FINANCIAL DISINTERMEDIATION IN INTERNATIONAL MARKETS AND GLOBAL BANKS FUNDING MODELS

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This paper investigates the process of financial disintermediation in international markets after the global financial crisis. Since the outbreak of the crisis, global banks are reducing their cross-border positions, this way reversing their large expansion in the period 2000-2008. Global banks funding structures are shifting in parallel, with a sharp and protracted reduction in wholesale funding. We test whether this trend towards more stable funding patterns explains the contraction in cross-border bank financing, using a panel of 56 countries, for the period 1991-2013. We find that net redemptions of banks' international debt or the declining activity of global banks' branches in the US important drivers of the process. We highlight next how, in some regions, financial disintermediation is a defining feature of the post-crisis international markets. International capital markets have gained importance as source of external financing for private borrowers headquartered in emerging economies, supported by easy monetary conditions in advanced economies. The potential implications of such process for financial stability have raised concerns. Assessing them requires further information on bond holders' investment profiles, and borrowers' financial soundness.

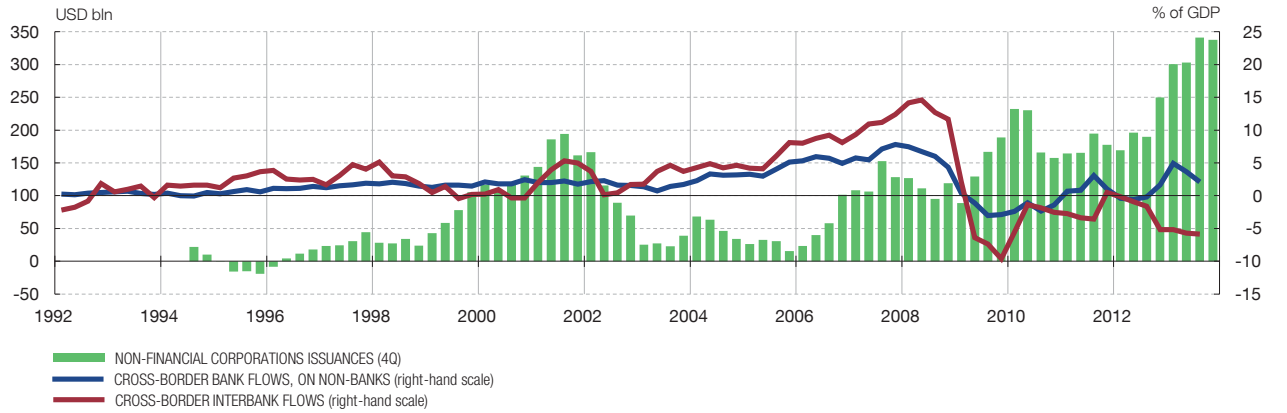
1 Introduction

The process of financial integration experienced a turning point after the global financial crisis. Global banking is today described by cross-border fragmentation. Cross-border bank claims are experiencing a sustained and deep contraction which lasts since the outbreak of the global financial crisis. The contraction of cross-border interbank claims is sharper, but cross-border claims vis-à-vis non banks have also remained subdued – Chart 1 –. It is also apparent in this chart how non-financial corporations' debt issuances at international markets have increased protractedly, in the same period. Issuances are nearly three times higher than in 2008, and have reached an all-time high after the global financial crisis.[1] Financial disintermediation seems therefore a defining feature of the post-crisis international markets.

The process of cross-border bank deleveraging is a reversal of the rapid expansion of banks' cross-border activity in the period 2000-2008, which was fostered by the development of

1 Cross-border bank deleveraging also contrasts with the resilience of other models of internationally expansion. For instance, banking subsidiaries' local claims have grown, a development attributed to the stability of their funding models, based on local liabilities and capital [CIEPR (2012)].

BANKING FRAGMENTATION AND NON-FINANCIAL COMPANIES ACCESS TO CAPITAL MARKETS (a) CHART 1



SOURCE: BIS.

a The graph shows new patterns of financial integration after the global financial crisis. Non-financial corporations issuances are shown in US bn (sum of last four quarters). Cross-border bank flows in the last four quarters are measured relative to each country's GDP, as a simple average of all countries of the sample (see appendix 1 for details on the data sample). Non-financial corporations issuances in international markets have increased markedly. Cross-border bank flows have not recovered after the global financial crisis, and cross-border interbank flows are experiencing a marked and steady contraction.

centralized funding structures. Banking groups headquartered in a number of advanced economies, in particular euro area countries, obtained wholesale funding in international markets, and invested them worldwide [CGFS (2010c), McCauley, McGuire and Von Peter (2010), Shin (2012)]. Today, these global banks funding structures are shifting in parallel to cross-border bank deleveraging.[2] Wholesale funding is contracting, as part of broader shifts towards more stable funding sources.

These shifts in banks' funding patterns are particularly relevant in financial centres [Serena and Valdeolivas (2014)]. Global banks' branches in the US, which were used as funding vehicles during the period 2000-2008, are no longer a source of financial resources for their banking groups [Goulding and Nolle (2012)]. EU and US banks branches in offshore centres such as Hong-Kong are experiencing similar changes (HKMA (2013). The changes in international funding patters are broad, and are not limited to these few, although relevant, financial centres [Caruana and Van Rixtel (2012)]. Banks international net issuances are contracting sharply on an aggregate basis. Cross-border interbank liabilities are also contracting, in particular by banks headquartered in advanced economies [García-Luna and Van Rixtel (2014)]. Global banks activity from financial hubs remains subdued. Regulatory reforms, either at the global level, or in home and host countries, are among the main underlying factors [Tarullo (2012, 2014), CGFS (2010c), Gambacorta and Van Rixtel (2013)]. Therefore, this trend towards more stable funding models is probably of permanent nature. Global banks which expanded overseas by establishing locally funded and capitalized subsidiaries have been more resilient.

In stark contrast with global banks' cross-border deleveraging, international capital markets show a strong dynamism. International issuances – bonds issued by non-residents, in all markets –, have increased, particularly in emerging economies [Goodhart (2014), Turner (2014)]. It has been suggested that banks could be "losing ground" in favour of international capital markets [BIS (2013), Deutsche Bank (2014)].

These developments pose a number of interesting, unexplored, and pressing questions. Are cross-border bank disinvestments driven by the contraction in global banks international wholesale funding? Are capital markets counterbalancing global banks cross-border deleveraging? And, which are the implications for the transmission of global liquidly across borders?

The objective of this paper is to shed light on these issues. We will argue that banking fragmentation reflects, to some extent, a post-crisis reassessment of global banks business models. Banks are obtaining less funding from international wholesale markets. These changes have global reach implications, frequently overlooked. International wholesale funding was instrumental to finance cross-border activity. Accordingly, its shrinking importance could be a driver of cross-border bank deleveraging.

We investigate econometrically this hypothesis, building on a database comprising quarterly data for 56 countries, emerging and advanced, for the period 1991-3Q2013. Our results suggest that new funding patterns are among the key factors behind the sharp contraction in cross-border bank flows, and therefore impacting on financial integration.

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2 Global bank are those which have any activity of international reach -outside the country where the parent bank is headquartered. They are also known as internationally active banks. Global banks can expand abroad using different models [McCauley *et al.* (2010)]. We are implicitly focusing on the so-called international banks, which expand through cross-border investments, and centralized funding. Multinational banks are another typology of global banks, not analyzed in this article. They expand overseas by establishing subsidiaries, with a decentralized funding structure. Foreign subsidiaries are locally funded and capitalized, so multinational banks gain international.

We show next how heightened activity in capital markets, coupled with the steady shrinkage of cross-border banking activity, has implied, from the perspective of recipient countries, a shift in the composition of their external financing. There is an ongoing trend towards financial disintermediation: countries obtain less international financing from banks, and more from capital markets. Geographical breakdowns show that, in areas such as Emerging Asia or Latin America, capital markets have gain relative importance relative to banks' cross-border credit. In these countries, non-financial corporations' issuances have reached all-time high volumes. It remains open whether this substitution is short-lived, since other factors, such as the accommodative monetary policy in advanced economies, have been supportive [Lo Luca *et al.* (2014)]. Moreover, for some borrowers, such as SMEs, capital markets could be an imperfect substitute of cross-border bank financing [Larosière (2013)]. The increasing access to capital markets by banks headquartered in emerging economies is also remarkable.

The rest of the article is structured as follows. In Section 2, we describe in detail how global banks funding in international markets is decreasing after the global financial crisis. In Section 3, we investigate econometrically the impact of these shifts on cross-border bank investments. In Section 4, we depict the main changes in financial integration after the global financial crisis. Finally, in Section 5, we discuss the main implications of these trends, and the questions they open. Large international debt issuances pose risks, either overborrowing or currency mismatches. Bond markets could be new carriers of global liquidity. The impact of tightening of global liquidity conditions on bond holders investment decisions would depend on the investors risk profile, investment horizon, or leverage.

2 Global banks funding patterns after the global financial crisis

In this section we discuss how global banks have reduced their reliance on international wholesale financing. Wholesale international financing was instrumental to finance global banks cross-border expansion. Therefore the current decline in international financing is a reversal of the previous process, and has far-reaching implications for financial integration.

Whole sale funding refers to all financing from non-retail sources. Retail funding are mostly small, insured deposits, and similar instruments, such as promissory notes. Wholesale funding includes a wide range of financial instruments: debt instruments, interbank loans, and any other liabilities versus institutional investors.[3]

The trend towards more stable funding patterns is being analyzed at length, using consolidated balance sheets – see for instance, IMF (2013), for a global analysis, or ECB (2012), for an analysis of euro area developments –.

We focus instead on the international dimension. Global banks usually tap wholesale funding in international markets, either by issuing debt in international markets, through cross-border interbank loans, or by using branches in key financial centres as funding vehicles.

