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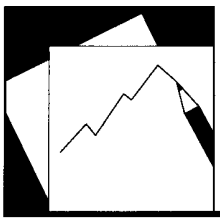

IMF Working Paper

The Great Cross-Border Bank Deleveraging: Supply Constraints and Intra-Group Frictions

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INTERNATIONAL MONETARY FUND

 WP/14/180

IMF Working Paper

Research Department

The Great Cross-Border Bank Deleveraging: Supply Constraints and Intra-Group Frictions[1]

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September 2014

Abstract

International banks greatly reduced their direct cross-border and local affiliates' lending as the global financial crisis strained balance sheets, lowered borrower demand, and changed government policies. Using bilateral, lender-borrower countrydata and controlling for credit demand, we show that reductions largely varied in line with markets' prior assessments of banks' vulnerabilities, with banks' financial statement variables and lender-borrower country characteristics playing minor roles. We find evidence that moving resources within banking groups became more restricted as drivers of reductions in direct cross-border loans differ from those for local affiliates' lending, especially for impaired banking systems. Home bias induced by government interventions, however, affected both equally.

JEL Classification Numbers: E44, F23, F36, G21

Keywords: Global banks, Credit supply, Financial crisis, Deleveraging, International capital markets

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[1] We would like to thank Charles Calomiris, Ralph De Haas, Giovanni Dell'Ariccia, Luc Laeven, Frederic Lambert, Camelia Minoiu, Srobona Mitra, Neeltje van Horen, and participants in the CEPR Workshop on the Economics of Cross-Border Banking (Paris, December 2013), IMF brownbag and surveillance meetings for very helpful comments, and Yangfan Sun for help with the data.

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I. INTRODUCTION

The global financial crisis (GFC) has seen a large retrenchment in cross-border banking, with aggregate gross foreign banking claims as of end-2013 some 20 percent below their pre-crisis peak in June 2008 of USD 30 trillion. While this retrenchment, which has affected both direct cross-border and local affiliates' lending (but to different degrees), reflects many factors, three are notable. One, the deterioration in balance sheets of international banks, with many facing capital shortfalls and liquidity strains, especially so in 2008–09 and notably for banks in advanced countries, and pressures from markets to improve their financial positions. Two, a weakening of loan demand, given worse economic prospects, and increased default and other risks facing borrowers. Three, increased regulatory constraints and greater uncertainty about the future shape and rules governing the international banking system, including regarding the ability to freely move resources within banking groups and across borders. All these factors may have led banks to not only rebalance their operations away from cross-border banking activities, but also to do so in specific ways, e.g., to reduce direct cross-border bank lending relatively more and affiliate lending less.

The first objective of this paper is to analyze the role of supply and lender-borrower factors in driving changes in international banking lending. Were the reductions indeed largely due to the balance sheet impairments of many banks in advanced countries? And if so, what indicators best capture the pressures banks faced? Teasing out the relative importance of these various supply factors in determining changes in cross-border banking is challenging, as it requires controlling for demand, but here the bilateral data we use help. The second objective is to identify the motivations and constraints driving banks' specific forms of cross-border rebalancing: either direct cross-border lending (i.e., lending by headquarters directly to borrowers in a different country) or local foreign affiliates' (subsidiaries and branches) lending (or a combination of both). The changes in the two forms differed greatly: in aggregate, local affiliate lending declined by only 5 percent during the GFC compared to 23 percent for direct cross-border lending. Did banks chose to change one form more than the other on the basis of their own, internal choices, or did regulatory and other changes at the lender and borrower country levels affect choices? While the exact reasons leading to differences are difficult to identify, indirect evidence can be obtained from comparing the respective drivers.

Given these two objectives, the first set of questions that we seek to answer is: What *ex ante* factors affect banks' decisions to deleverage during periods of financial stress, i.e., how do lender banking systems and other lender country characteristics prior to a shock affect subsequent changes in cross-border bank lending? To what extent do banks deleverage in response to market pressures? Or are they more affected by banks' financial statement indicators, and possibly related regulatory actions? What role do lender-borrower characteristics – distance, trade links, and common institutions – play? Which of these

factors are most important? We study the role of these characteristics while controlling for changes in economic activity and prospects in the borrower country. This issue is of interest given the large changes in international banking and what they may imply for the future.

The second set of questions relates to whether in times of financial turmoil, banks can move capital and liquidity globally relatively freely within the banking group, making direct cross-border lending and local affiliates' lending to the same borrowers respond similarly to shocks. Or are there (more) frictions and limitations on intra-banking-group lending during an event like the GFC? These frictions can involve heightened intra-group constraints and formal and informal regulatory actions limiting the transfers of funds during periods of financial turmoil. Questions on intra-group transfers are of great relevance given that foreign bank presence increased over the past two decades in many parts of the world, with affiliate lending taking on greater absolute and relative importance (e.g., it increased from 40 percent of BIS foreign claims before the crisis to more than 50 percent in 2012). While we cannot directly test for the presence of frictions and limitations, since there is no data available on intra-group lending at the international level, studying differences in how direct cross-border lending and local affiliates' lending to a given borrower respond to various factors provides valuable insights. With no frictions, cross-border and local affiliate claims can be expected to react similarly to shocks to the home banking system. With frictions, the two forms of lending could respond differently as when capital and liquidity are "trapped" and/or "ring-fenced" within affiliates, leading to sharp(-er) declines in direct cross-border lending as affiliates cannot support their parent banks. Evidence of barriers is of current policy interest given concerns about increased fragmentation in international financial markets.

For both objectives, we need to control for demand and other borrower-related factors, as well as for general time-varying factors, such as changes in global financial markets and economic prospects. We do this using an event methodology and exploiting the rich, bilateral cross-border banking dataset from the Bank of International Settlements (BIS), enhanced in several ways. We focus on the deleveraging episode related to the peak of the GFC when we can expect to see a large impact of supply factors. We exploit the bilateral nature of our data to control for changes in economic activities and prospects in the borrower country. Specifically, since banking systems from various lender countries all face the same demand conditions in a borrower country, relative differences in changes in bilateral claims represent differences arising from the supply side or specific lender-borrower relationships.

Besides addressing these two set of questions, we innovate relative to the existing literature, reviewed next, in three ways. First, we analyze how banking systems adjust their international operations in response to *ex ante*, that is, before a crisis period, vulnerabilities, including both market-based and accounting balance sheet indicators. Second, we are the first to directly exploit differences between the behavior of direct cross-border banking and local

affiliates' lending, so as to analyze potential frictions in the intra-group lending during the GFC. Third, we use adjusted BIS data that take into account effects of breaks-in-coverage in time series and exchange rate variations, allowing a more meaningful representation of the evolution of banks' foreign claims.

We find that reductions in cross-border and affiliates' lending largely vary with *ex ante*, market-based measures of creditor banks' vulnerabilities, while financial statement indicators and creditor-borrower characteristics (e.g., geographical proximity, trade relationships, and historical relationships) played minor roles. And we do find evidence of barriers to the movement of intra-group resources across borders in that those supply factors explaining the patterns in reductions in banks' cross-border lending do not similarly explain movements in local affiliates' lending. Results suggest that substitution between cross-border and affiliates' lending was more likely for those banking systems with lower vulnerabilities, suggesting that some affiliates may have been prevented from moving resources back to headquarters to compensate for cuts to direct cross-border lending. Where creditor banks' government intervened during the systemic crisis, however, banks reduced both direct cross-border and affiliates lending equally, possibly reflecting the larger induced home bias.[2]

In terms of outline, the paper proceeds as follows. It first reviews the literature that tries to identify the factors behind cross-border banking flows, develops the hypotheses we test, and relates the contribution of this paper to the existing literature. The next two sections describe the data and methodology, and the regression results respectively. The last section concludes and highlights possible further research steps.

II. Literature review, Contributions, and Hypotheses

A. Literature review

This paper relates to three main strands of research. The closest strand includes those papers that investigate changes in international bank activities using BIS data around periods of financial stress. A key contribution is Cetorelli and Goldberg (2011) which reports that banks reduced their international activities in the fall of 2008 and the first part of 2009, in part in response to a shortage of dollar funding. McGuire and von Peter (2009) show how dollar funding shortages help explain the behavior of cross-border banking flows during this period. Other studies note that bank behavior can vary considerably, in part related to the importance and funding conditions of local subsidiaries, and the distance between creditor and borrower

[2] As part of government support banks were often asked to focus on domestic lending during the GFC. For example, French banks that tap government assistance have pledged to increase lending by 3–4 percent annually, and ING announced that it was going to extend €25 billion to Dutch businesses and consumers when it received another round of government assistance (World Bank, 2009).

country. Cull and Martinez Peria (2012) show that in Eastern Europe foreign banks cut loans back more than domestic private banks, but not so in Latin America with the difference driven by the fact that foreign banks in Latin America were mostly funded through domestic deposits, in part due to regulatory requirements (see also Kamil and Rai, 2010). Claessens and van Horen (2013) show that foreign banks reduced credit more compared to domestic banks in countries where they had a small role, but not so when dominant or funded locally. And Claessens and van Horen (2014b) document the large changes in foreign bank presence and review the differences in the behavior of cross-border and local foreign bank lending since the GFC.

A second set of papers uses detailed, micro data, on large syndicated loans, to study the variation therein across creditor and borrower countries. This data allows controlling for many individual borrower and bank characteristics, including changes in demand at the borrower level (e.g., using borrower fixed effects). Using this data, Giannetti and Laeven (2012) and De Haas and Van Horen (2013) report evidence of a "flight home" or "flight to core markets" effect, i.e., after the crisis banks engaged less in cross-border lending, and rather lent to borrowers at home. Ongena, Peydro and Van Horen (2013) find that foreign banks in Eastern European countries reduce the supply of credit more compared to locally-funded domestic banks, but not compared to domestic banks that funded themselves more from international capital markets before the crisis.

In a related study, De Haas and Van Horen (2012) find that banks facing balance sheet constraints (such as losses on toxic assets or dependence on wholesale funding) reduced the supply of cross-border syndicated loans, but were more likely to stay committed to countries in which they had a subsidiary, especially in countries with weak institutions. This suggests that having local affiliates provides for specific information about borrowers, allowing them to continue to extend loans profitably. It also suggests that there are limits to moving funds intra-bank, perhaps because of frictions within the bank, regulation, and other barriers erected by the host country, or pressures from home country authorities. Hale, Kapan and Minoiu (2014) show that there have been transformations in the global banking network due to the crisis.

A third strand of literature investigates how internationally-active banks altered their operations due to financial turmoil or in response to regulatory changes. Cetorelli and Goldberg (2012a, b) show how US banks adjusted their interoffice liquidity and claims in response to variations in domestic liquidity. Using a broad set of international banks, De Haas and Van Lelyveld (2014) and Ivashina and Scharfstein (2010) show that banks reduce their cross-border and syndicated lending as a function of their pre-crisis exposure to wholesale funding shocks. Kapan and Minoiu (2013) find that this effect was smaller for well-capitalized banks. Aiyar, Calomiris, Hooley, Korniyenko and Wieladek (2014) show

that UK banks and UK-based subsidiaries curtailed foreign lending during the 2000s in response to higher capital requirements. Aiyar, Calomiris, and Wieladek (2014) find that in response to these same measures, UK-based branches of foreign banks increased their share of local lending, a sign of regulatory arbitrage. As such, the net effects of capital shocks or regulatory changes on overall cross-border and local lending can be ambiguous.

Related work on the internal capital markets of global banks has found that they can to some extent reallocate funds and liquidity across locations in response to host country crises. This has been shown indirectly by investigating the performance of foreign affiliates and domestic banks (De Haas and Lelyveld, 2010) and directly for US banks (Cetorelli and Goldberg, 2012a). Evidence is not consistent, however, for the GFC. De Haas and Lelyveld (2014) do not find evidence of an active internal capital market. Furthermore, the evidence is not as strong using US data after the Lehman bankruptcy, possibly due to the expansion of dollar swaps by central banks (Cetorelli and Goldberg, 2012a, b). This may be due to "ring-fencing" episodes during the GFC, for which Cerutti and Schmieder (2014) present anecdotal evidence and D'Hulster (2014) analyzes potential avenues of how it is done.

