks matter?", *ECB Working Paper Series*, no 1187, May.

Caruana, J (2011): "Global liquidity: a view from Basel", speech to International Capital Markets Association Annual General Meeting, Paris, 26 May.

Cetorelli, N and L Goldberg (2011): "Global banks and international shock transmission: evidence from the crisis", *IMF Economic Review*, vol 59, no 1, April, pp 41–76.

Fukumoto, T, M Higashi, Y Inamura and T Kimura (2010): "Effectiveness of window guidance and financial environment", *Bank of Japan Review*, E-4.

Hong Kong Monetary Authority (2011): "Credit growth: circular to all authorized institutions", from Chief Executive Norman Chan, 11 April.

Lane, P and G Milesi-Ferretti (2007): "A global perspective on external positions", in R Clarida (ed), *G7 current account imbalances*, Chicago, pp 67–102.

McCauley, R (2010): "Foreign currency borrowing in emerging Europe: households as carry traders", *BIS Quarterly Review*, September, pp 18–19.

McCauley, R and R Seth (1992): "Foreign bank credit to US corporations", *Federal Reserve Bank of New York Quarterly Review*, vol 17, pp 52–65.

Schularick, M and A Taylor (2009): "Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008", *NBER Working Papers*, no 15512, forthcoming in the *American Economic Review*.