International funding patters are not easy to analyze systematically, so we use two different approaches. We show first descriptive evidence on global banks branches activity in key financial centres, such as US and Hong-Kong. As a second step, we show evidence on aggregate funding patterns of global banks in international markets, either through debt issuance, or through cross-border interbank financing. Both approaches suggests global banks have decreased their wholesale funding in international markets.

3 Wholesale funding can have different maturities, or degree of stability, which are not discussed in this section [see Chen *et al.* (2012)].

2.1 BRANCHES OF FOREIGN BANKS IN KEY FINANCIAL CENTRES

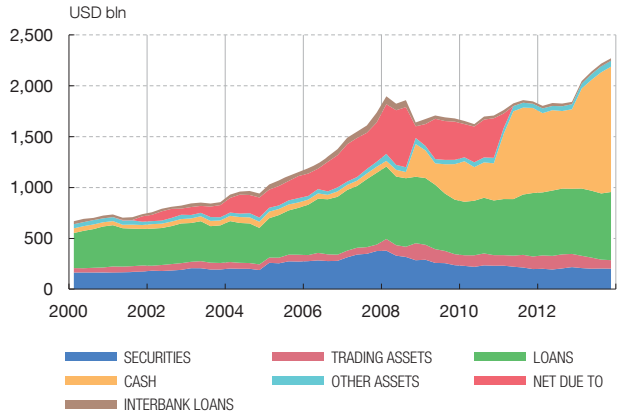
The US financial market has been for years a key funding location for non-US international banks. The depth of its financial markets and the prominence of the US dollar as currency of invoice make it an attractive financial centre. Global banks' branches in the US have therefore an important role as funding vehicles of their banking groups.[4]

Their activity has experienced two dramatic shifts despite the apparent stability of branches' activities - their balance sheets have increased in size since the onset of the global financial crisis. These shifts have to do with the balance sheets composition, as shown in Chart 2 [see Goulding and Nolle (2012) for a detailed analysis].

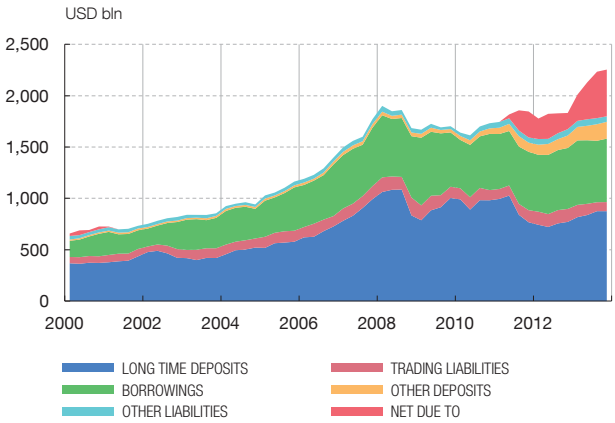
4 Foreign banking offices in the US are either branches (and agencies) or subsidiaries. Foreign-owned subsidiaries are US commercial banks, of which a foreign banking organization owns at least 25 percent. US branches and agencies of foreign banks are incorporated in their foreign banking organizations. Foreign-owned subsidiaries and US branches of foreign banks have very different activities, analyzed in detail in Goulding and Nolle (2012).

BRANCHES OF GLOBAL BANKS IN THE US, SELECTED BALANCE SHEET ITEMS (a) CHART 2

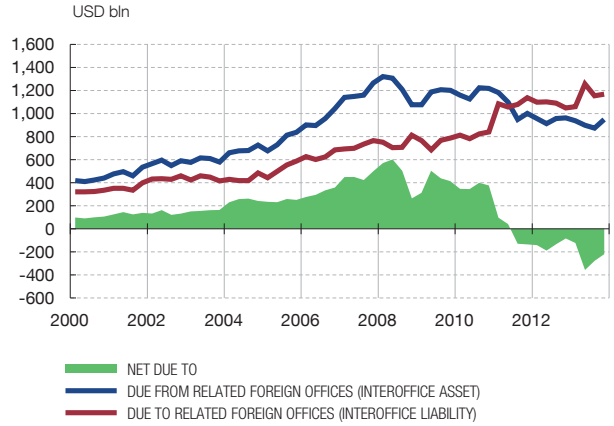
2.1 ASSETS



2.2 LIABILITIES



2.3 NET DUE TO



2.4 US BRANCHES, BALANCE SHEET

Assets	Liabilities
Bank credit	Deposits
Securities	Large time deposits
Loans and leases	Other deposits
Interbank loans	
Cash assets	Borrowings
Trading assets	Trading liabilities
Other assets	Other liabilities
	Net due to (Due to / From related foreign offices)

SOURCE: US Financial Accounts; 4.30 Assets and Liabilities of U.S. Branches and Agencies of Foreign Banks.

a The chart shows the significant changes in the activity of US branches of Foreign Banks Organizations. Charts 2.1 and 2.2 break down US branches balance sheet; as detailed in chart 2.4 above, assets are break down in bank credit (securities; loans and leases; interbank loans); cash assets; trading assets and other assets. Liabilities are broken down in wholesale deposits; borrowings; trading liabilities and other liabilities. Net Due to positions vis-a-vis related foreign offices (interoffice) can be either a source of funding, or an use. Chart 2.3 zooms in Net Due To Positions. a positive value reflects a net creditor position of branches vis-a-vis their banking groups, while a negative value implies FBOS are importing funding from their banking groups. The aggregate Net Due To Position can be break down between branches with a net debtor position vis-a-vis their banking groups, represented as the red line; and branches with a net creditor position vis-a-vis their banking group, represented with a blue line. In the last two years, branches with a creditor position have decreased it steadly; at the same time, branches with a debtor position are importing larger amounts of financing from their banking groups.

Panel 2.4 present a stylized balance sheet. Assets are classified either as bank credit (securities, loans and leases, and interbank loans), cash assets, or trading assets. Liabilities are classified either as wholesale deposits, borrowed funds, and trading liabilities. Branches of foreign banks cannot take retail deposits from US citizens or residents, so all funding is wholesale.

Net Due To (NDT) positions vis-à-vis (foreign) relate banking offices are a key item to track branches activity. In panel 2.4, NDT positions are included in the right-hand-side of the balance sheet. However, they can be either an use (asset), or a source (liability). If branches are providing financial resources to their banking groups overseas, NDT positions are positive, and therefore constitute an asset. If branches are net importers of financing, NDT positions are negative, and booked as a liability.

The evolution of assets and liabilities is shown in panels 2.1 and 2.2. Branches obtained the bulk of funding from wholesale deposits and borrowed funds, in the period 2000-2008. Part of this funding was channelled abroad, to their banking groups. Therefore branches NDT positions vis-a-vis related banking offices were an asset. Such net creditor position reached its peak in mid-2008, when accounted to 35% of the balance sheet. The remaining assets were allocated to bank credit. Cash holdings were negligible.

The first remarkable change after the crisis has to do with the branches financial position vis-à-vis their banking groups. Branches decreased the funds channelled towards their banking groups, so that in mid-2011, NDT positions vis-à-vis their banking groups became a liability (apparent in panel 2.2). This net debtor position has widened since then, reflecting that branches are obtaining funding from their banking groups, overseas.

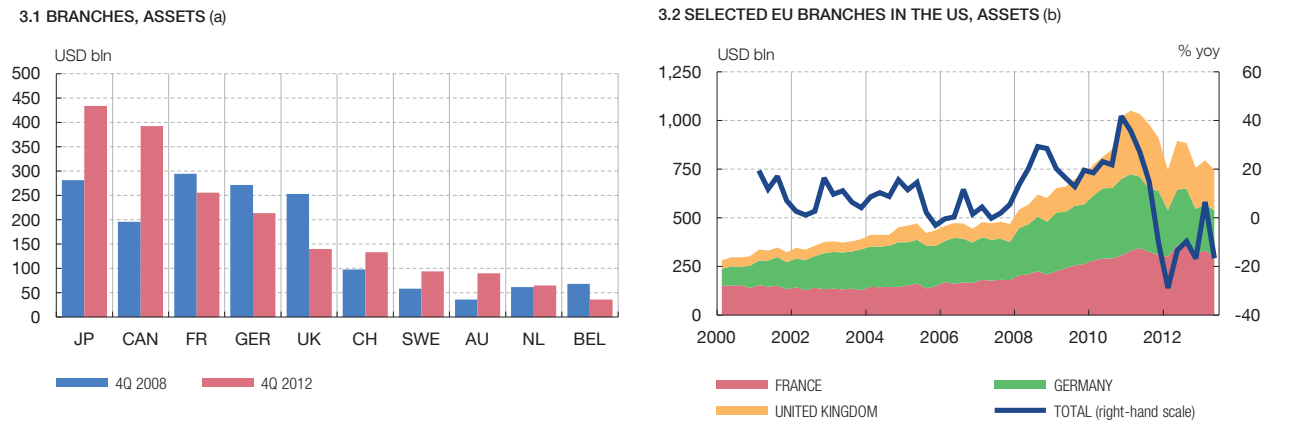
The aggregate NDT position can break down between creditor and debtor branches. Due from related foreign offices (interoffice assets) aggregate the NDT positions of branches with net claims vis-à-vis their banking groups. Due to related foreign offices (interoffice liabilities) include the positions of branches with net liabilities.

Panel 2.3 shows these two measures, and also the aggregate NDT position (previously included in panels 2.1 and 2.2). Branches with net creditor positions vis-à-vis their banking groups have decreased the funding channelled overseas. This is an underlying factor behind the contraction in aggregate creditor NDT positions. The increase in the funds obtained by branches with a net debtor position vis-à-vis their banking groups is a second factor. The joint effect is the dramatic shift in the activity of branches of foreign banks.