B. Contributions

Our paper expands on and complements these three strands of papers in several ways. First, we explore how banking systems adjust their international operations, both cross-border and affiliate lending, in response to *ex ante* (that is, before the crisis) balance sheet vulnerabilities. These are captured using both market-based and accounting indicators. Using pre-crisis data allows us to avoid endogeneity caused by the possibility that banks' actual actions are reflected in market assessments or financial statements. This way we obtain behavioral responses and more forward-looking insights into how banks adjust their operations in response to market and balance sheet pressures.

Second, we analyze changes in both cross-border banking and local affiliates' lending, using the fact that the sample contains lender banking systems with both direct cross-border and affiliates' lending to many borrower countries.[3] With international banks today having local presence in many countries – the market share of foreign banks increased from an average of 20 percent in the 1990s to more than 35 percent just before the financial crisis, with shares in some countries of more than 90 percent (Claessens and Van Horen, 2014a) – many can choose how to lend to a given borrower.

[3] We use the BIS consolidated banking statistics at ultimate risk basis, which unlike the BIS data at immediate risk basis used in many other papers in the literature, provide a clean distinction between banks' direct cross-border lending and affiliates' lending.

Third, we are very careful in correcting data for changes in coverage and exchange rate-related valuation effects when using BIS data. As noted by Cerutti (2014), such corrections are necessary for a proper interpretation and analysis since they can make for large differences with the original series. One notable example is the change in coverage of BIS banking statistics as investment banks in the US became commercial banks in 2009 Q1, which boosted US banking system foreign assets by USD 1.3 trillion. Another notable example is the large effect of the sharp movement in the dollar/euro exchange rate over 2008–09. BIS banking claims are reported in US dollars, so an important source of variation in claims during the period under study originates from exchange rate movements, and not from changes in underlying positions. Altogether, the aggregated amount of adjustments was some USD 1 trillion in each quarter during the period 2008–09.

Another advantage of using BIS data is that we fully capture on balance-sheet international banking activities. While data on individual syndicated loans provides more details than BIS data in many dimensions (e.g., bank and borrower information that allows better to control for demand conditions), it have several limitations. Cerutti, Hale and Minoiu (2014) analyze the composition of cross-border loan claims and emphasize the following characteristics of syndicated loans: (i) partial coverage of cross-border lending activity (specifically, syndicated loans represent only up to one-third of total cross-border lending); (ii) much of syndicated loan data refers to credit lines rather than actual disbursements (and information on whether credit lines are drawn is not available); and (iii) it is difficult to exactly identify individual participation shares for each syndicate member (individual loan shares are available for less than half of the loans).

Our BIS data represents the universe of cross-border banking claims (coverage is complete from the lender source points of view). We also cover most (borrower) countries (about 120), allowing us to explore differences by both lender and borrowing country and their combinations.

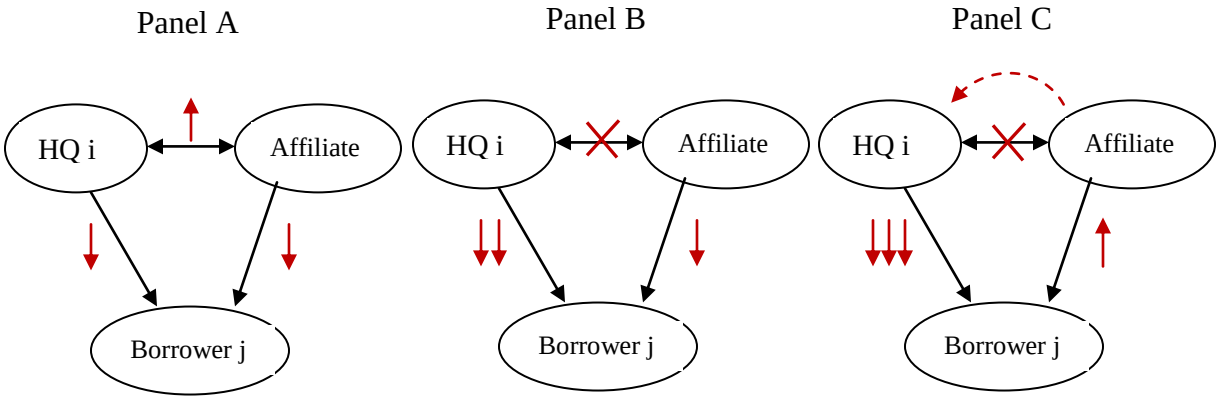
C. Hypotheses

Our hypotheses related to the roles of *ex ante* supply and lender-borrower factors in driving changes in international banking lending are relatively straightforward. They cover the following questions: To what extent, controlling for credit demand, do banks deleverage in response to *ex ante* market pressures and/or to financial statement indicators? Do lender-borrower characteristics, such as distance, trade links, and common institutions, play a large role in determining deleveraging? Which of these factors are most important?

Our hypotheses related to the motivations and constraints driving particular forms of deleveraging (i.e., direct cross-border vs. affiliates' lending) are more challenging, especially given the lack of intra-banking group lending data at the international level. Analyzing how

direct cross-border and affiliates' lending respond to shocks, however, can provide insights on the presence of barriers (or the lack thereof) to intra-group transfers. Three scenarios can be envisioned:

Potential Evolution of Direct Cross-Border Claims and Affiliates' Claims



Notes: Red upward arrows denote increases and red downward arrows decreases.

In the first scenario, the internal capital markets of banking groups are unconstrained and equally transmit shocks across all parts of the groups. In this case, as shown in panel A, a negative shock to lender banking system *i* can be expected to lead not only to a reduction in direct cross-border lending to borrower *j*, but also for funds to flow from banks' affiliates in country *j* to headquarters *i* (through the internal capital market) with an associated reduction of affiliates' lending to borrower *j*. Note that while both direct cross-border and affiliates' lending are affected, responses do not need to be proportional. For example, if affiliates have special information on and relationships with local borrowers, they may adjust their lending less than what happens to direct cross-border lending in response to the same shock.

A second, "ring fencing" scenario is possible. Here international banking groups might face limitations on how much liquidity and capital, especially from subsidiaries, can be moved through their internal capital markets to other parts of the group. In this scenario, depicted in panel B, a supply shock to the parent bank can trigger a much larger response in terms of reduction in direct cross-border lending than the reduction in affiliates' lending as headquarter banks are not able to tap into the liquidity and capital of the affiliates. Another possibility is that banks are told during the crisis by their lender country authorities that, in exchange for support, banks need to "lend at home," and thus cut back more on their cross-border lending.

In a third scenario, depicted in panel C, there are also limits on moving capital and funds internally, but banks try to overcome these limits through their lending operations. Here the reduction in direct cross-border lending to borrowers *j* is even larger, but in this case part of

this reduction is "compensated" for by an increase in affiliates' lending to the same borrowers, as an indirect way of bypassing host countries' ring-fencing of affiliates (again, given informational and relationships, the two forms may respond differently). This is a way of explicitly mitigating the impact of internal market barriers in the presence of shocks to lender country banking systems.

In reality, any three of the scenarios or combinations thereof may prevail. Situations may differ, however, by characteristics of the lender or borrower country banking systems in such a way that they suggest some specific scenario to be more likely.[4] Studying therefore how direct cross-border and local affiliates' lending respond to various shocks and identifying differences by lender and borrower country characteristics can provide insights as to the presence (or lack) of barriers in internal financial markets and across regulatory regimes.

III. DATA USED, EVENT STUDIED, AND METHODOLOGY

This section presents the data used and variables included as explanatory factors in the empirical analysis and their expected sign, the event studied, and our approach for exploring these two set of questions, which is based on a difference-in-difference approach.

A. Data Used

Our main data source is BIS consolidated banking statistics (BIS CBS) on ultimate risk basis (i.e., this allocates claims to the country where the ultimate risk resides in a manner consistent with banks' own systems of risk management). This dataset provides a breakdown of foreign claims into: (i) *direct cross-border claims*, capturing direct lending from banks to a foreign borrower without relying on any presence in the borrower country; and (ii) *affiliates' claims*, which includes lending by either branches or subsidiaries operating in the borrower countries. Both publically available data (available through BIS website) and restricted data (available through data requests to BIS) are used in the calculations.

Following Cerutti (2014), the analysis is performed taking into account coverage break-in-series and exchange rate variations.[5] These corrections are important for a meaningful

[4] See also Kerl and Niepmann (2014) for a model of how international banks may choose between international interbank lending, intrabank lending to affiliates and cross-border lending to foreign firms given, among others, impediments to foreign bank operations, with supportive evidence from German bank level data.

[5] The exchange rate adjustments are threefold. First, the domestic-currency denominated affiliates claims are corrected using bilateral US dollar domestic currency exchange rates, with the domestic-currency denominated affiliates' claims proxied by using its share of total BIS CBS foreign claims at immediate borrower basis. Second, at the same time, the identification of the amount of foreign-currency denominated affiliates' claims, which are assumed to be in Euros in Europe and US dollars for other countries. Finally, bilateral CBS cross-border claims positions are adjusted using, as a

(continued…)

representation of the evolution of banks' claims, as the differences between adjusted and unadjusted series in Figure 2 shows. Total (adjusted) foreign claims were about USD 25 trillion in mid-2012, down from above USD 30 trillion in mid-2008, for the reporting banking systems included in our sample. Local affiliate lending has become relatively more important, with greater foreign bank presence, and even more so following the financial crises. They represent about 50 percent of total foreign lending as of 2012, compared to a 40 percent share before the crisis. This growth in the local affiliates' lending is shown in Figure 1 by the widening gap between the total, that is, foreign claims, and cross-border lending. See further Table 1 for data definitions.

B. Episode Analyzed

We choose the GFC as the event to study since it represents the clearest shock to the international banking system in the last decades (see Figure 1). This largely unanticipated event started in mid 2008 and worsened after the take-over of the investment bank Bear Stearns and the bankruptcy of Lehman Brothers. We date this intense period to end as of June 2009, as at that time the amount of lending stabilizes again. There were other deleveraging periods afterwards (e.g., the deleveraging episode in the second half of 2011 during the height of the European debt crisis), but they were not as severe as the first period, and their slower dynamics also complicates identification (agents and markets had time to anticipate and react to the shock).

There was much heterogeneity in the deleveraging process, with great variation among creditor, borrower, and bilateral patterns. This heterogeneity is clear from Figure 2, which depicts the bilateral percentage changes in direct cross-border (Panel A) and affiliates' claims (Panel B), with lenders in the columns and borrowers in the rows. Each cell of the panel displays the change in lending of the 20 analyzed lender banking systems to each of the 120 borrower countries included in the analysis. The columns are sorted from left to right by the overall degree of deleveraging of the lender country, and the rows are sorted from top to bottom by the overall degree of deleveraging experienced by the borrowing country.

The panels show that there is some general relationship – in that deleveraging increases more along the diagonal than off the diagonal, and notably so for cross-border claims. Lenders, however, clearly did not uniformly adjust their claims across borrowers. Even lenders that greatly reduced their overall positions show increases in cross-border claims or affiliate lending with respect to some borrowers. Conversely, even borrower countries experiencing very large aggregate declines, saw some heterogeneity at the bilateral level as not all home countries pulled back equally from them, with some even increasing lending.

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proxy, the currency breakdown currency (US Dollar, Euro, British Pound, Japanese Yen, and Swiss Francs) available from the BIS locational banking statistics. See Cerutti (2014) for more details.

While these patterns exist in both direct cross-border and affiliates' lending, there are differences.[6] Overall one sees relatively sharper reductions in direct cross-border lending than in affiliates' lending, which could suggest some barriers, but there is much heterogeneity in how the two forms change. This is clear from Figure 3, which plots the two against each other for the same lender-borrower pairs (Panel A is in log differences and Panel B in percentage differences). Identifying what drives this heterogeneity and to what extent that may indicate the presence of barriers is a focus of our interest.

C. Methodology

Observing and analyzing actual credit is not informative on the role of demand or supply conditions since any changes in lending patterns can just reflect changes in economic prospects or borrowers' risks rather than supply factors. Controlling for demand is difficult, however, as borrowers' economic and financial prospects can as much be driven by the availability of credit as that credit adjusts to these prospects. During a recession, for example, credit may be tight, but economic prospects may be poor as well. And during boom times, both supply of credit from banks and demand from borrowers are likely to be higher. Panel regressions using aggregate credit provided are therefore unlikely to provide meaningful insights. Controlling for demand can be done using a cross-sectional approach during a specific deleveraging period, when banks, albeit to different degrees, are known to suffer shortages in funding and capital, at the same time that they face increases in risks which vary by borrower.

Specifically, to control first credit demand at the borrower country level, we use the identification strategy proposed by Khwaja and Mian (2008) and used by other recent papers (Cetorelli and Goldberg 2011, Kapan and Minoiu, 2013, De Haas and Van Horen 2012, 2013). The approach is based on the notion that any difference in lending by different lenders to the same borrower must reflect variations in supply conditions among lenders or specific creditor-borrower relationships, rather than demand conditions.

We implement this approach by estimating the following cross-sectional specification:

$$\Delta L_{ij} = \beta_1 BankSystem_{i,t-1} + \beta_2(\text{Lender} - \text{Borrower})_{ij} + \gamma_j + \varepsilon_{ij}$$

where the dependent variable ΔL_{it} is the log-difference between 2009:Q2 and 2008:Q1in bilateral cross-border lending (or local affiliates' lending) of lender banking system *i* on

[6] Part of these differences relate to variations in samples. International banks cover much more borrowers through direct cross-border lending than through their network of affiliates (not all banking systems have affiliates in every borrowing country). The number of observations for which we have affiliates lending is thus much smaller (some 800) than that for which we have direct cross-border loans (about 1800). But even when using matched samples differences remain, as we show.

borrower country *j* between the beginning and the end of the specific deleveraging episode (adjusted for both coverage break-in-series and exchange rate variations). We use log-differences to account for the skewed distribution in the changes in both direct cross-border and affiliate lending (see Figure 3). To control for borrower characteristics, including borrower-specific demand, we exploit the bilateral nature of our data and include fixed effects for borrower countries γ_j.

The two sets of explanatory variables used in the analysis refer to the state of the lender country banking system and the bilateral relationships between individual lender and borrower countries. All these explanatory variables are measured at the end of 2007, half a year before the start of the period for which we measure changes in lending, so as to avoid the crisis and the deleveraging process itself from influencing them.

The first set of creditor country variables, $BankSystem_i$, captures the state of the home banking system fundamentals, both as perceived by financial markets and as captured in accounting variables. As such, the regressions analyze how banking systems respond in their lending to a shock, such as the GFC, depending on their *ex ante* vulnerabilities. Our main variable captures how financial markets perceived the riskiness of the creditor banking system prior to the deleveraging period. It is based on the Systemic Risk Contribution (SRISK) measure developed by Acharya et al (2010). This method uses an option-pricing model, with as inputs the behavior of bank's stock prices and some key balance sheets variables, to derive the perceived riskiness of each bank at each point in time.[7] It is a forward-looking measure of the vulnerability of the system, i.e., it is exogenous to the deleveraging process itself. As it provides for a dollar amount of potential capital losses under some adverse scenario, we sum the positive amounts for all domestically-owned banks in each creditor country to derive an overall measure of banking system capital at risk, which we then scale using the creditor country's GDP to capture the overall ability of the country to support its banking system as of end-2007

[7]The calculation of SRISK takes three steps (see http://vlab.stern.nyu.edu/doc/3?topic=apps for further documentation). First, the expected daily drop in equity value of a firm if the aggregate market falls more than 2% is estimated. This so called Marginal Expected Shortfall or MES, incorporates both the volatility of the firm and its correlation with the market, as well as its performance in extremes. It is estimated using asymmetric volatility, correlation and copula methods. In a second step this is extrapolated to a financial crisis which involves a much larger fall over a much greater time period. Finally, these equity losses expected in a crisis are combined with current equity market value and outstanding measures of debt to determine how much capital would be needed in such a crisis, where a bank is assumed to require at least 8% capital relative to its asset value. The Systemic Risk Contribution, SRISK, is the dollar value of capital shortfall experienced by this bank in the event of a crisis. Other papers that use SRISK include Idier, Lamé and Mésonnier (2013) and López-Espinosa, Moreno, Rubia, and Valderrama (2012).

In addition to this market-based systemic risk measure, we explore a number of standard accounting, financial statement-based performance, portfolio quality, and solvency variables. Specifically, we include the banking system's 2007 return on assets, and end-of-2007 ratio of non-performing loans to total gross loans and ratio of risk-weighted assets to total assets. These measures also provide an indication of banking systems' vulnerabilities, but at the same time can suffer from reporting problems and biases. To cover the (subsequent occurrence of) a systemic banking crisis in the creditor country, we include a dummy based on the Laeven and Valencia (2013) dataset whether the country had a systemic crisis as of mid-2009. Since this measure is based in large part on the *de facto* amount of government support, the estimated effects for this dummy is best interpreted as how lender banking systems deleverage internationally depending on whether they received state support *ex post*. A negative coefficient can then be interpreted as a sign of home bias induced by the support.

In terms of bilateral characteristics, that is, the matrix $Lender–Borrower_{ij}$, we use variables that capture the nature of trade, financial, and other linkages between creditor banking system *i* and borrower country *j*. Here, we include traditional "distance" variables: (i) the log distance between the capital cities of the lender and borrower country; (ii) a dummy of geographical adjacency; (iii) a dummy for common language; (iv) a dummy for type of legal origin; (v) a dummy for colonial past; (vi) bilateral trade as proportion of the lender country overall trade; and (vii) the direct cross-border exposure of lender banks to a particular country, measured as the share of the cross-border claims to a particular borrower as percentage of the lender overall cross-border claims. These variables are proxies for both the severity of informational, financial, and other frictions between lender country banks and the borrower country as well as for the presence of (historical) ties. The last variable (vii) provides an indication whether, once faced with a shock, banks cut back more or less loans depending on the relative economic size of the borrower.

We use the same specification to analyze changes in both direct cross-border and affiliate lending. To explore the relationship between the two forms of lending, however, we include in either regression the changes in the other form of lending. Coefficients on the other form will indicate to what extent, controlling for all our other factors, there was some substitution between the two forms. To explicitly explore the presence of barriers, we include an interaction between the change in affiliate lending (or direct cross-border) and our proxy for the state of the home country banking system. This will allow us to tell whether the substitution effects (or lack thereof) between the two forms may be less when the lender banking system is more vulnerable. Evidence of this effect could suggest that imperfect substitution arises because host country regulators were more likely to impose some restrictions on intra-group flows to protect the affiliates from troubles in the parent banks.

IV. EMPIRICAL RESULTS

A. Basic Statistics

Key statistics for the dependent and independent variables are provided in Table 1 and some of the patterns in dependent variables are shown in Figures 3 and 4. As noted, on aggregate and for most lender-borrower pairs, direct cross-border lending dropped much more than affiliate lending did. The median change in direct cross-border across lender-borrower-country pairs was large, -16 percent, while affiliates' lending saw a median 2 percent increase for the period 2008Q2–2009Q2. These median percentage changes for the bilateral figures are very close to the mean of the log differences, as Table 1 shows. At a more disaggregated level, however, there was also a large variation in bilateral patterns as was shown in Figures 2 and 3, something that the regressions are trying to capture.

Figure 4 provides the distributions of the key independent variables. Our main explanatory variable is the SRISK variable, in the top panel. It shows a great deal of variation, with banking systems that are large relative to GDP (such as many of the European systems, like Switzerland) perceived to be quite vulnerable to shocks already at end 2007. Banks' return on assets (ROA), non-performing loans (NPL) and risk-weighted assets as a proportion of total assets, also as of end 2007, are depicted in the bottom panel of Figure 4. None of these accounting measures offer the same relative ranking across countries as SRISK does, confirming that backward-looking accounting measures can differ from forward-looking market-based assessments.

B. Regression Results: Supply Side Determinants

Table 2 provides the base regression results, with Panel A showing regression results for changes in cross-border lending and Panel B for changes in local affiliates lending. Panel A shows the importance of supply factors in driving the reduction in cross-border banking lending. Specifically, the SRISK variable is statistically significant and negative in the base regression (column 1) and highly so in most other specifications (row 1). The estimated economic effects are important. For example, the coefficient in column 1 indicates that a one unit increase in SRISK would approximately translate into a 0.05 percent decline in direct cross-border lending; or given that SRISK standard deviation is about 97, a one standard deviation increase in SRISK would translate into a 5 percent decline in direct cross-border lending (as noted, the median bilateral decline was 16 percent).

Differentiating by regions (column 2), we find for the 2008–09 deleveraging episode that lender banking system in North America (US and Canada) and Asia (Japan and Australia) adjusted their cross-border lending relatively more in response to perceived capital shortfalls before the crisis (and European banks, the base case, in contrast, less). This could be because the shock originated in the US and other banking systems were less cognizant at the time of

the (forthcoming) balance sheets constraints. It could also be that these other banking systems were less inclined to adjust their balance sheets in response, maybe as market discipline was less effective in these countries (e.g., because of weaker corporate governance or a more extensive public safety net with associated moral hazard).

We next explore a number of accounting measures of banking systems' vulnerabilities. We find ratios of non-performing loans, return on assets, and risk weighted assets to total assets generally not to be statistically significant as predictors of subsequent deleveraging actions (column 3).[8] When we combine market-based measures of banking systems vulnerabilities with accounting measures (column 4), we find that market-based measures remain statistically significant and accounting measures insignificant, consistent with other work (e.g., Kapan and Miniou, 2013). This suggests that banks' international deleveraging was largely driven by market pressures, i.e., it appears that shareholders, creditors and other stakeholders pressured banks to deleverage internationally more when banks were very exposed before the crisis.

When we add a dummy for countries that ran into subsequent systemic crises, we find that these did cut back their cross-border lending even more so (column 6), but the coefficient is not statistically significant. When winsorizing observations using percentiles 5 and 95 percent (column 5 and 7), we find the regression results to be confirmed. When combining all variables, without and with winsorized observations (columns 8 and 9), we find that SRISK remains highly statistically significant, and important again especially for banking systems in North America. Whether the banking system has higher return on assets, more non-performing loans, riskier assets or a systemic crisis are again not significant factors in explaining deleveraging.

We show the behavior of affiliates' lending over this period in Panel B. As not all banking systems have local operations, and not necessarily in the same countries as those in which they engage in cross-border lending, the sample is smaller, only about 45% of that used for analyzing changes in cross-border lending. The regression results (columns 1-9) show that supply factors are in general not as important in driving the reduction in local affiliate lending as the systemic capital at risk variable is not always statistically significant, and sometimes even positive. Differentiating by regions (column 2) shows that for lender banking systems from North America and Asia, local affiliate lending did adjust somewhat upwards in a response to perceived capital shortfalls. For these systems, it seems cross-

[8] We also tried other accounting variables typically used to identify vulnerabilities, such as: (i) Tier I capital; (ii) size (log of assets); (iii) other profitability (e.g. ROE); and (iv) funding structures (the ratio of deposit to loans in the creditor banking system *i*). These variables were not significant across specifications, or displayed counterintuitive signs often due to high correlations with the variables already included in the regressions reported.

border and local operations behaved as if segmented, since facing capital constraints, local affiliate lending increased while cross-border lending declined. This suggests that for these banking systems, local affiliate lending was somewhat of a substitute for lending to borrowers in the host country when hit by a capital shock at home. Regression results for other, that is, European, banking systems contrasts since direct lending actually decreased in response to shortfalls in the home country banking systems. This differential pattern could be because European banks operated at that time in more integrated banking markets, where shocks originating at home affected both cross-border and affiliated lending similarly.