The increasing volume of cash assets held in the Federal Reserve is the second remarkable shift in US branches activity. The increase is so sizable that cash holdings already represent the bulk of branches assets. Hence, branches investment profile has became more conservative: much of their funding, either domestically-obtained or received from overseas, is hoarded in the Federal Reserve cash vaults [McCauley and McGuire (2014)].

It is not possible to ascertain which branches have decreased their funding overseas. However, we can break down their assets under management according to the nationality of their banking groups (Chart 3). The shrinking balance sheet of European branches suggests they might be those under retreat. The combined assets of French, German, and UK banks, was well above 1 trillion dollars in 2008. At the end of 2012, their assets represented

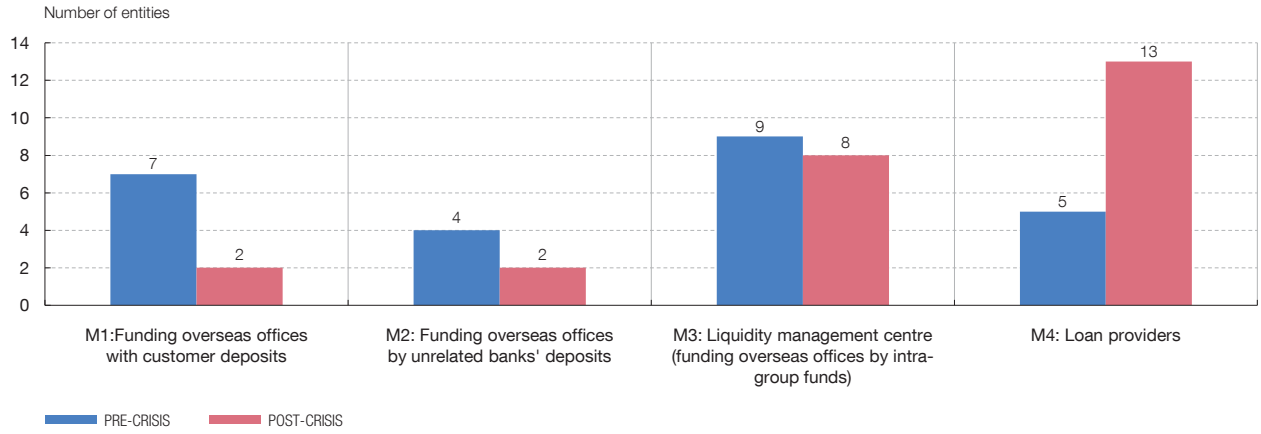
BRANCHES OF FOREIGN BANKS IN THE US (a) CHART 3



SOURCE: Structure Data for the U.S. Offices of Foreign Banking Organizations.

a US branches of foreign banks, by nationality of their parent bank.
b Historical evolution of UK, French, and German US branches.

FOREIGN BRANCHES IN HONG-KONG. EU AND US BANKS, BREAKDOWN BY TYPE OF ACTIVITY (a) CHART 4



SOURCE: HKMA (2013).

a The graph shows how EU and US branches are classified, according to their activity, by the Hong-Kong Monetary Authority, before and after the global financial crisis. The number of "funding branches" – models 1 y 2 – has shrinked, and the number of branches classified as loan providers has increased.

only 600 US bn. The volume of assets Japanese, Canadian, or Australian, branches has, on the contrary, increased. They can be amongst those increasingly present in US financial markets, focused on hoarding liquidity in the Federal Reserve.

A similar declining role of branches as funding vehicles of their banking groups is observed in other key financial centres, such as Hong-Kong. Chart 4 presents the Hong-Kong Monetary Authority classification of EU and US branches according to their activity. They are classified in four groups: branches focused on funding overseas offices with customer deposits (group 1); funding overseas offices by unrelated banks' deposits (group 2); branches akin to liquidity management centres (group 3); and loan providers (4). Branches classified as loan providers have increased to 13 – well above the 5 branches classified as loan providers before the crisis –. Branches classified as funding vehicles of overseas offices have decreased to 4, while before the crisis 11 branches were used as funding vehicles by their banking groups.

2.2 INTERNATIONAL WHOLESALE FINANCING

We turn now to the analysis of global banks aggregate funding patterns in international markets: international bond issuances, cross-border interbank liabilities, and global banks activity in financial hubs.

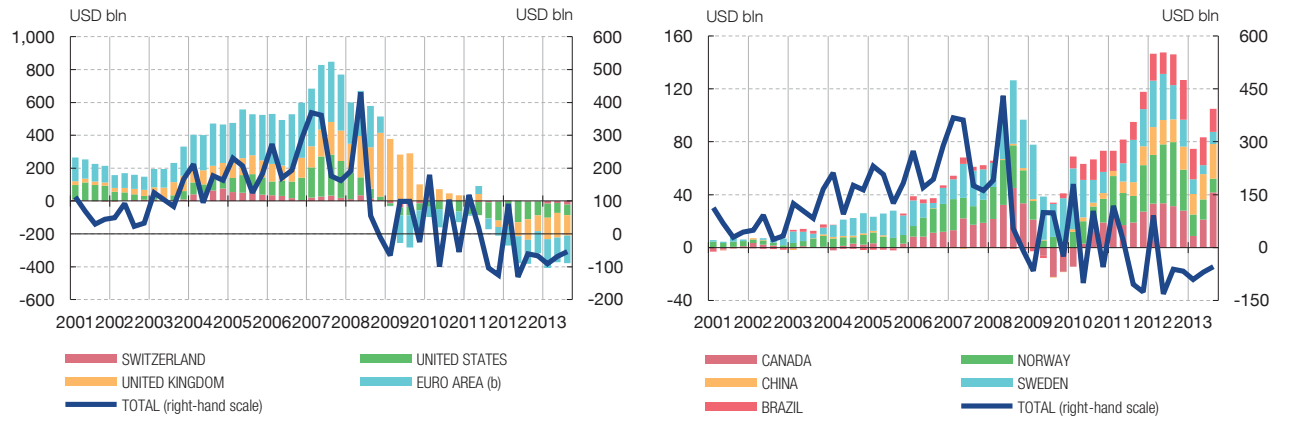
BIS securities data track net international issuances, classifying banks according to the nationality of their banking groups. The information is compiled on a national basis, so that issuances by foreign subsidiaries, branches, or vehicles are classified according to the nationality of the ultimate owner of the entity. Therefore, international bond issuances are those in which the ultimate issuer is not headquartered in the market of issuance.

Chart 5 shows the protracted contraction of net aggregate international issuances –represented by the black line, included in both panels. This trend is driven by the deleveraging of banks headquartered in UK, US, Switzerland and most euro area banking systems, which are redeeming international debt, on net basis. Other banks, headquartered in emerging (Brazil or China) and some advanced economies (Canada, Norway, or Sweden) have increasingly tapped international markets after the global financial crisis. However, their increase is not large enough to compensate the large and protracted redemption of debt by the aforementioned banking systems

The net redemptions of global banks' international debt might reflect different factors, ranging from temporary closures of financial markets in some banking systems, to higher funding costs, or, structural policy-driven changes in funding models. Whichever is the reason, they imply less towards less wholesale funding in international financial markets.

There are broader changes in banks' debt issuances after the global financial crisis, not easily grasped in aggregate data. Bank-level data suggests that debt issuances have experienced significant composition effects [see Van Rixtel and Gasparini (2013), for an analysis on euro area patterns]. Debt issuances have shifted towards secured funding. In some banking systems, government sponsored issuances increased, and a higher fraction of bond issuance was retained, to be used as collateral. As collateralized debt issuances

BANK ISSUANCES IN INTERNATIONAL MARKETS. BREAKDOWN BY NATIONALITY OF PARENT BANK (a) CHART 5



SOURCE: BIS.

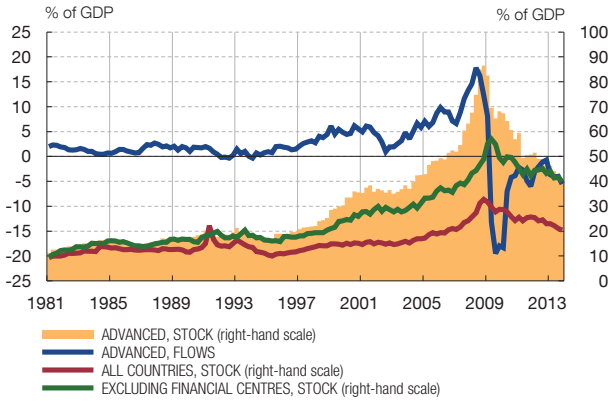
a The graph shows the recent evolution of banks net international bond issuances. International bond issuances are those issued outside the market where the borrower resides. Issuances are classifed by tha nationality of the parent bank. Therefore, issuances by foreign subsidiaries/branches are classified according to the nationality of their banking group. Panel A shows net international issuances of banking systems which are deleveraging. These include mostly european banks, and the US. Euro area includes France, Germany, Italy, and Spain .Panel B shows net international issuances of banks tapping international markets, such as emerging market banking systems, and also a number of developed countries which includ Canada, Norway, or Sweden. The blue line represents global banks total issuances.

b Germany, France, Italy and Spain.