The accounting measures of banking system vulnerabilities, non-performing loans, return on assets, and risk weighted assets over assets, are again not statistically significant (column 3). When combining all variables, without and with winsorized observations (column 4 and 5), we find SRISK again not to be statistically significant in general, but with positive signs for banking systems from the Americas and Asia, and accounting variables to remain insignificant. Lender banking systems that ran into subsequent systemic crises cut back more on affiliated lending (without and with winsorized observations, columns 6-7). Including all variables (without and with winsorized observations, columns 8-9) confirms the regression results. Overall, local affiliate lending seems to have acted largely independently of what was happening to home banking systems. The presence of a systemic crisis in the home bank country, however, seems to have triggered a decline in affiliates' lending, with the net effect, a 17 percent decline in affiliate claims, similar as that for direct cross-border lending.

The results of Table 2 show that the supply side drivers of direct cross-border loans differed somewhat from those for lending by local affiliates. While the evolution of cross-border lending was affected by prior market perceptions of risks (as captured by SRISK), the changes in affiliate lending were not driven by these factors. Yet, the home bias motive related to a systemic crisis seems to have affected mainly affiliate lending. We next run similar regressions using a sample where creditor banking systems have both cross-border lending on and local affiliates in each borrower country.[9] This way we can check that these results are not driven by differences between the cross-border and affiliates' samples. More importantly, we can formally analyze the interactions between the two forms and investigate whether there were barriers to moving resources across borders within banking groups.

When using a sample where both cross-border and affiliates lending occurs, we find most regression results to be qualitatively confirmed and quantitatively of similar magnitudes (compare columns 1 to 9 in Tables 2 and 3). Both market-based and accounting measures of

[9] The sample covering banking systems that lend to borrowers in the same country through both direct cross-border and affiliates activities is very similar to sample for the local affiliates' regressions in Table 2B since only for 15 observations is there affiliate lending without cross-border lending.

vulnerabilities have the same signs and similar significance levels. Affiliate lending, however, is less sensitive with respect to SRISK than direct cross-border lending is, with coefficients less often statistically significant and at times of opposite sign. These differences suggest the presence of some forms of ring fencing: since affiliates are more insulated from shocks at home than direct cross-border lending is, banks do not appear able to freely allocate resources within the group. Interestingly, the role of the systemic crisis dummy becomes more important for direct cross-border lending and is now of the same magnitude as for affiliate lending. It suggests that the home bias induced by government interventions in systemic crises affects both direct and affiliates' lending equally when both forms are present, even though the two forms behave differentially with respect to SRISK, maybe because authorities in creditor countries call for comparable reductions in both as a quid pro quo for government support extended.[10]

Using the matching sample, we can also formally further test different conjectures regarding the interactions between the forms of cross-border lending and our hypothesis of barriers preventing movements of capital. More specifically, we first investigate how changes in cross-border (affiliate) lending relate to the evolution of affiliate (cross-border) lending for the same creditor-borrower pair. The negative but not statistically significant signs for the changes in affiliate and cross-border lending in columns 10 of Table 3 panels A and B respectively suggest that there were some substitution effects. When next inter acting the changes with SRISK, the coefficients for both the change in affiliate and in cross-border lending become actually negative and statistically significant (column 11). Most importantly, we find that the interaction term of SRISK with the change in affiliate lending is now positive and statistically significant in the regression for cross-border lending (column 11 in Table 3A). This suggests that, while there was a substitution effect, it was smaller for banking systems with greater vulnerabilities, i.e., with a high SRISK.[11] The size of the coefficients indicate that for a banking system with SRISK at the high 75th percentile, a one standard deviation increase in affiliates' lending would reduce direct cross-border lending by 1¼ percent, whereas for banking systems with SRISK at the low 25th percentile, it would reduce them by 4¾ percent. This suggests that financial frictions increased if the shock in the lender banking systems was more severe, perhaps as restrictions (whether regulatory or supervisory) in lender and/or borrower countries affected the ability to move funds.

[10] Also in some cases, the government support was conditional on the selling of foreign affiliates, something that is captured in our data as a reduction in affiliates' exposure.

[11] Unreported regression results show a negative sign for the interaction between the changes in cross-border (and affiliate claims) and the aggregate host country banking system deposit to loan ratios, suggesting that the substitution effect was larger for affiliates with larger deposit funding, but the coefficient was not statistically significant.

C. Regression Results: Creditor-Borrower Determinants

We next explore the role of bilateral factors in explaining the deleveraging patterns, while controlling for lender banking systems' vulnerabilities. Specifically, we investigate the role of the exposure of the banking system to the specific country, cultural similarity (common language, legal and colonial origin), bilateral distance, geographical contiguity, and institutional environment. The first variable is of risk management relevance; the other variables are commonly used to explain bilateral patterns in cross-border capital flows (and trade). We explore these factors using the base regression.

To investigate the role of exposures, we include the share of direct cross-border lending to a particular borrower out of the total banking system's direct cross-border claims, all prior to the episode. Unlike De Haas and Van Horen (2013), we find some evidence that banks decreased more their direct cross-border lending to countries where they had high pre-episode exposures (Table 4A, column 1). This "rebalancing" could reflect that banks had previously overextended themselves lending to these markets and they set tighter risks limits during the crisis. It could also be that it was relatively easier to deleverage in markets where they had larger exposures, either as these may have been less affected by the financial turmoil or because other banks, including local banks, were more willing to take up the slack. The effect is, however, not present for affiliate lending, suggesting again that risk management concerns did not apply equally to both forms of lending (Table 4B, column 1).[12]

In terms of bilateral relationships, we find less reduction in cross-border claims to borrower countries where a recent (after 1945) colonial relationship exists (Table 4A, column 5), or when a common language is present in the case of affiliates' lending (Table 4B, column 2). Although not consistent across all specifications, the statistically negative sign for common language in the evolution of cross-border lending suggests that with cultural ties, lending had actually grown too large before the financial crisis. The positive sign for affiliate lending is consistent with the notion that transaction costs with local presence are less as (relationship-based) lending was maintained more. Although less so than the presence of a post 1945 colonial relationship, contiguous borders lower the reduction in direct cross-border lending. These results are confirmed when including all variables (column 6).

Distance is usually considered in the literature as a proxy for the degree of transaction costs and information asymmetries. While never statistically significant, the greater the distance between the lender and borrower countries, the larger indeed the reduction in direct and affiliate lending (Table 4A and 4B, column 7). We also include bilateral trade, measured as a

[12] As shown in the robustness section, this rebalancing might have played a role especially with regard to European borrowers (see Table 7).

share of lender banking system's GDP calculated before the crisis episodes for two reasons. The reduction in cross-border lending could be due to the drop in trade around the crisis periods as banks did cut back in general on trade finance (Chor and Manova, 2012). At the same time, bilateral trade could reflect the familiarity of the lender banking system with the specific borrower country and the absence of information asymmetries. As such, higher trade intensity could be associated with fewer cutbacks in cross-border lending. Including the bilateral trade variable first alone and then also with the distance variable, we find (Table 4A and 4B, columns 8-9) that trade has a negative effect on direct cross-border lending and affiliates' lending, but it is only significant when also distance is included in the case of affiliate lending. This suggests that offsetting impacts make for an overall ambiguous effect, but that the trade finance channel is more important as adding the distance variable, a direct proxy for the absence of information asymmetries, makes trade statistically significant.

Regression results in the matched sample (see Table 5), where banking systems' lending occurs through both direct cross-border and affiliates activities, show similar results with respect to most variables. The main differences is that a colonial relationship after 1945 is no longer highly statistically significant in the evolution of cross-border lending – reflecting the fact that several French colonies are no longer in the sample – and now having contiguous borders is more consistently statistically significant, in the sense that its presence lowered the reduction in direct cross-border lending.

In general, the results in Table 4 and 5 show that lender-borrower characteristics (e.g., proximity, trade relationships, and historical relationships) help explain banking systems' deleveraging, but much less than supply side characteristics do. The contribution of lender-borrower characteristics to the total R^2s is especially substantially less than the contribution of supply side factors in the case of direct cross-border loans.

D. Robustness Tests

We conduct some further regressions as robust tests. We already included regressions with winsorized data (in Tables 2 to 5) and these results are similar. We also use single clustering, instead of the double clustering shown, and results do not change. Furthermore, we checked whether some other supply variables made a difference. Besides being confronted with capital shocks, banking systems also suffered from unanticipated liquidity and funding shocks. Especially being unable to fund easily assets in dollars, banks had to adjust their lending dramatically during the crisis. To measure dollar liquidity, we use the McGuire and Goetz (2009) creditor country banking system gross short-term dollar funding need measure (as also used by Cetorelli and Goldberg, 2011).

While the data reduce our sample considerably – by about one-half, the regression results remain similar in terms of coefficient signs. Interesting, dollar shortfall variables themselves

are not statistically significant (especially if double clustering is implemented). Similar results, also with a considerable drop in the sample size, are obtained if as a proxy of funding conditions the change in the market-to-book ratio of equity of banks of country *i* (similar to Giannetti and Laeven, 2012 and De Haas and Van Horen, 2012), or the average spread in the overnight swap rate in banking system *i* during the deleveraging episode (similar to Giannetti and Laeven, 2012) is used. We also test for the importance of local funding conditions for affiliate lending, but found this not statistically significant either.

As a further robustness test, we split the sample following the geographical location of the borrowers into four regional groups (Asian borrowers, European borrowers, Western Hemisphere (WHD) borrowers, and other borrowers). Table 6 replicates columns 2 and 9 of Table 2 for each of these regional breakdowns. The results continue to highlight the role of market perceptions of vulnerabilities as captured by SRISK across regions in the case of the evolution of direct cross-border lending. The main difference compared to the total sample is that for the "other" borrowers group – countries in Middle East and Africa – balance sheet characteristics of lenders before the deleveraging episode played a role. Specifically, higher pre-crisis NPLs, ROA, and relative riskiness of the portfolio further reduce direct cross-border lending. The main insight with respect to the evolution of affiliates' claim lending s is the fact that the overall importance of systemic crisis seems to be driven by the deleveraging of European borrowers. A similar split is performed in Table 7 with respect to columns 1 and 9 of Table 4. In general, the results are not different, but an interesting insight is that banks decreased their direct cross-border lending much more to European countries where they had high pre-episode exposures.[13]

Finally, we tested for the robustness of the creditor-borrower determinants by including credit bank country fixed effects instead of the systemic capital risk variables. The results are very similar with only minor changes in the level of significance of other variables and slightly larger coefficients for some variables (see Table 8, compared to Table 4). Notably, the recent colony dummy remains statistically significant for the entire sample of direct cross-border lending, and common language, distance and bilateral trade for affiliate lending.

[13] We also explored another deleveraging episode, the second half of 2011, and found regression results to be similar to those for the GFC, in that SRISK relates negatively to cutbacks in direct cross-border lending, but this time it was not always statistically significant across all specifications.

V. CONCLUSIONS

We analyze the role of supply, borrower, and lender-borrower factors in driving changes in international banking claims during the deleveraging episode triggered by the GFC, considering both direct cross-border loans and local affiliates' lending. Relative to the existing literature, we innovate in three ways. First, we explore the role of *ex ante* supply conditions and lender-borrower factors in driving the degree of deleveraging in international claims. Second, we exploit differences between direct cross-border banking and affiliated lending, and we are able to confirm the potential presence of frictions in banks' ability to move resources within the banking group during the GFC. Third, we use data that take into account exchange rate variations and coverage-related break-in-series in cross-border bank claims, allowing a meaningful representation of international banking activities.

Our findings confirm the importance of supply factors in driving international capital flows, in particular those intermediated by global banks. Controlling for demand and other borrower-related factors, we find that deleveraging largely varied with *ex ante*, market-based measures of vulnerabilities of banking systems to shocks, with traditional accounting variables not consistently displaying significant results. Creditor-borrower characteristics (e.g., concentration of loans, cultural and geographical proximity, trade relationships) play some roles as well, but not as large as the role of supply factors. Importantly, we find suggestive evidence of barriers to the cross-border movement of resources within banking groups, as supply side factors explaining the reduction in direct cross-border loans are different from those explaining the reduction in lending by local affiliates.

The relevance and importance of our findings, notably those related to supply factors, but also including those relating to the bilateral relationships between the lender and borrower country, matter for policy. First, they highlight that financial statement measures that are backward-looking can be very poor guides to the risk of deleveraging and suggest that market-based that are forward-looking can be more informative. As such, our findings suggest that financial stability and other assessments should incorporate more such measures. Second, the findings have implications for borrower countries as they should also consider the type and origin of cross-border lending. After controlling for demand and lender-borrower characteristics, direct cross-border lending seems to be much more sensitive to market supply factors than lending by foreign affiliates. Third, the results broadly suggest the presence of frictions to the movement of resources within banking groups across borders during times of financial turmoil, also associated with large reductions in direct cross-border lending. More *ex ante* coordination among bank regulators could avoid ring-fencing and other unilateral regulatory measures, and thereby perhaps limit the sharp contraction in direct cross-border lending during periods of financial turmoil.

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Table 1. Summary Statistics (Period 2008Q2-09Q2)

Variable	Description	Obs	Mean	Median	Std. Dev.	Min	Max
Logdiff_Cross-border	Adj Direct Cross-border, log difference: 2009Q2 minus 2008Q1	1858	-0.18	-0.16	0.83	-5.35	6.42
Logdiff_Cross-border_wins	Adj Direct Cross-border, log difference: 2009Q2 minus 2008Q1, winsorised using percentiles 5 and 95%	1858	-0.19	-0.16	0.76	-2.63	2.39
Logdiff_Affiliates	Adj Affilliates claims, log difference: 2009Q2 minus 2008Q1	846	0.00	0.04	0.89	-5.47	6.17
Logdiff_Affiliates_wins	Adj Affilliates claims, log difference: 2009Q2 minus 2008Q1 , winsorised using percentiles 5 and 95%	846	-0.01	0.04	0.78	-3.25	2.72
SRISK_GDP	Creditor country sum of positive SRISK (Weighted by GDP), measured as of Dec 2007; (CAR of 8% was used in all	2478	83.45	48.24	97.10	0.00	416.28
SRISK_GDP* Asia	interaction variable: SRISK_GDP * dummy for Asian creditor banking systems (Japan and Australia)	2478	2.64	0.00	10.55	0.00	48.24
SRISK_GDP* WH	interaction variable: qSRISK_GDP * dummy for Western Hemisphere creditor banking systems (US and Canada)	2478	2.78	0.00	8.90	0.00	37.71
systemic_crisis	systemic banking crisis from Laeven and Valencia (2010)	2478	0.45	0.00	0.50	0.00	1.00
roa	Return on Assets of domestically-owned banks, as of Dec 07	2478	0.80	0.74	0.46	0.10	1.83
npl	Non-performing loans of domestically-owned banks, as of Dec 07	2478	1.65	1.10	1.52	0.20	5.30
rwa_assets	Risk weighted assets over total assets, as of Dec 07	2478	0.50	0.51	0.14	0.19	0.77
comlang_off	1 for common language	2478	0.12	0.00	0.33	0.00	1.00
comlegal	1 for common legal origin	2478	0.31	0.00	0.46	0.00	1.00
contig	1 for geographical contiguity	2478	0.02	0.00	0.15	0.00	1.00
col45	1 for pairs in colonial relationship after 1945	2478	0.02	0.00	0.15	0.00	1.00
bitrade	Bilateral trade (normalized by homecountry GDP), measured as of Dec 2007	2444	0.15	0.01	0.59	0.00	10.19
distlog	log of distance (most populated cities, km)	2478	8.47	8.77	0.93	4.09	9.88
share_cross-border	Share of cross-border claims on borrower j by lender i, wrt total cross-border claims by lender i (in percentage); as of Dec 07	2944	0.78	0.02	2.72	0.00	43.87

Table 2. Deleveraging during 2008Q2-09Q2: Supply Side Determinants

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	-0.0518*	-0.0746***		-0.0869*	-0.0834*	-0.0774***	-0.0735***	-0.0878**	-0.0842**
	(0.0276)	(0.0240)		(0.0460)	(0.0440)	(0.0249)	(0.0248)	(0.0435)	(0.0418)
SRISK_GDP* WH		-0.973***		-1.044***	-0.944***	-0.915***	-0.824***	-1.005***	-0.906***
		(0.164)		(0.240)	(0.222)	(0.177)	(0.159)	(0.227)	(0.212)
SRISK_GDP* Asia		-0.307***		-0.427***	-0.383***	-0.391***	-0.345***	-0.488***	-0.442***
		(0.0929)		(0.105)	(0.103)	(0.0934)	(0.0875)	(0.104)	(0.103)
roa			0.996	-12.17	-11.90			-11.43	-11.18
			(8.104)	(9.093)	(8.636)			(9.039)	(8.424)
npl			2.025	-0.583	-0.507			-0.917	-0.832
			(2.063)	(1.914)	(1.809)			(2.220)	(2.079)
RWA over assets			13.61	24.87	23.51			25.65	24.27
			(41.67)	(36.41)	(35.10)			(34.49)	(33.66)
systemic_crisis						-7.839	-7.657	-7.464	-7.263
						(6.363)	(5.903)	(6.390)	(5.930)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858
R-squared with FE only	0.120	1.120	2.120	3.120	4.120	5.120	6.120	7.120	8.120
R-squared	0.120	0.133	0.118	0.135	0.137	0.135	0.137	0.137	0.139

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	-0.00682	0.0149		0.0231	0.00866	0.0133	-0.00394	0.0318	0.0178
	(0.0275)	(0.0240)		(0.0519)	(0.0461)	(0.0261)	(0.0249)	(0.0472)	(0.0421)
SRISK_GDP* WH		0.436***		0.385*	0.361*	0.619***	0.575***	0.503**	0.484*
		(0.169)		(0.227)	(0.215)	(0.213)	(0.198)	(0.247)	(0.252)
SRISK_GDP* Asia		0.284***		0.351	0.351*	0.164***	0.134***	0.245	0.240
		(0.0889)		(0.214)	(0.186)	(0.0429)	(0.0500)	(0.178)	(0.153)
roa			-5.299	3.603	7.712			2.842	6.918
			(17.03)	(20.96)	(19.17)			(19.66)	(17.07)
npl			-1.732	-0.906	-0.312			-1.729	-1.171
			(3.162)	(3.802)	(3.864)			(2.972)	(2.980)
RWA over assets			25.37	1.839	-7.142			15.74	7.374
			(38.04)	(46.68)	(41.19)			(36.94)	(33.82)
systemic_crisis						-14.45*	-15.32**	-15.53**	-16.22**
						(8.039)	(7.526)	(7.693)	(7.108)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	846	846	846	846	846	846	846	846	846
R-squared with FE only	0.204	1.204	2.204	3.204	4.204	5.204	6.204	7.204	8.204
R -squared	0.166	0.169	0.167	0.169	0.164	0.174	0.171	0.175	0.172

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). Columns 5, 7 and 9 show regressions with winsorised dependent variable (using percentiles 5 and 95%). All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3. Deleveraging during 2008Q2-09Q2: Supply Side Determinants with Matching Samples

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SRISK_GDP	-0.0646**	-0.103***		-0.100**	-0.0989**	-0.105***	-0.104***	-0.0916***	-0.0906***	-0.0897***	-0.110***
	(0.0327)	(0.0195)		(0.0474)	(0.0453)	(0.0126)	(0.0120)	(0.0348)	(0.0342)	(0.0344)	(0.0418)
SRISK_GDP* WH		-0.973***		-0.925***	-0.832***	-0.769***	-0.700***	-0.810***	-0.722***	-0.708***	
		(0.153)		(0.188)	(0.175)	(0.185)	(0.163)	(0.132)	(0.120)	(0.114)	
SRISK_GDP* Asia		0.00988		0.0321	0.0415	-0.131***	-0.117	-0.0870	-0.0717	-0.0648	
		(0.0673)		(0.133)	(0.129)	(0.00851)	(0.0550)	(0.102)	(0.0982)	(0.0951)	
roa			19.21	5.059	6.013			3.817	4.833	4.877	7.708
			(13.24)	(12.39)	(11.71)			(12.69)	(12.06)	(11.81)	(11.40)
npl			4.872**	0.889	1.144			-0.126	0.178	0.106	0.803
			(2.099)	(1.520)	(1.408)			(2.001)	(1.875)	(1.850)	(1.977)
RWA over assets			-28.86	-12.05	-15.42			4.247	0.0713	0.700	-47.28
			(50.28)	(38.63)	(35.88)			(28.15)	(26.86)	(26.55)	(38.97)
systemic_crisis						-16.63***	-15.96***	-16.96***	-16.13***	-16.61***	-18.18***
						(4.142)	(4.080)	(4.662)	(4.549)	(4.330)	(4.936)
Change in Affiliate Claims										-0.0283	-0.0868**
										(0.0253)	(0.0348)
Change in Affiliate Claims * SRISK_GDP											0.000449**
											(0.000208)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	831	831	831	831	831	831	831	831	831	831	831
R-squared with FE only	0.242	0.242	0.242	0.242	0.248	0.242	0.248	0.242	0.248	0.242	0.248
R-squared	0.239	0.264	0.238	0.264	0.270	0.278	0.284	0.278	0.284	0.286	0.280

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SRISK_GDP	-0.00754	0.0149		0.0230	0.00836	0.0127	-0.00493	0.0318	0.0174	0.0114	0.0350
	(0.0279)	(0.0244)		(0.0519)	(0.0461)	(0.0268)	(0.0255)	(0.0470)	(0.0419)	(0.0435)	(0.0471)
SRISK_GDP* WH		0.453***		0.372	0.353	0.644***	0.598***	0.489*	0.474*	0.421*	
		(0.173)		(0.236)	(0.226)	(0.217)	(0.201)	(0.255)	(0.265)	(0.255)	
SRISK_GDP* Asia		0.285***		0.364*	0.359*	0.154***	0.123**	0.244	0.235	0.230	
		(0.0894)		(0.220)	(0.188)	(0.0422)	(0.0512)	(0.183)	(0.156)	(0.155)	
roa			-6.283	2.802	6.994			1.547	5.701	5.952	2.035
			(16.93)	(20.89)	(19.13)			(19.57)	(16.95)	(16.49)	(14.99)
npl			-2.335	-1.522	-0.791			-2.549	-1.848	-1.857	-2.233
			(3.358)	(4.040)	(4.032)			(3.092)	(3.056)	(3.048)	(3.001)
RWA over assets			29.18	5.704	-3.831			22.19	13.13	13.41	45.24
			(38.59)	(48.51)	(43.12)			(38.52)	(36.16)	(36.08)	(33.09)
systemic_crisis						-15.61*	-16.38**	-17.16**	-17.66**	-18.77***	-18.67***
						(8.094)	(7.586)	(7.584)	(7.091)	(7.008)	(6.737)
Change in Cross-Border Claims										-0.0657	-0.113*
										(0.0460)	(0.0615)
Change in Cross-Border Claims * SRISK_GDP											0.000416
											(0.000503)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	831	831	831	831	831	831	831	831	831	831	831
R-squared with FE only	0.203	1.203	2.203	3.203	4.203	5.203	6.203	7.203	8.203	9.203	10.203
R -squared	0.172	0.175	0.167	0.176	0.167	0.182	0.175	0.183	0.177	0.179	0.178

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). Columns 5, 7, 9, 10 and 11 show regressions with winsorised dependent variable (using percentiles 5 and 95%). All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4. Deleveraging during 2008Q2-09Q2: Creditor-Borrower Determinants