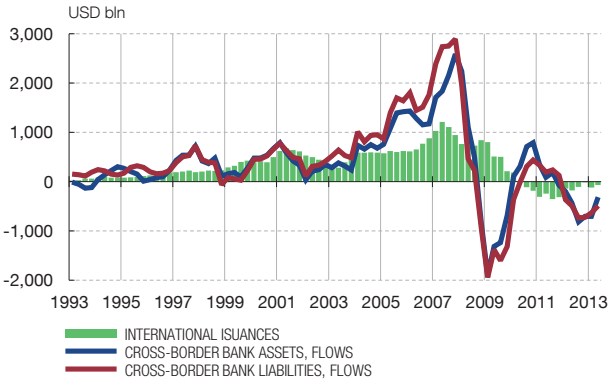
INTERBANK LIABILITIES AND FINANCIAL HUBS

CHART 6

6.1 INTERBANK LIABILITIES. CROSS-BORDER (a)



6.2 FINANCIAL HUBS AND GLOBAL BANKING ACTIVITY (b)



SOURCE: BIS Locational Banking Statistics, national accounts.

a Cross-border interbank liabilities, average stocks in GDP terms of advanced economies; of advanced economies, excluding financial centres; of all countries. The chart also shows changes in cross-border interbank liabilities, in the last four quarters, measured also relative to GDP, for advanced economies, which explain the large build-up in banks' external, non-core, liabilties, and the subsequent contraction.

b Activity of Internationally active banks in countries which have features of financial hubs (Hong-Kong, Luxembourg, Iceland, Irland, Switzerland, United Kingdom, US). The chart shows changes in internationally active banks cross-border assets and liabilities, booked in financial hubs shown in US million: they have a remarkable synchronization, and are experiencing a sizable contraction. Internationally active banks issuances from financial hub have a similar pattern: they increased before the global financial crisis, and are currenty contracting.

increased substantially after the global financial crisis, asset encumbrance became a risk, amidst heightened counterpart credit risk, and ongoing regulatory reforms. The process had probably implications for banks cross-border activity, since reflected scarcer unsecured funding and, altogether, an increase in funding costs [CGFS (2013)]. Such analysis is, however, beyond the scope of this paper.

Cross-border interbank liabilities have also contracted sharply, in particular between advanced economies banks. Panel 6.1 shows the evolution of cross-border interbank loans. Interbank liabilities, measured in GDP terms, reached to 90% of GDP in advanced economies at the end of 2008, and 60% excluding financial centres. Interbank liabilities also increased in emerging economies, although to lower levels – an average of 30% of GDP –.

The outbreak of the global financial crisis was a turning point in cross-border interbank financing. Cross-border interbank liabilities have contracted protractedly, in every quarter since 2009. The stock of cross-border interbank liabilities in advanced economies has halved, while that of emerging economies is 35% lower than its peak. The reduction in cross-border interbank liabilities reflects, in some banking systems, less financing obtained from overseas. It can reflect as well lesser degree of liquidity management from financial hubs.

The subdued activity of global banks from their banking offices operating in financial hubs is apparent in panel 6.2. Cross-border assets and liabilities booked by banking offices in financial centers increased sharply, and with great synchronization, in the period 2000-2008. They suffered a sharp reversal and, after a short-lived recovery, cross-border banking activity is contracting again. This is consistent with evidence of lower activity by global banks from financial centers. Banks headquartered in the euro area or Switzerland are amongst those reducing their cross-border interbank activity from United Kingdom [García-Luna and Van Rixtel (2014)].

3 Drivers of cross-border bank flows. Econometric analysis

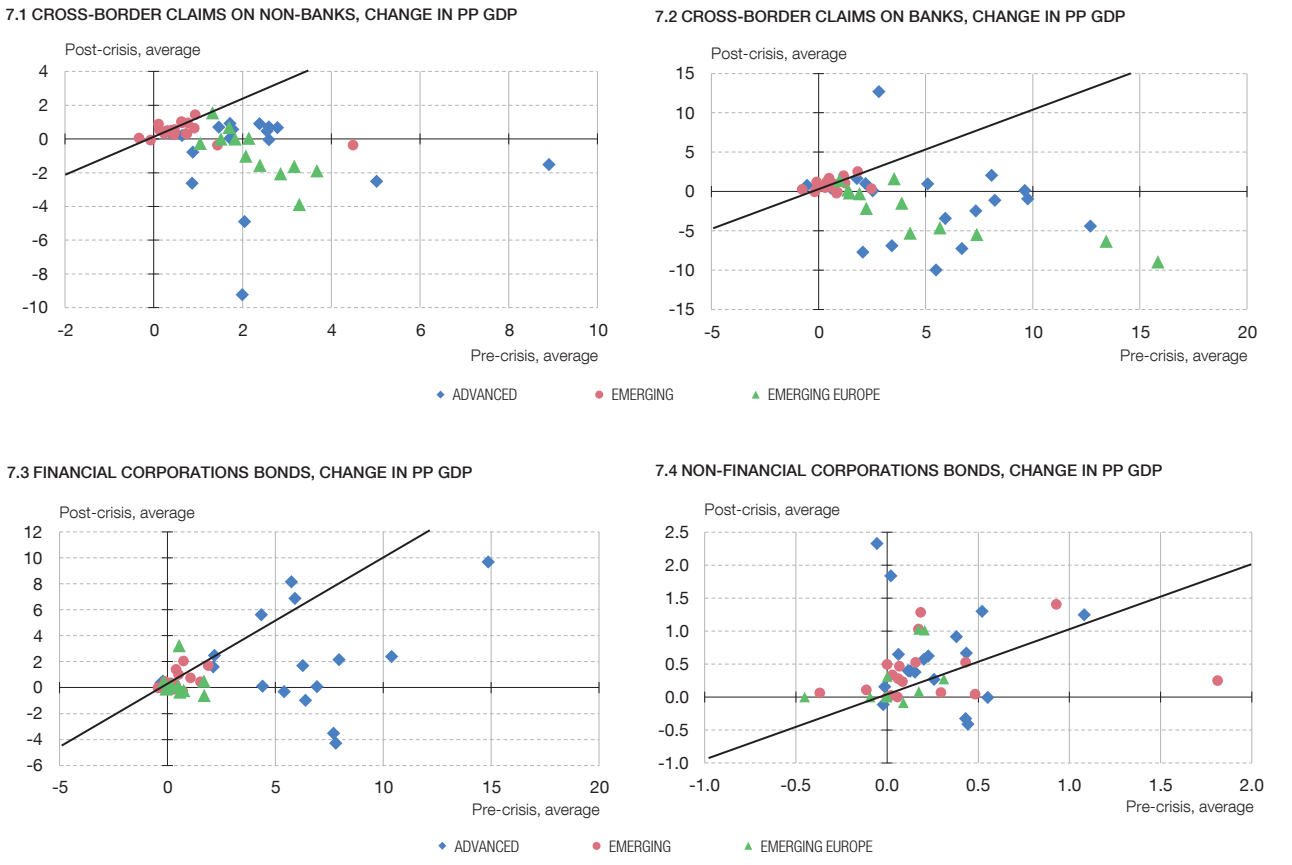
In this section we investigate econometrically the drivers of cross-border banking activity building on the previous work of Bruno and Shin (2013). Our focus lies on the statistical and economic significance of different measures of global banks reliance on international wholesale funding. The results confirm that cross-border bank investments depend positively on global banks international wholesale funding. As for the economic significance, the sharp contraction in banks' international wholesale funding explains 1/3 of the cross-border bank flows reduction after the global financial crisis.

3.1 PRELIMINARY EVIDENCE

International banks are shedding cross-border bank assets, in parallel to their contraction in wholesale international funding. The process is impacting on countries' international financing, as shown in Chart 7.

In this chart, dots represent countries' reliance on different sources of funding, measured in GDP terms, before and after the crisis (horizontal and vertical axis). Dots above the bisecting line reflect a country is relying more on a given source of financing after the crisis. We break down international financing between cross-border claims on non-banks (panel 7.1), cross-border interbank claims (panel 7.2), financial corporations' international issuances (panel 7.3), and non-financial corporations' international issuances (panel 7.4). This highlights how countries financing patterns are changing.

FINANCIAL INTEGRATION AFTER THE CRISIS. CROSS-COUNTRY ANALYSIS (a) CHART 7



SOURCES: BIS, International Banking Statistics; BIS Securities Statistics; national accounts, owns elaboration.

a Pre and post-crisis average value of each variable: Non-financial corporations international bond issuances; Financial corporations international bond issuances; Cross-border claims on non-banks and Cross-border claims on banks. Pre-crisis average is the average of 2005, 2006, and 2007; Post-crisis average is the average of 2010, 2011, 2012, and 2013. Each dot represents a country: advanced countries are represented in blue, Emerging Europe countries in green, and the rest of emerging economies (Asian, Latin American, and a number of countries of Africa & Middle East) in red. If points are above the bisecting line, countries have relied more on that source of financing after the crisis.

Cross-border bank flows on non-banks headquartered in advanced economies and emerging Europe are contracting – panel 7.1 –, where most dots are below the bisecting line. The impact on other emerging economies, represented as red dots, is less clear-cut. Cross-border interbank flows have contracted even more sharply, in particular vis-a-vis advanced economies – panel 7.2 –. As for financial corporations debt issuances in international markets, there are net redemptions in most advanced economies – panel 7.3 –, although with some relevant outliers. This contrasts with the large international issuances by financial corporations' headquartered in number of emerging economies. These stylized facts are consistent with the more aggregate pattern show in Chart 2. Finally, panel 7.4 shows how non-financial corporations' international debt issuances have increased. The increase is common to non-financial companies headquartered in emerging and advanced economies alike, although their size is still low, measured in GDP terms. We delve into this trend in Section 4.

3.2 DATA ISSUES

We turn now to the econometric analysis on the drivers of cross-border bank flows. Our panel data includes 56 countries – advanced, emerging, and financial hubs – which are listed in Appendix 1. We use quarterly data for the period 1991-2013. We construct measures of quarterly cross-border bank investments building on the BIS International Banking Statistics: cross-border investments in all sectors (Table 6A); and on banks (cross-border interbank claims, constructed as the difference between Tables 6A and 6B). We define the dependent variable in Section 3.3.

To investigate the relevance of global banks funding patterns as drivers of cross-border bank flows, we construct a number of proxies, detailed in Table 1.