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	-0.0744***	-0.0732***	-0.0752***	-0.0747***	-0.0759***	-0.0755***	-0.0766***	-0.0783***	-0.0797***
	(0.0240)	(0.0240)	(0.0243)	(0.0240)	(0.0238)	(0.0241)	(0.0245)	(0.0240)	(0.0245)
SRISK_GDP* WH	-0.948***	-0.916***	-0.954***	-0.939***	-0.935***	-0.864***	-0.816***	-0.888***	-0.829***
	(0.161)	(0.154)	(0.164)	(0.163)	(0.163)	(0.159)	(0.165)	(0.157)	(0.164)
SRISK_GDP* Asia	-0.306***	-0.317***	-0.312***	-0.297***	-0.309***	-0.320***	-0.273***	-0.326***	-0.266***
	(0.0931)	(0.0947)	(0.0974)	(0.0942)	(0.0932)	(0.0986)	(0.0983)	(0.0985)	(0.0999)
share_cross-border	-0.789*	-0.700	-0.731	-0.934*	-0.828*	-0.874*	-0.936*	-0.732	-0.773
	(0.472)	(0.459)	(0.463)	(0.494)	(0.474)	(0.476)	(0.494)	(0.484)	(0.503)
comlang_off		-7.046				-12.38*	-12.41*	-11.52	-11.46
		(6.668)				(7.338)	(7.264)	(7.426)	(7.393)
comlegal			-1.906			-1.370	-1.499	-1.956	-2.095
			(4.478)			(4.719)	(4.831)	(4.731)	(4.816)
contig				10.20		15.89*	12.07	20.15*	16.65
				(7.327)		(8.333)	(11.46)	(10.90)	(12.79)
col45					17.80***	25.40***	25.38***	25.14***	25.20***
					(6.150)	(7.079)	(7.040)	(7.215)	(7.173)
distlog							-2.712		-3.567
							(4.184)		(4.269)
bitrade								-2.666	-3.633
								(2.430)	(2.407)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,830	1,830
R-squared with FE only	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.114	0.114
R-squared with FE & Supply	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.131	0.131
R -squared	0.133	0.133	0.133	0.133	0.134	0.136	0.137	0.134	0.135

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	0.0148	0.0161	0.0156	0.0148	0.0145	0.0136	0.0113	0.0188	0.0155
	(0.0237)	(0.0232)	(0.0231)	(0.0237)	(0.0237)	(0.0231)	(0.0239)	(0.0254)	(0.0263)
SRISK_GDP* WH	0.464***	0.444***	0.471***	0.465***	0.491***	0.424***	0.542***	0.372***	0.549***
	(0.173)	(0.167)	(0.172)	(0.159)	(0.185)	(0.150)	(0.179)	(0.130)	(0.182)
SRISK_GDP* Asia	0.287***	0.336***	0.293***	0.289***	0.284***	0.320***	0.387***	0.274***	0.386***
	(0.0894)	(0.0844)	(0.0928)	(0.0632)	(0.0892)	(0.0689)	(0.107)	(0.0727)	(0.120)
share_cross-border	-0.613	-0.788	-0.650	-0.621	-0.647	-0.670	-0.795	-0.305	-0.388
	(0.647)	(0.726)	(0.695)	(0.613)	(0.658)	(0.632)	(0.710)	(0.654)	(0.658)
comlang_off		14.06*				16.60*	16.90*	18.46**	19.56**
		(8.305)				(8.807)	(9.073)	(8.571)	(8.775)
comlegal			1.300			-3.960	-4.125	-2.677	-2.758
			(6.282)			(6.500)	(6.584)	(6.268)	(6.426)
contig				0.592		-4.143	-14.01	8.416	-3.096
				(16.80)		(18.18)	(19.67)	(14.76)	(18.19)
col45					10.42	4.400	4.084	1.589	1.225
					(11.80)	(11.30)	(11.31)	(10.69)	(10.75)
distlog							-7.172		-11.68*
							(7.049)		(6.843)
bitrade								-8.752	-11.78*
								(6.780)	(6.274)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	846	846	846	846	846	846	846	829	829
R-squared with FE only	0.166	0.166	0.166	0.166	0.166	0.166	0.166	0.165	0.165
R-squared with FE & Supply	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.168	0.168
R -squared	0.169	0.171	0.169	0.169	0.170	0.172	0.174	0.175	0.179

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5. Deleveraging during 2008Q2-09Q2: Creditor-Borrower Determinants with Matching Samples

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	-0.103***	-0.103***	-0.101***	-0.103***	-0.103***	-0.102***	-0.102***	-0.108***	-0.108***
	(0.0196)	(0.0198)	(0.0195)	(0.0194)	(0.0205)	(0.0210)	(0.0211)	(0.0195)	(0.0196)
SRISK_GDP* WH	-0.957***	-0.956***	-0.938***	-0.939***	-0.925***	-0.868***	-0.866***	-0.916***	-0.888***
	(0.157)	(0.157)	(0.157)	(0.157)	(0.159)	(0.159)	(0.154)	(0.158)	(0.159)
SRISK_GDP* Asia	0.0117	0.00846	0.0251	0.0369	0.00827	0.0198	0.0209	-0.00337	0.0134
	(0.0683)	(0.0697)	(0.0628)	(0.0692)	(0.0731)	(0.0735)	(0.0711)	(0.0589)	(0.0664)
share_cross-border	-0.342	-0.330	-0.437	-0.498	-0.382	-0.558	-0.560	-0.390	-0.403
	(0.407)	(0.411)	(0.392)	(0.404)	(0.395)	(0.364)	(0.354)	(0.408)	(0.405)
comlang_off		-0.911				-8.521	-8.515	-7.290	-7.112
		(8.561)				(8.970)	(8.987)	(9.027)	(9.088)
comlegal			3.355			3.272	3.271	2.642	2.647
			(4.505)			(3.537)	(3.545)	(3.785)	(3.776)
contig				12.34*		14.46*	14.30	19.62*	17.93*
				(7.154)		(8.664)	(9.044)	(10.73)	(10.49)
col45					12.58	15.06	15.06	14.80	14.77
					(13.14)	(13.32)	(13.34)	(13.55)	(13.50)
distlog							-0.111		-1.713
							(3.465)		(3.942)
bitrade								-3.416	-3.862
								(2.341)	(2.700)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	831	831	831	831	831	831	831	814	814
R-squared with FE only	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.226	0.226
R-squared with FE & Supply	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.262	0.262
R -squared	0.264	0.264	0.265	0.266	0.265	0.268	0.268	0.268	0.268

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRISK_GDP	0.0147	0.0163	0.0150	0.0146	0.0146	0.0133	0.0112	0.0184	0.0155
	(0.0241)	(0.0235)	(0.0234)	(0.0241)	(0.0241)	(0.0235)	(0.0242)	(0.0258)	(0.0267)
SRISK_GDP* WH	0.483***	0.466***	0.486***	0.481***	0.504***	0.427***	0.549***	0.376***	0.560***
	(0.179)	(0.172)	(0.176)	(0.163)	(0.191)	(0.155)	(0.185)	(0.136)	(0.189)
SRISK_GDP* Asia	0.289***	0.342***	0.291***	0.285***	0.287***	0.323***	0.391***	0.276***	0.390***
	(0.0899)	(0.0833)	(0.0930)	(0.0634)	(0.0895)	(0.0676)	(0.108)	(0.0713)	(0.122)
share_cross-border	-0.653	-0.843	-0.667	-0.631	-0.679	-0.674	-0.802	-0.322	-0.411
	(0.663)	(0.747)	(0.701)	(0.606)	(0.676)	(0.629)	(0.703)	(0.659)	(0.662)
comlang_off		15.02*				19.28**	19.64**	21.10**	22.31**
		(8.389)				(9.132)	(9.373)	(8.747)	(8.878)
comlegal			0.488			-4.859	-4.960	-3.612	-3.578
			(6.765)			(6.902)	(6.995)	(6.652)	(6.817)
contig				-1.734		-7.181	-17.06	4.884	-6.563
				(18.41)		(19.75)	(21.11)	(17.22)	(20.15)
col45					8.222	1.771	1.520	-1.094	-1.278
					(13.04)	(12.31)	(12.29)	(11.76)	(11.81)
distlog							-7.167		-11.61*
							(7.217)		(6.957)
bitrade								-8.403	-11.42*
								(6.891)	(6.358)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	831	831	831	831	831	831	831	814	814
R-squared with FE only	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172
R-squared with FE & Supply	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
R -squared	0.176	0.178	0.176	0.176	0.176	0.179	0.181	0.182	0.186

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6 . Robustness: Supply Side Determinants and Regional Breakdowns

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

Variable	All Borrowers		Asian Borrowers		European Borrowers		WHD Borrowers		Other Borrowers	
	(2)	(9)	(2)	(9)	(2)	(9)	(2)	(9)	(2)	(9)
SRISK_GDP	-0.0746***	-0.0842**	-0.105***	-0.0954	-0.0968***	-0.119**	-0.0808***	-0.115*	-0.0221	-0.0131
	(0.0240)	(0.0418)	(0.0207)	(0.0773)	(0.0333)	(0.0564)	(0.0313)	(0.0672)	(0.0374)	(0.0702)
SRISK_GDP* WH	-0.973***	-0.906***	-0.946***	-0.944**	-0.837***	-0.777***	-0.376	-0.181	-1.548***	-1.685***
	(0.164)	(0.212)	(0.327)	(0.482)	(0.145)	(0.193)	(0.348)	(0.308)	(0.313)	(0.329)
SRISK_GDP* Asia	-0.307***	-0.442***	-0.526**	-0.574***	-0.191	-0.321*	-0.540***	-0.679***	-0.138	-0.445***
	(0.0929)	(0.103)	(0.216)	(0.178)	(0.116)	(0.183)	(0.150)	(0.186)	(0.165)	(0.118)
systemic_crisis		-7.263		-9.666		-0.784		-1.237		-20.56***
		(5.930)		(6.986)		(6.589)		(11.96)		(7.396)
roa		-11.18		-9.669		-9.913		-6.744		-25.89**
		(8.424)		(9.720)		(11.21)		(15.61)		(11.57)
npl		-0.832		1.077		0.539		1.377		-6.568***
		(2.079)		(2.999)		(2.903)		(3.948)		(1.519)
RWA over assets		24.27		36.89		3.080		-19.12		106.5***
		(33.66)		(62.62)		(44.75)		(45.14)		(38.91)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,858	1,858	307	307	692	692	368	368	491	491
R-squared	0.133	0.139	0.115	0.126	0.123	0.128	0.069	0.075	0.213	0.217

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

Variable	All Borrowers		Asian Borrowers		European Borrowers		WHD Borrowers		Other Borrowers	
	(2)	(9)	(2)	(9)	(2)	(9)	(2)	(9)	(2)	(9)
SRISK_GDP	0.0149	0.0178	-0.104***	0.0736	0.0815*	0.0312	0.0225	-0.0085	-0.0448	-0.146
	(0.0240)	(0.0421)	(0.0319)	(0.0664)	(0.0457)	(0.0570)	(0.0785)	(0.124)	(0.0703)	(0.194)
SRISK_GDP* WH	0.436***	0.484*	-0.0469	-0.515*	0.115	0.267	0.363	0.509	1.154***	1.801
	(0.169)	(0.252)	(0.212)	(0.295)	(0.337)	(0.306)	(0.354)	(0.437)	(0.269)	(1.109)
SRISK_GDP* Asia	0.284***	0.240	0.441***	0.782***	-0.00230	-0.381	0.164	0.686	-0.00152	-0.181
	(0.0889)	(0.153)	(0.0788)	(0.0526)	(0.132)	(0.315)	(0.211)	(0.629)	(0.528)	(1.002)
systemic_crisis		-16.22**		3.094		-28.41***		-3.942		-0.0928
		(7.108)		(10.38)		(7.824)		(15.35)		(20.31)
roa		6.918		41.82		-17.54		35.16*		2.271
		(17.07)		(28.30)		(37.73)		(19.11)		(42.98)
npl		-1.171		3.943		-2.247		-5.901		5.300
		(2.980)		(6.651)		(2.732)		(11.43)		(4.262)
RWA over assets		7.374		58.32		34.02		-97.85		-108.2
		(33.82)		(36.33)		(70.93)		(64.34)		(172.5)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	846	846	170	170	390	390	152	152	134	134
R -squared	0.169	0.172	0.159	0.195	0.124	0.149	0.153	0.162	0.338	0.329