Changes in outstanding volumes of global banks international bonds are deemed a measure of banks' international funding patterns. Global banks international bonds increased before the global financial crisis, and are experiencing a protracted contraction afterwards. We construct this variable using BIS Securities data to test if this is driving global banks cross-border deleveraging.

Branches in the US were also a source of funding for global banks using centralized funding models. We construct a measure of the Net Due To positions share in branches total assets, using the Assets and Liabilities of U.S. Branches and Agencies of Foreign Banks (4.30). The evolving relevance of centralized funding models are reflected in the sharp changes in NDT positions. Branches Net Due To positions vis-à-vis their banking groups were large and positive during the period 2000-2008. The declining importance of branches as funding vehicles is reflected in the protracted reduction in creditor NDT positions. We expect decreases in net creditor NDT positions to impact negatively on cross-border bank flows.

MEASURING GLOBAL BANKS INTERNATIONAL FUNDING. MAIN VARIABLES — TABLE 1

	Description	Source
Banks international issuances (+)	Quarterly change in the outstanding total stock of banks international debt securities	BIS, Table 12
US branches funding (+)	Quarterly change in the net due to position of branches of foreign banks, vis-a-vis their banking groups (positive if creditor)	Reserva Federal, Assets and Liabilities of U.S. Branches and Agencies of Foreign Banks (4.30)
Broker Dealer Leverage (+)	Quarterly change in the, leverage of the broker-dealer sector US, measured as the ratio (liabilities plus equity)/equity	Flow of Funds, L. 128

SOURCE: Author's elaboration.

Branches have not separate capital, so it is not possible to compute their leverage. However, there are shifts in branches risk-appetite. Their current liquidity hoarding, described in Section 2.1, is an extreme example. US broker-dealer leverage is considered a proxy of branches activity, since both institutional sectors are influenced by similar factors [Bruno and Shin (2013)]. Therefore we compute the leverage of the US Broker-Dealer sector, using the Flow of Funds, and introduce it as proxy of global banks activity in wholesale funding markets. Higher leverage is expected to affect positively cross-border bank flows.

Cross-border bank flows are expected to depend on other global factors, not directly related to global banks funding patterns. These variables include world GDP growth, or global risk aversion (measured by the VIX). The VIX can be interpreted a measure of global banks risk-aversion. Alternatively the VIX can be considered a proxy of banks' funding costs in wholesale markets.

We include also a number of country-specific variables which are also expected to influence cross-border bank flows. The selection is guided by previous work on determinants on capital flows – pull factors –. The variables included as control variables are domestic GDP growth, the current account balance, the sovereign rating, and measures of fiscal soundness (fiscal balance and public debt). Countries with sounder economic fundamentals are expected to receive more cross-border bank flows.

3.3 ECONOMETRIC FRAMEWORK

We estimate the following equation:

$$xb_{it} = \varnothing xb_{t-1} + \beta' f(local_{it}) + \gamma\, g(global_t) + \alpha_i + y_t + \epsilon_{it} \qquad [1]$$

where cross-border bank flows xb_{t-1} on country i, at quarter t, depend on a vector of country-specific variables $f(local_{it})$ and a vector of global variables $g(global_t)$. The latter includes the measures of global banks funding patterns, and the remaining global factors (VIX, and world GDP growth). The right-hand side variables include a lag of the dependent variable, xb_{it-1}, country-fixed effects, and time effects.

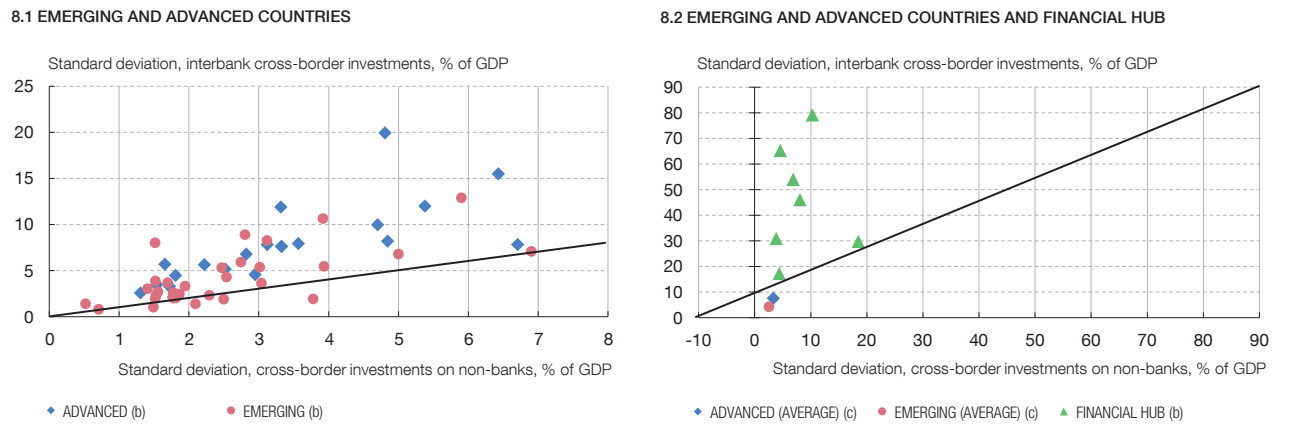
Cross-border bank flows xb_{it} are quarterly flows, measured in GDP terms, and standardized at the country-level. To standardize them we divide cross-border bank flows by their historical (country-specific) standard deviation, following Broner *et al.* (2013).

$$xb_{it} = (XB_{it} / PIB_{it}) / sd_{xb_{it}} \qquad [2]$$

This standardization is important. Cross-border bank flows received by countries, even scaled by their GDP, have remarkable differences in size and volatility. This is apparent in Chart 8 which plots the historical country-specific volatility of bank flows: volatility of cross-border bank flows on non-banks is plotted in the horizontal axis, against the interbank flows volatility, in the vertical axis. Each dot represents a country.

Panel 8.1 shows volatility of advanced and emerging economies, which are represented with blue and red dots, respectively. It is apparent how volatility is much higher in advanced economies. The chart also shows that cross-border interbank claims are more volatile than claims on non-banks, since most of the dots are above the bisecting line. Panel 8.2 shows the volatility of cross-border bank flows to financial hub. It is much higher than that of advanced and emerging economies – to ease the comparison the average volatility of cross – border bank flows to these countries is included.

CROSS-BORDER BANK FLOWS. HISTORICAL COUNTRY-SPECIFIC VOLATILITY (a) CHART 8



SOURCE: BIS (Locational Banking Statistics).

a Standard deviation of quarterly flows, measured in GDP terms, for the period 1Q 1991 2Q 2013.
b Each dot represents a country.
c Average volatility of emerging and advanced countries including in the sample.

Cross-border bank flows, once standardized, can be interpreted as deviations from each country-specific dynamics. In Section 3.5, we rescale the results to gauge their economic size in percentage points of GDP.

3.4 MAIN RESULTS

We estimate equation [1] with system-GMM. We instrument the three variables deemed endogenous, which are the lag of the dependent variable, domestic GDP growth, and the current account balance.[5] In columns 1 to 3 our dependent variable are cross-border bank flows on all counterparts.

Column 1 estimates the model for all countries. The results confirm that cross-border bank flows depend on global banks reliance on international, wholesale, funding. Cross-border bank flows depend positively on global banks issuances in international markets. Therefore, net redemptions of banks international debt – Chart 2 – have as a by-product cross-border asset shedding.

Cross-border bank flows depend positively on increases in the NDT position of branches of foreign banks in the US vis-à-vis their banking groups. It implies that global banks have more lending resources. Accordingly the sharp reversal in the funds channelled from US markets to non-US global banks implies less cross-border banking activity. Finally, the leverage of the US broker-dealer sector, a proxy of activity of wholesale, international banks, also has the expected positive impact on cross-border bank flows.

As for the rest of global variables, cross-border bank flows depend positively on world global growth. VIX increases impact negatively on cross-border bank investments. Cross-border investments can be impaired by global banks heightened risk-aversion, proxied by the VIX.

Country-specific variables also are important determinants of cross-border bank flows. Countries with higher GDP growth rates attract more bank flows, as do countries with

5 We use system-GMM to estimate all specifications. We introduce time dummies to control for cross-country correlation. As for the number of lags used as instruments, we choose it so as to avoid having too many instruments (as detailed in the tables). Following standard rules-of-thumb, we target a number of instrument similar to N [Roodman (2006)]. Arellano-Bond autocorrelation tests are reported, while Hansen tests (not shown) do not reject the null hypothesis that overidentifying restrictions are valid.

better sovereign rating. Public debt to GDP ratios are negatively associated with cross-border bank investments received. Other variables deemed as potentially relevant, such as current account balance or the fiscal balance, are not statistically significant.

We conduct a number of robustness checks. First, we investigate if the results hold in different country samples. In column 2 we exclude financial centres. These countries are not strictly capital flows recipient countries, and share features with hubs which banks use to manage liquidity routinely. Therefore their correlation with funding matters could be endogenous, and not a connection between funding and asset shedding. We find very similar results.