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). Columns 2 and 9 correspond to the similar columns presented in Table 2. All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 7. Robustness: Creditor-Borrower Determinants and Regional Breakdowns

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

Variable	All Borrowers		Asian Borrowers		European Borrowers		WHD Borrowers		Other Borrowers	
	(1)	(9)	(1)	(9)	(1)	(9)	(1)	(9)	(1)	(9)
SRISK_GDP	-0.0744***	-0.0797***	-0.107***	-0.0975***	-0.0986***	-0.107***	-0.0812***	-0.0777**	-0.0249	-0.0280
	(0.0240)	(0.0245)	(0.0187)	(0.0175)	(0.0335)	(0.0362)	(0.0312)	(0.0386)	(0.0366)	(0.0402)
SRISK_GDP* WH	-0.948***	-0.829***	-1.005***	-0.0682	-0.772***	-0.679***	-0.383	-0.377	-1.426***	-1.159**
	(0.161)	(0.164)	(0.314)	(0.244)	(0.152)	(0.122)	(0.353)	(0.483)	(0.306)	(0.509)
SRISK_GDP* Asia	-0.306***	-0.266***	-0.540**	-1.478***	-0.216*	-0.126	-0.548***	-0.583***	-0.155	-0.261
	(0.0931)	(0.0999)	(0.229)	(0.488)	(0.117)	(0.158)	(0.159)	(0.168)	(0.170)	(0.353)
share_cross-border	-0.789*	-0.773	1.167	-0.0249	-1.312***	-1.388**	0.218	0.811*	-33.70***	-40.71**
	(0.472)	(0.503)	(3.021)	(2.966)	(0.448)	(0.563)	(0.425)	(0.475)	(11.70)	(17.61)
comlang_off		-11.46		-31.59**		-11.63		-4.861		-13.88
		(7.393)		(14.57)		(7.609)		(17.36)		(11.47)
comlegal		-2.095		7.698		-3.529		3.360		-6.643
		(4.816)		(7.558)		(7.136)		(18.09)		(8.474)
contig		16.65				18.71		43.76		
		(12.79)				(13.22)		(28.10)		
col45		25.20***		34.92**		24.22**		-41.76		31.64***
		(7.173)		(17.35)		(11.04)		(29.20)		(8.781)
distlog		-3.567		-58.00***		-2.071		2.127		-4.763
		(4.269)		(22.21)		(5.783)		(20.45)		(20.62)
bitrade		-3.633		-18.80		-2.866		-8.282***		162.3**
		(2.407)		(11.53)		(2.768)		(2.460)		(72.78)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,858	1,830	307	307	692	682	368	368	491	473
R-squared with FE only	0.116	0.114								
R-squared with FE & Supply	0.133	0.131								
R -squared	0.133	0.135	0.115	0.152	0.125	0.131	0.069	0.075	0.196	0.200

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

Variable	All Borrowers		Asian Borrowers		European Borrowers		WHD Borrowers		Other Borrowers	
	(1)	(9)	(1)	(9)	(1)	(9)	(1)	(9)	(1)	(9)
SRISK_GDP	0.0148	0.0155	-0.108***	-0.125**	0.0791*	0.0559	0.0200	0.115	-0.0415	-0.0984
	(0.0237)	(0.0263)	(0.0329)	(0.0598)	(0.0436)	(0.0437)	(0.0792)	(0.137)	(0.0698)	(0.0604)
SRISK_GDP* WH	0.464***	0.549***	-0.0986	-0.172	0.165	0.472	0.339	0.172	1.002***	-1.170
	(0.173)	(0.182)	(0.270)	(0.499)	(0.385)	(0.938)	(0.358)	(0.675)	(0.335)	(1.352)
SRISK_GDP* Asia	0.287***	0.386***	0.428***	0.506***	-0.0293	0.362	0.113	0.954	-0.0255	-2.787***
	(0.0894)	(0.120)	(0.0709)	(0.113)	(0.205)	(0.808)	(0.225)	(0.582)	(0.529)	(0.873)
share_cross-border	-0.613	-0.388	0.859	1.217	-0.684	-0.537	0.537*	0.246	24.55	92.88*
	(0.647)	(0.658)	(1.996)	(2.012)	(1.623)	(1.425)	(0.294)	(0.778)	(23.84)	(51.38)
comlang_off		19.56**		-16.97		19.65		35.88		39.69*
		(8.775)		(16.17)		(15.62)		(24.92)		(22.18)
comlegal		-2.758		12.01		-2.538		23.86		-61.58***
		(6.426)		(15.47)		(7.377)		(35.40)		(20.20)
contig		-3.096				-5.161		-9.065		
		(18.19)				(24.14)		(30.40)		
col45		1.225		30.34**		-161.1		2.684		10.71
		(10.75)		(14.76)		(103.3)		(11.35)		(23.90)
distlog		-11.68*		6.072		-14.62		-32.51		80.00
		(6.843)		(15.23)		(17.93)		(23.70)		(55.97)
bitrade		-11.78*		-10.08		-14.60**		-16.90***		-66.19
		(6.274)		(24.99)		(6.785)		(3.817)		(203.0)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	846	829	170	170	390	384	152	152	134	123
R-squared with FE only	0.166	0.165								
R-squared with FE & Supply	0.173	0.168								
R -squared	0.169	0.179	0.159	0.182	0.125	0.149	0.153	0.222	0.341	0.415

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). Columns 2 and 9 correspond to the similar columns presented in Table 4. All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 8. Deleveraging during 2008Q2-09Q2: Creditor-Borrower Determinants with Creditor and Borrower FE

Panel A - Dependent Variable: Log Changes in Direct Cross-Border Claims (in %)

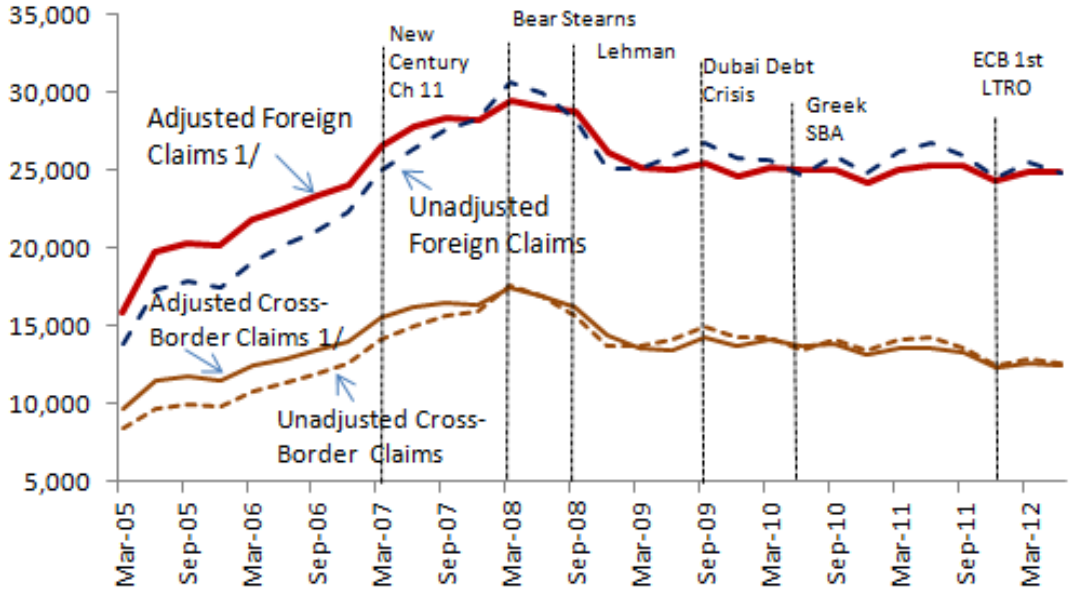
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
share_cross-border	-0.744	-0.743	-0.756	-0.931	-0.789	-0.945	-0.965	-0.819	-0.827
	(0.594)	(0.598)	(0.600)	(0.631)	(0.617)	(0.634)	(0.635)	(0.538)	(0.564)
comlang_off		-0.113				-6.540	-6.727	-7.162	-7.756
		(8.090)				(8.384)	(8.469)	(7.744)	(7.620)
comlegal			0.490			-0.842	-0.880	-0.963	-1.125
			(5.025)			(4.822)	(4.872)	(4.721)	(4.784)
contig				11.88*		15.04*	13.81	13.99	10.92
				(6.838)		(8.122)	(11.06)	(11.81)	(13.12)
col45					27.20***	31.22***	31.30***	32.36***	32.84***
					(4.438)	(7.369)	(7.458)	(7.318)	(7.471)
distlog							-0.960		-3.469
							(4.484)		(3.997)
bitrade								-1.568	-2.362
								(2.689)	(2.590)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creditor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,836	1,836
R-squared with Borrower FE only	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.114	0.114
R-squared with both FE	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.165	0.165
R -squared	0.159	0.159	0.159	0.159	0.161	0.162	0.162	0.169	0.169

Panel B - Dependent Variable: Log Changes in Local Affiliates Claims (in %)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
share_cross-border	-0.577	-0.725	-0.605	-0.623	-0.593	-0.658	-0.831	-0.406	-0.483
	(0.617)	(0.703)	(0.676)	(0.573)	(0.626)	(0.608)	(0.727)	(0.601)	(0.621)
comlang_off		10.92				12.95	12.23	14.58*	14.35*
		(8.654)				(8.216)	(8.287)	(8.011)	(8.033)
comlegal			0.988			-3.140	-3.157	-2.665	-2.502
			(6.121)			(6.073)	(6.126)	(5.923)	(5.966)
contig				3.691		-0.691	-15.05	7.031	-5.483
				(16.00)		(18.00)	(20.65)	(16.10)	(19.41)
col45					5.925	1.159	0.680	-1.182	-1.079
					(11.71)	(11.68)	(11.81)	(11.57)	(11.67)
distlog							-11.47*		-14.61**
							(6.370)		(5.891)
bitrade								-5.812	-9.499*
								(6.103)	(5.468)
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Creditor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	846	846	846	846	846	846	846	829	829
R-squared with Borrower FE only	0.166	0.166	0.166	0.166	0.166	0.166	0.166	0.165	0.165
R-squared with both FEs	0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194
R -squared	0.195	0.196	0.195	0.195	0.195	0.196	0.200	0.197	0.203

Notes: Cross-sectional regression are estimated. The dependent variable changes were calculated as log differences between the end of the deleveraging episode and its start (coefficients are already reported in percentage). All standard errors are double clustered by creditor bank and borrower country. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Figure 1 - BIS Reporting Banks' Adjusted Foreign Claims (in USD billions)