In column 3, we estimate the model excluding also euro area countries. Financial integration in Europe was boosted by the introduction of the euro. It was mostly bank-based, and had very

CROSS-BORDER BANK FLOWS (a) TABLE 2

Dependent variable is cross-border bank flows

	Total (1)	Excluding financial centres (2)	& Excluding euro area (3)
Country-specific variables			
Lag Bank flows - GDP terms, standarized	-0.399*** [0.121]	-0.236 [0.151]	-0.417** [0.162]
Current account - GDP terms	-0.018* [0.010]	-0.033*** [0.010]	-0.021 [0.037]
Domestic GDP growth	0.053** [0.024]	0.042* [0.024]	0.050 [0.036]
Standard & Poors Rating	0.067*** [0.010]	0.061*** [0.012]	0.059*** [0.013]
Public debt to GDP	-0.003** [0.002]	-0.003 [0.002]	-0.004 [0.003]
Fiscal balance to GDP	0.004 [0.013]	0.006 [0.012]	-0.000 [0.026]
Global variables			
World GDP	0.177*** [0.030]	0.185*** [0.034]	0.161*** [0.038]
VIX	-0.247*** [0.083]	-0.198* [0.107]	-0.121 [0.109]
BrokerDealer Leverage	0.109*** [0.021]	0.104*** [0.021]	0.106*** [0.026]
US branches funding	-1.927*** [0.400]	-1.706*** [0.461]	-2.200*** [0.444]
Banks international issuances	1.356*** [0.431]	1.225** [0.499]	1.518*** [0.544]
Observations	3,977	3,413	2,542
Number of id	54	46	36
Instruments	56	53	44
Test Arellano-Bond AR(1)	0.0836	0.0325	0.258
Test Arellano-Bond AR(2)	0.352	0.739	0.311

SOURCE: Author's elaboration.

a Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1. Equations estimated using system GMM. Variables treated as endogenous are the lag of the dependent variable, domestic GDP growth, and the current account. We choose the number of lags used as instruments in order to avoid instrument proliferation, and taking into account residual autocorrelation paterns. In columns 1 and 3 the minimum lag is 1 and 2 for the levels and transformed equation; and the maximum lag is modified depending on the number of groups (12 and 8, respectively). In column 2 lags 3 to 12 are used (2 in the transformed equation). Hansen-Tests (not reported) do not reject the null-hypothesis that overidentifying restrictions are exogenous. Column 2 excludes financial centres. Column 3 excludes financial centres and euro area countries.

specific features. Retail banking remained mostly national and interbank lending, or direct cross-border investments boomed [Sapir and Wolff (2013)]. Since the outbreak of the crisis cross-border interbank flows are experiencing a particularly protracted contraction. Financial fragmentation can be attributed to an important extent to idiosyncratic developments [Millaruelo and del Río (2013)]. Therefore it is sensible to test whether the results are robust to the exclusion of euro area countries. Most of them hold in this alternative data sampling, although cross-border bank flows do not depend on the VIX.

3.5 ADDITIONAL ROBUSTNESS CHECKS. TIME SPANS, AND SECTOR OF COUNTERPART

In Table 3 we present additional robustness checks. First, we analyze alternative time spans. We expect cross-border bank flows to be more dependent on global financial conditions in periods in which centralized funding models were more prominent. Therefore,

ROBUSTNESS CHECKS (a)

TABLE 3

Dependent variable is:

	Cross-border bank claims		Interbank claims	
	Until 1Q2010 (1)	1999-2010 (2)	All sample (3)	1999-2010 (4)
Country-specific variables				
Lag Bank flows - GDP terms, standarized	-0.423*** [0.145]	-0.565*** [0.186]	-0.478* [0.246]	-0.587*** [0.190]
Current account - GDP terms	0.011 [0.038]	0.007 [0.042]	-0.113*** [0.038]	-0.105*** [0.033]
Domestic GDP growth	0.025 [0.032]	0.011 [0.062]	0.033 [0.048]	-0.000 [0.090]
Standard & Poors Rating	0.067*** [0.015]	0.092*** [0.017]	0.045** [0.021]	0.058** [0.027]
Public debt to GDP	-0.008** [0.004]	-0.010* [0.005]	0.002 [0.003]	0.000 [0.004]
Fiscal balance to GDP	-0.015 [0.027]	-0.029 [0.035]	0.050 [0.033]	0.044 [0.040]
Global variables				
World GDP	0.367*** [0.066]	0.425*** [0.085]	0.133*** [0.047]	0.356*** [0.112]
VIX	-0.347*** [0.133]	-0.437*** [0.159]	-0.266** [0.113]	-0.558*** [0.193]
BrokerDealer Leverage	0.120*** [0.028]	0.128*** [0.028]	0.098*** [0.032]	0.105*** [0.035]
US branches funding	-2.666*** [0.422]	-2.920*** [0.511]	-1.801*** [0.450]	-2.270*** [0.464]
Banks international issuances	1.515** [0.707]	1.874* [1.068]	1.142 [0.943]	1.648 [1.189]
Observations	2,049	1,352	2,526	1,352
Number of id	34	34	36	34
Instruments	36	40	41	33
Test Arellano-Bond AR(1)	0.262	0.693	0.367	0.464
Test Arellano-Bond AR(2)	0.325	0.221	0.360	0.0721

SOURCE: Author's elaboration.

a Robust standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1.Equations estimated using system GMM. Variables treated as endogenous are the lag of the dependent variable, domestic GDP growth, and the current account. We choose the number of lags used as instruments in order to avoid instrument proliferation, and taking into account residual autocorrelation paterns. In columns 1 and the minimum lag is 1 and 2 for the levels and transformed equation; and the maximum lag is 8 and 10. In columns 3 and 4 the minimum lag is 2 and 3 for levels and transfromed equation, and the maximum lag is 8 and 10, respectively). Hansen-Tests (not reported) do not reject the null-hypothesis that overidentifying restrictions are exogenous. All estimations exclude financial centres and euro-area countries.

we estimate the model for different sub-periods: column 1 presents results of sub-period 1991-2010; while column 2 uses period 1999-2010. This is the period when centralized funding models were more prevalent.

The results hold, qualitatively, in both sub-periods. Interestingly, a number of global variables have higher economic size. The coefficient of the VIX – the measure of funding costs in wholesale markets or global risk aversion – is highest in the period 1999-2010. We find a similar increase in the economic size our three measures of global banks funding patterns. World GDP growth has also a stronger economic impact on cross-border bank flows.

Finally, in columns 3 and 4 we use as dependent variable cross-border interbank claims (claims on banks). They are the most volatile source of cross-border bank financing. The results for the whole time span are qualitatively very similar to our benchmark results. The results obtained in the sub-period 1999-2010 are also stronger.[6] The main difference is the non-significance coefficient of banks international issuances. Cross-border interbank claims have probably shorter maturities, and they might be associated with shorter-term liabilities.

3.6 ECONOMIC SIZE

We investigate next the economic size of our main results (Table 2, first column, obtained excluding financial centres). In order to measure the quantitative importance of the shifting funding patterns of global banks, we classify drivers in four groups: global banks funding patterns, other global factors, country-specific factors, time effects. Non-significant variables are included in the unexplained variation. We compute the average impact of each group of variables at a country-level. Then we average this impact for advanced and emerging economies, and compute their contribution to cross-border bank flows before and after the crisis (pre: 1Q2000-3Q2008, post: 1Q2010-3Q2013). Since cross-border bank flows, and its drivers, are measured in terms of (country-specific) standard deviations, we need to rescale them. Therefore we multiply them by the average standard deviation of cross-border bank flows in emerging and advanced economies. Chart 9 shows the decomposition, for advanced and emerging economies (panel 9.1 and 9.2, respectively). We present the information annualized.

Cross-border bank flows have experienced a sizable contraction, which is stronger in advanced economies. In these countries, cross-border bank flows are, on average, 20 pp of GDP lower than before the global financial crisis.

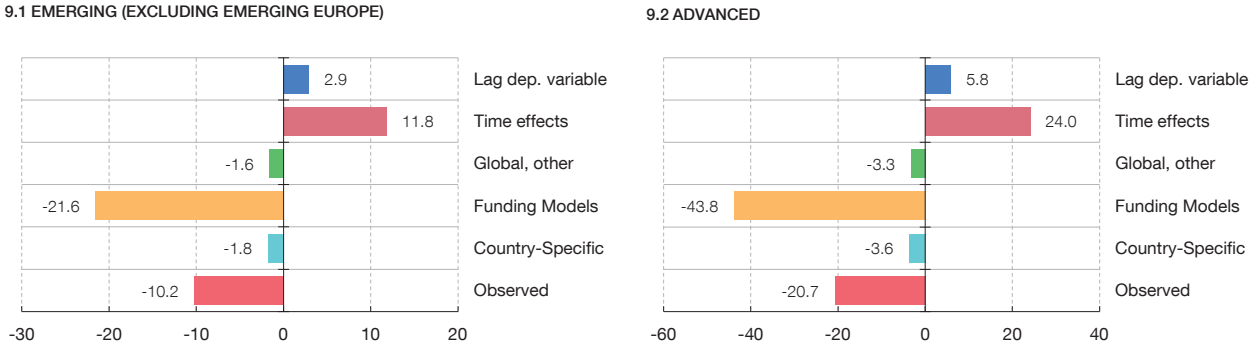
The contraction of international wholesale funding represents the key driver. Indeed, global banks new funding patterns predict a contraction in flows twice as important as the observed. Other global factors (including world GDP growth and risk aversion) explain 15% of that reduction. As for country-specific variables, they have less impact: they explain 20% of banking fragmentation, reflecting lower economic growth and worsening in sovereign rating. Time dummies have a large, positive, impact, this way partially counterbalancing the negative impact of global variables on cross-border bank flows after the crisis.

This sizable impact of time-effects on cross-border bank flows suggests that an unobserved, global factor, has partially smoothed the retrenchment of wholesale-oriented global banks headquartered in advanced economies.[7] This could reflect that, short after the crisis, a

6 Coefficients measure the impact of variables on standardized cross-border bank flows. Since interbank flows are more volatile, all variables have stronger impact on them, measured in pp of GDP (see Chart 8).

7 If the model is estimated removing the time dummies, the coefficients of global variables become much smaller – for instance, the coefficient of the broker-dealer leverage (the most important single variable) halves –.

CROSS-BORDER BANK FLOWS AFTER THE GLOBAL FINANCIAL CRISIS. AVERAGE ECONOMIC IMPACT (a) CHART 9



SOURCE: Author's estimations.

a The charts show the average change in cross-border bank flows on emerging and advanced economies, after the global financial crisis: pre-crisis includes quarters 1q2000-3q2008, post-crisis quarters 1q2010-2q2013. Annualized changes. Drivers of the change are computed using the coefficients of table 2, column 2. The chart shows the average impact in emerging economies, and in advanced economies. Determinants are grouped in 1) Funding models: bank international issuances, Net Due To positions of US branches of FBOS, and leverage of broker-dealer sector; 2) Other global factors: world GDP growth, and VIX; 3) Country-specific variables: current account/GDP, domestic GDP growth, sovereign rating, public debt/GDP, fiscal balance; d) Time Effects; e) Lag of the dependent variable. Non-significant variables are asigned to the residual. These results are already rescaled -in the econometric analysis cross-border bank flows are standarized. We use the average standard deviation, which is 4.3 and 9, for emerging and advanced economies (chart 8 shows the country-specific standard deviation for emerging and advanced economies).

number of banking systems engaged in a cross-border expansion, less dependent on wholesale international funding. Emerging markets banking systems have expanded overseas, to an important extent relying on their domestic retail funding (CGFS (2014). In areas such as Asia-Pacific, their cross-border activity has picked strongly, so that intrarregional banks represent the bulk of cross-border credit. Japanese banks overseas expansion has also increased, financed either with corporate deposits, or currency swaps of their domestic currency retail funding [Lam (2013)]. Global banking after the crisis is defined, therefore, by a sharp contraction of wholesale-funding cross-border activity, and a modest decoupling of cross-border bank flows from these factors.

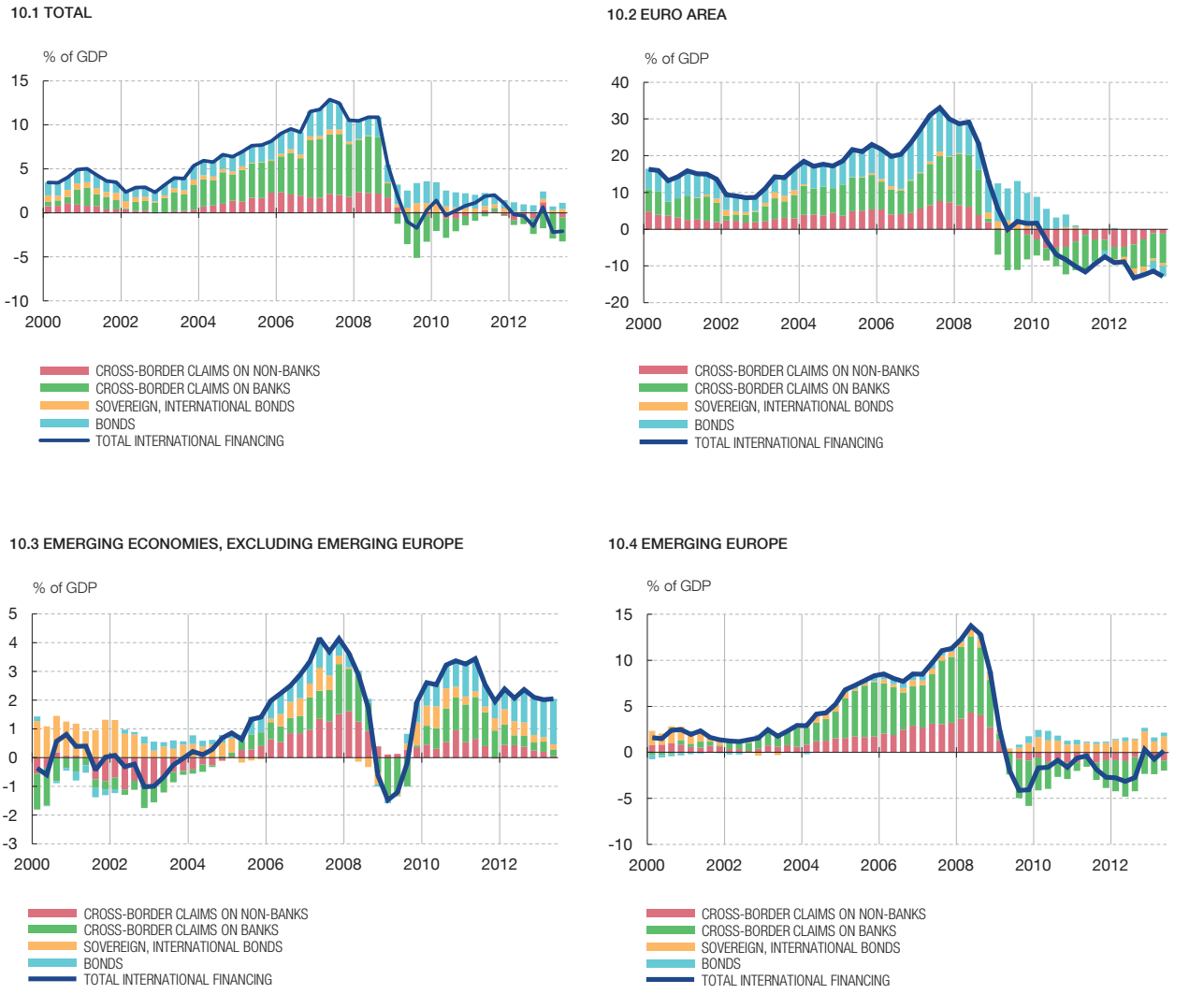
4 Financial disintermediation in international markets after the crisis

The retrenchment of international banks through cross-border asset-shedding is impacting strongly on financial integration. Banks are losing importance as providers of cross-border credit. International capital markets are gaining relative importance. In some geographical areas, international capital markets have also increased in absolute terms. This trend towards financial disintermediation in international markets is depicted in Chart 10.

International financing is break down between funding obtained from banks, and from capital markets. Cross-border bank claims are investments by banks operating overseas, on residents in the recipient economy. These investments can be either on banks, or on non-banks (all other sectors). International issuances are those by residents in the country, in all markets, excepting the domestic. Therefore, they are not necessarily associated with balance of payment flows. We present separately issuances by sovereigns and by other institutional sectors (including banks, non-financial corporations, and other financial institutions (bonds). Capital flows are measured relative to GDP, as a sum of the last four quarters. In other to account different geographical patterns, we show evolutions in the euro area, emerging economies, and emerging Europe.

Panel 10.1 shows that cross-border bank flows are experiencing a protracted contraction, particularly severe in interbank financing. International issuances have hold better, although remain small in absolute terms. Financial fragmentation is sharper in the euro

FINANCIAL INTEGRATION AFTER THE GLOBAL FINANCIAL CRISIS. RECENT EVOLUTION (a) CHART 10



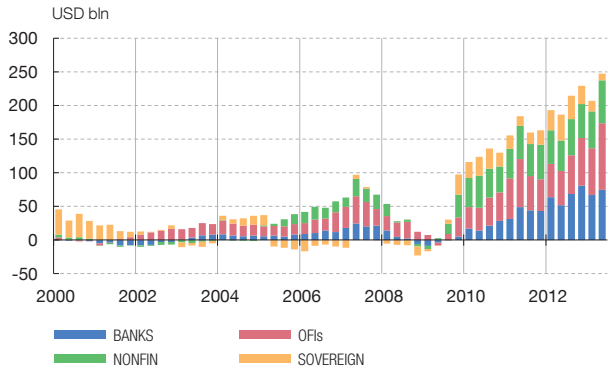
SOURCE: BIS Securities Statistics, Table 12.

a The charts show the changes in international financing of countries after the global financial crisis, by showing the evolution of selected items: cross-border bank flows on non-banks; cross-border interbank flows; international issuances by sovereigns; the rest of international issuances (i.e., by banks, non-financial corporations, and other financial companies). International issuances are those in which the issuer is a non-resident, and frequently target foreign investors. They are classifed according to the nationality of the ultimate owner of the company (Table 12, BIS Securities Statistics). International issuances are not necessarily related to balance of payment capital flows . FDI, which is not shown, has been more stable over time. Data is shown in GDP terms, as a simple average of the countries included in each group.

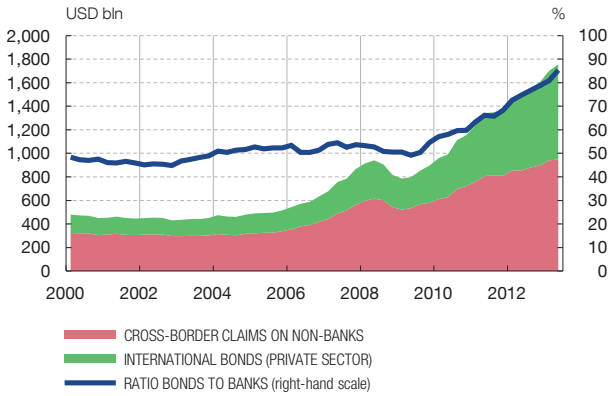
area – panel 10.2 –, where cross-border bank flows are contracting, and international issuances remain low. There are also sizable cross-border bank disinvestments vis-a-vis emerging Europe. Cross-border bank flows vis-à-vis the rest of emerging economies have hold better – panel 10.3 –, but have not recovered the pre-crisis levels.

We investigate next additional features of international issuances in Emerging Asia and Latin America. In both areas, large private international debt issuances have counterbalanced the lesser importance of cross-border bank financing. This trend is driven by private issuances, as shown in panel 11.1, which breaks down international issuances by type of issuer: non-financial corporations, banks, other financial institutions, and sovereigns. Non-financial corporations' international issuances are three times larger than before the global financial crisis, while banks and other financial institutions international issuances have had a slightly increase.