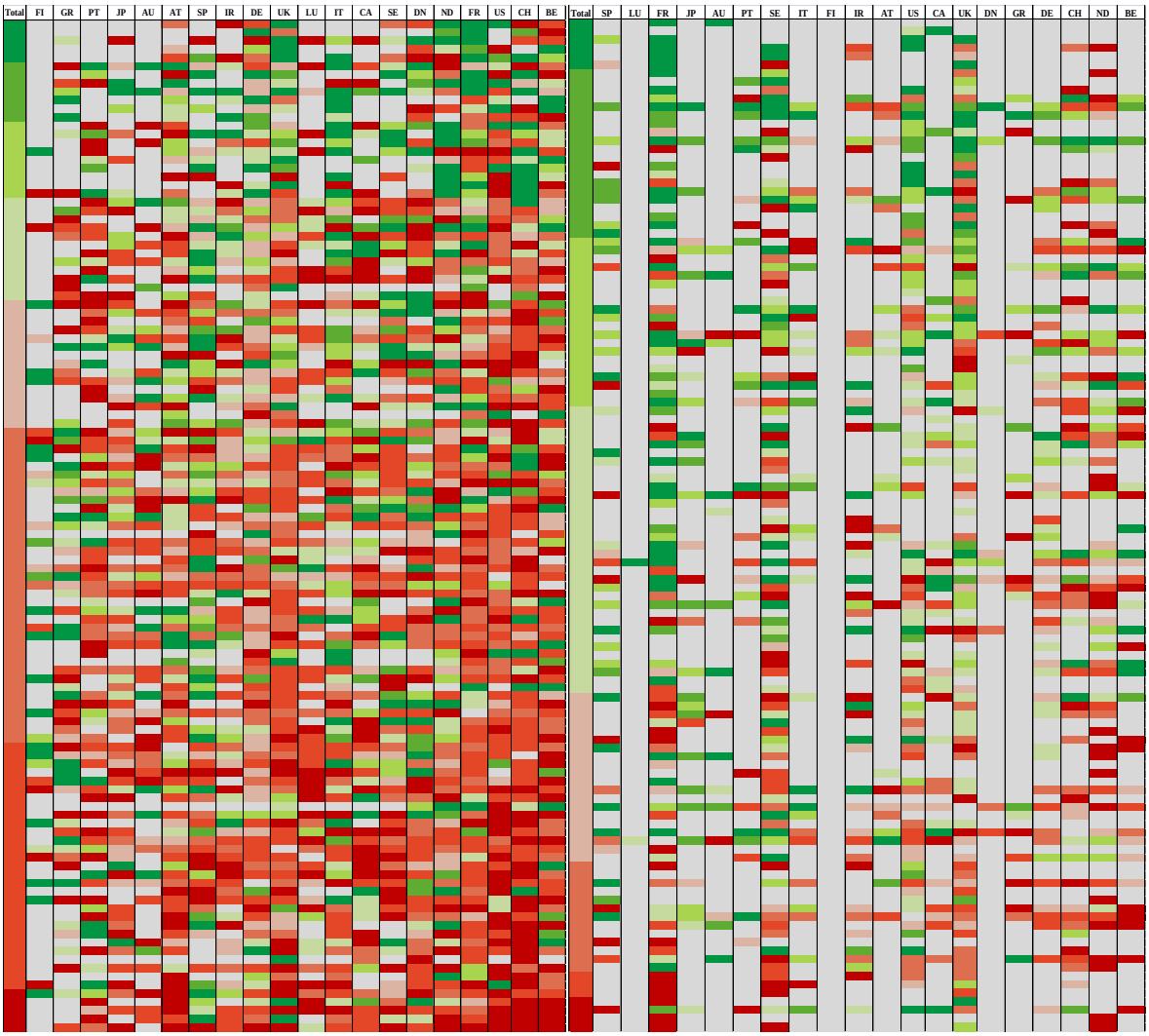


Source: IFS, BIS banking statistics, and authors' estimates.

Note: 1/ Break-in-series and exchange rate changes adjusted data following Cerutti 2014.

Figure 2. Bilateral evolution of banks' claims during 2008Q2-09Q2

Cross-Border Claims Affiliates' claims

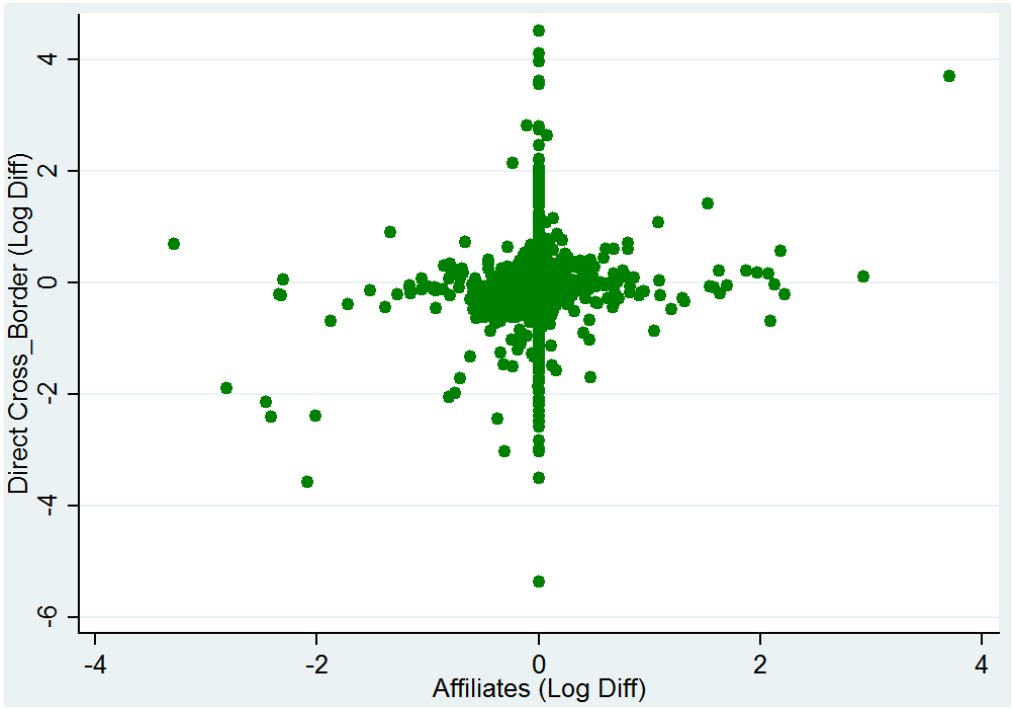


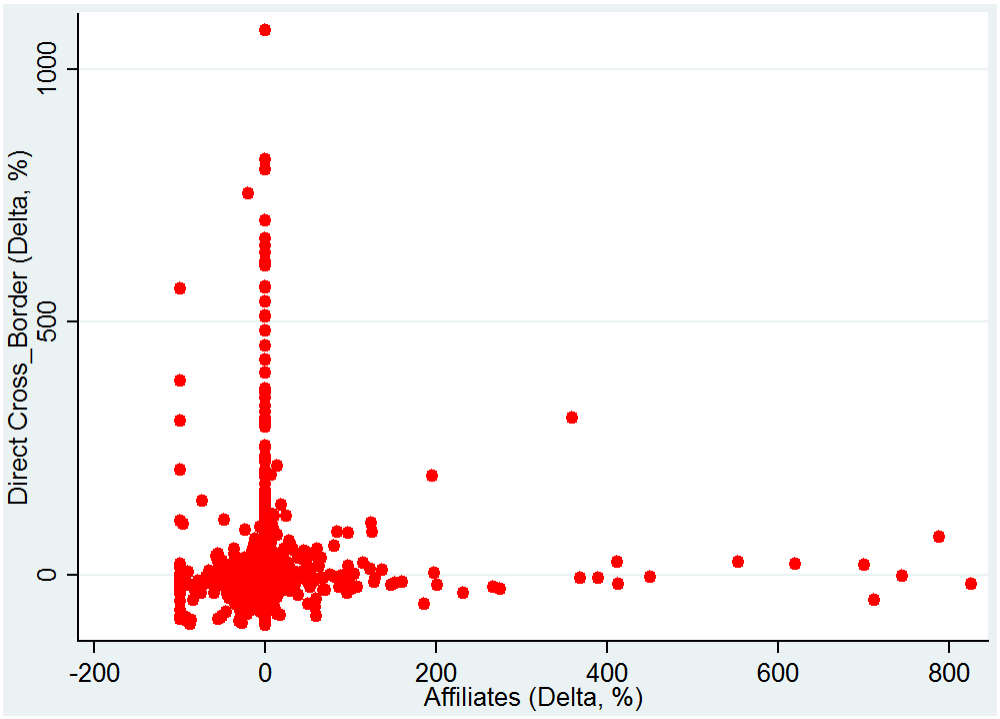
Percentage Change

More than 50	
Between 25 and 50	
Between 10 and +25	
Between 0 and 10	
No Activity	
Between 0 and -10	
Between -10 and -25	
Between -25 and -50	
Less than -50	

Source: BIS, IFS, and authors' estimations.
Notes: Each cell depicts the bilateral—lender in the columns, and borrowers in the rows—percentage changes in cross-border claims (see legend for color scale). The left-hand side panel shows the bilateral evolution of cross-border claims. The right-hand side panel displays the evolution of affiliates' claims. The first column of each panel displays banks' total lending to each borrower country. The columns are sorted from left to right by the overall degree of deleveraging of the creditor country and the rows are sorted from top to bottom by the overall degree of deleveraging at the borrowing country.

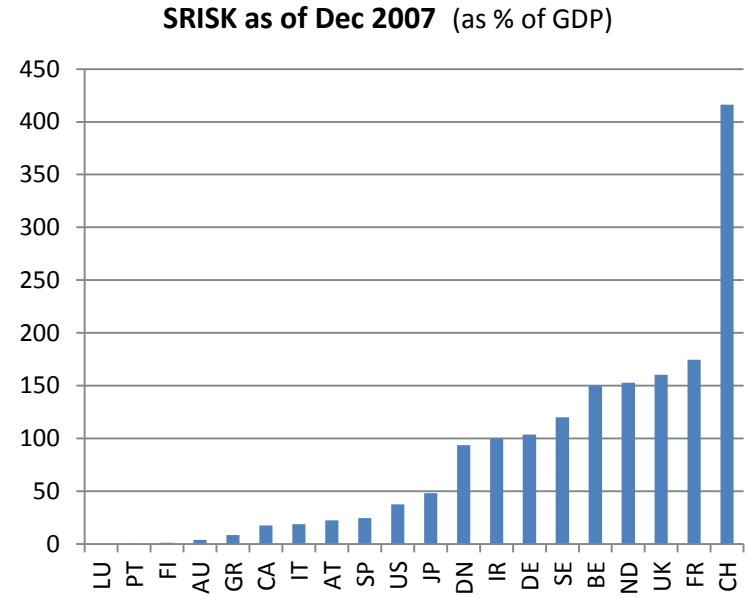
Figure 3. Evolution of Cross-Border and Affiliates' Claims
Period 2008Q2-09Q2

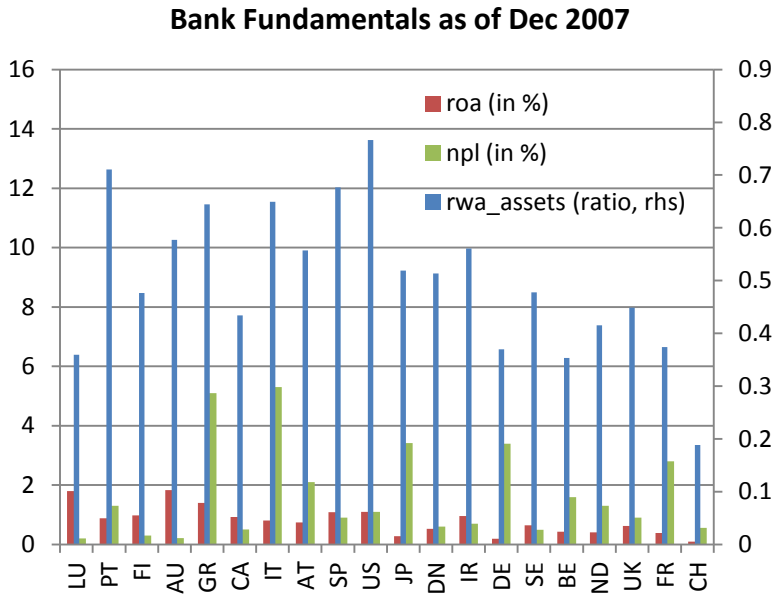




Source: BIS, IFS, and authors' estimations

Figure 4. Supply Side Variables





Sources: NYU Stern, IFS, Central Banks, and authors' estimations