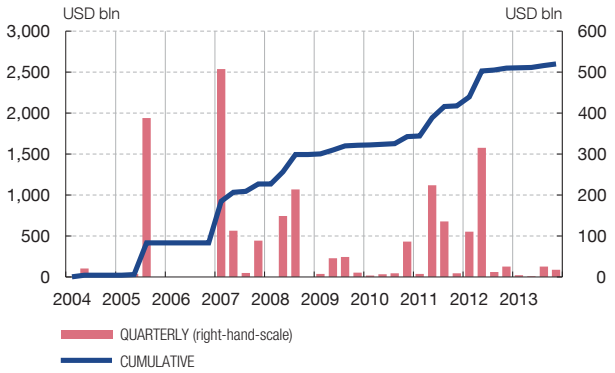
11.1 EMERGING ECONOMIES, EXCLUDING EMERGING EUROPE (a)



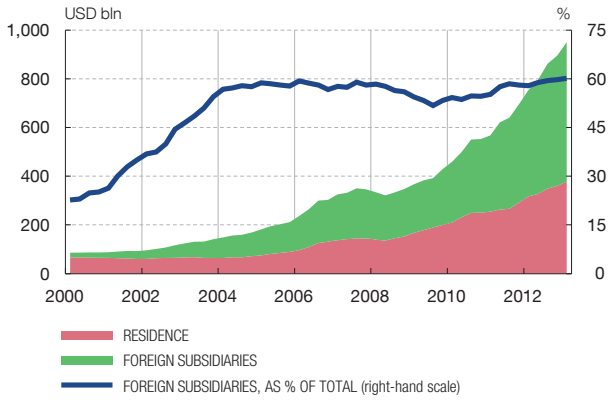
11.2 RELATIVE VOLUME OF BONDS AND CROSS-BORDER BANK FLOWS



11.3 SMEs ISSUANCES IN EMERGING ECONOMIES



11.4 ISSUANCES BY FOREIGN SUBSIDIARIES



SOURCES: BIS (Securities and International Banking Statistics) and Bloomberg.

a Latin America, Emerging Asia, Africa and Middle East. International issuances, breakdown by issuer: banks, other financial institutions (OFIs), non-financial corporations; and sovereigns.

Thus, international capital markets are gaining importance relative to cross-border banking in Latin America and Emerging Asia.[8] The volumes of cross-border bank claims and outstanding international bonds are compared in panel 11.2. International bonds issued by non-sovereigns were half-the volume of cross-border bank claims until 2010. Bonds started to gain importance in 2010. Bonds issued in international markets already represent 85% of cross-border bank claims in Emerging Asia and Latin America.

This process of international financial disintermediation might pose risks. Capital markets can be a poor substitute of cross-border bank financing for some borrowers, for instance, SMEs. Firm-level data suggests that bond issuances are positively related to asset size. Panel 11.3 shows international issuances by SMEs headquartered in emerging economies. It suggests they remain relatively low, despite a pick-up in 2011 and 2012. The sharp reduction in SMEs issuances in 2013 might reflect a shutdown of capital markets, which contrasts with the still resilient access of the whole population of firms. A proper assessment requires delving in recent trends in SMEs access to domestic bank credit, or domestic bond markets.

8 In the following analysis, Emerging Asia includes India, Indonesia, Malaysia, Philippines, and Thailand. Latin America includes Argentina, Brazil, Chile, Colombia, Mexico, Peru. Korea and China are not included, and have different patterns.

On the other hand, large issuances can lead to build-up of potential risks and vulnerabilities in firms' balance sheets. Aggregate evidence suggests that international issuances have been denominates mostly in dollars, although issuances in emerging market currencies have increased [Gruic and Wooldrdige (2013); see also IADB (2014) for an analysis of Latin America]. Large issuances by emerging-markets multinationals foreign-subsidiaries have also attracted attention, as a potencial source of hidden vulnerabilities. The historical record suggests, however, that this practice has not changed recently. Panel 11.4 shows issuances by domestically-based companies and their foreign subsidiaries in international markets. Their relative importance has remained constant, as depicted their ratio, which has remained stable all over the period.

5 Conclusions

Financial integration goes ahead after the global financial crisis, although has experienced remarkable changes. Financial disintermediation has increased in international markets. This is particularly important in some emerging economies, where bonds' weight in international financing has increased despite the relative resilience of cross-border banking. These countries obtain more funding from international capital markets, and less from cross-border banking

The lesser relative importance of global banks in international finance reflects their new business models, with decreasing importance of wholesale international financing. Regulation intended to achieve more stable funding patterns is among the prime drivers of a process which, therefore, has probably a permanent nature. Global banks which expanded overseas by establishing foreign subsidiaries, with local funding, have been more resilient [CIEPR (2012)].

A few banking systems depart from this general trend. For instance, emerging banking systems are expanding their cross-border activity, at a modest scale, and with less reliance on market-based financing [CGFS (2014)]. Recently, issuances by banks headquartered in some emerging economies have picked up. This could eventually become a source of vulnerabilities, since represent wholesale financing which banks could use to finance domestic credit.

Financial disintermediation poses risks and uncertainties for financial stability. Cross-border bank flows have been historically a very volatile source of external financing, highly connected with global financial conditions. The impact of tightening of global financial conditions on bond holders and borrowers is more uncertain. Large issuances have been supported by factors which could be temporary, as easy monetary policy in advanced economies. The sharp sell-off in emerging economies bond markets after tapering talks in May 2013 suggests new channels of transmission of global financial conditions [Turner (2014)]. The financial stability implications of an eventual process of international financial disintermediation would depend on issues such as the investors risk profile, investment horizon, or leverage.

As for borrowers, non-financial corporations' large debt issuances have caused concern, since, based on historical records, are considered telltale signs of overborrowing or currency mismatches. However, understanding these risks requires a firm-level analysis on balance-sheet soundness. Issues such as companies leverage, rating, or an eventual substitution of banks financing by bond issuances are of interest.

Finally, it is worth noting that, for some nonfinancial corporations, capital markets can be an imperfect substitute of cross-border bank financing. Access to capital markets is often more restrictive for SMEs. There is little evidence of an increasing access of SMEs to international financial, their ability to tap markets at large-scale is yet to be tested.

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APPENDIX. DATA DESCRIPTION

Our panel data includes 54 countries, which can be classified as advanced, emerging, or financial hubs. Advanced economies: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States. Emerging economies: Latin America; Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay, Venezuela; Emerging Asia: China, India, Indonesia, Korea, Malaysia, Philippines, Thailand; Emerging Europe: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia, Turkey; other emerging; Qatar, Egypt, South Africa. Financial hubs: Hong-Kong, Luxembourg, Singapore (Iceland, Switzerland, United Kingdom, United States are also considered financial hubs).

Euro area countries include Austria, Belgium, Finland, France, Greece, Ireland, Italy, Netherlands, Portugal, Spain. We do not include in our sample Malta and Cyprus, which share features with financial hubs, during a short-period of time.

We use quarterly data, for the period 1Q1991-3Q2013. Table A.1 shows descriptive statistics. Table A.2 shows the correlation matrix between the variables.

DESCRIPTIVE STATISTICS

TABLE A.1

	Mean	Median	Std. Dev.	Min	Max	Source
Country-specific						
Current account to GDP	-0.491	-1.013	6.166	-50.507	38.450	IMF, national accounts
GDP growth	3.307	3.393	4.841	-54.819	119.429	National accounts
Sovereign rating	15.992	16.000	4.571	0.000	21.000	S&P
Public Debt to GDP	57.645	49.470	52.479	1.060	1,266.220	IMF, national accounts
Primary balance to GDP	-1.974	-1.898	4.784	-140.620	20.183	IMF, national accounts
Global variables						
World GDP growth	2.644	2.823	1.379	-2.832	4.758	IMF, WEO
VIX, qoq change	-0.005	-0.019	0.195	-0.489	0.847	CBOE
Broker Dealer Leverage	15.050	13.612	5.903	5.596	30.680	Flow of Funds, L.128
NDT position, qoq change	0.001	-0.002	0.048	-0.153	0.387	Structure and Share Data, 4.30
Banks international issuances	0.035	0.041	0.039	-0.068	0.123	BIS Securities data
Cross-border bank flows measures						
All countries						
On all counterparts	4.013	1.074	33.923	-848.896	867.958	BIS IBS, national accounts
On banks	2.626	0.537	29.497	-789.600	836.573	BIS IBS, national accounts
On non-banks	1.387	0.440	13.307	-289.685	287.322	BIS IBS, national accounts
Excluding Financial centres						
On all counterparts	1.374	0.836	7.993	-99.395	78.888	BIS IBS, national accounts
On banks	0.782	0.408	6.978	-129.646	74.818	BIS IBS, national accounts
On non-banks	0.592	0.350	3.322	-38.703	53.224	BIS IBS, national accounts

SOURCE: Author's elaboration.

CORRELATION MATRIX

TABLE A.2

	Current Account (GDP terms)	Domestic GDP growth	Standard & Poors rating	Public Debt to GDP	Fiscal Balance to GDP	World GDP growth	VIX	Broker Dealer Leverage	US branches funding	Banks international issuances
Current Account (GDP terms)	1									
Domestic GDP growth	-0.2343	1								
Standard & Poors rating	-0.8244	0.2967	1							
Public Debt to GDP	0.8202	-0.2735	-0.8339	1						
Fiscal Balance to GDP	0.0094	0.5242	-0.024	0.0152	1					
World GDP growth	-0.1228	0.4279	0.0307	0.0126	0.3977	1				
VIX	0.0018	0.0496	0.0146	-0.0483	0.0822	0.0975	1			
Broker Dealer Leverage	0.072	0.1296	-0.0436	0.127	0.6341	0.4043	0.1453	1		
US branches funding	0.0263	0.106	0.0343	-0.0714	-0.0823	-0.0124	0.5145	-0.2286	1	
Banks international issuances	0.0048	0.1204	-0.0566	0.1591	0.4096	0.2837	-0.2392	0.5175	-0.21	1

SOURCE: Author's elaboration.