Liquidity management of U.S. global banks: Internal capital markets in the great recession

Nicola Cetorelli
Federal Reserve Bank of New York

Linda S. Goldberg
Federal Reserve Bank of New York and NBER

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Abstract

The recent crisis highlighted the importance of globally active banks in linking markets. One channel for this linkage is management of liquidity across an entire banking organization, with funds flowing across international affiliates and within geographically diverse banks. This paper analyzes such liquidity management by U.S. banking organization during the Great Recession. Faced with a shock to the parent, global banks activated internal capital markets shuffling funds in and out of specific locations based on the relative importance of such locations as local funding pools and on their overall foreign investment strategies, differentiating across "core" and "periphery" business locations.

Keywords: Bank, global, liquidity, transmission, capital markets, crisis, contagion

JEL Classification: E44, F36, G32

 Address correspondences to Linda S. Goldberg, Federal Reserve Bank of NY, Research Department, 33 Liberty St, New York, N.Y. 10045. email: Linda.Goldberg@ny.frb.org or Nicola.Cetorelli@ny.frb.org . We thank Leslie Shen and Benjamin Mandel for excellent research assistance.

I. Introduction

The importance and international interconnectedness of global banks was clearly demonstrated during the Great Recession. One concern in national and international policy discussions was the degree of interconnectedness of affiliates within globally active banking networks. As unprecedented funding market dislocations occurred and impacted individual banks, the crisis spread more broadly. Not adequately understood is the way that these global banking networks work. We explore the extent to which global banks responded to shocks by receiving more funds from their foreign affiliates, or sending fewer funds to these affiliates. We expect that banks prioritize their operations, assessing which business lines of the bank headquarters and foreign affiliates need to be supported to a greater degree.

Indeed, many smaller countries in which foreign banks have affiliates expressed concerns during the crisis that the foreign banks would cut and run to some degree, leaving holes in the local financial markets. Larger countries also expressed concerns that the needs of affiliates in other markets would exasperate conditions in their own localities. For example, in the United States, in part to avoid sharp contractions in domestic and international business activity, various emergency lending facilities provided extensive dollar liquidity to global banking organizations in the United States[1] and to stressed foreign banks located abroad. Funds drawn at the Term Auction Facility of the Federal Reserve and central bank dollar swap facilities played an important role in funding global banks.[2] Since some banks extensively rely on global liquidity management, moving around funds within organizations and across borders, these "internal capital market" flows can contribute to the international transmission of shocks and policies, and be a factor in international contagion.

Despite the potential importance of this form of international capital flows, there is very little direct evidence or analysis of how internal capital market transfers work within banking organizations. Cetorelli and Goldberg (forthcoming) have used bank-specific data and

[1]See blog discussion on this topic by Linda Goldberg and David Skeie "Why did US Branches of foreign banks borrow at the discount window during the crisis? http://libertystreeteconomics.newyorkfed.org/2011/04/why-did-us-branches-of-foreign-banks-borrow-at-the-discount-window-during-the-crisis.html

[2]On the TAF. see Olivier Armantier, Sandy Krieger, and Jamie McAndrews. 2008. "The Federal Reserve's Term Auction Facility". Federal Reserve Bank of New York *Current Issues in Economics and Finance*, July volume 14 number 5. On the central bank dollar swap facilities, see Linda Goldberg, Craig Kennedy, and Jason Miu. 2011. Central Bank Dollar Swap Lines and Overseas Dollar Funding Costs" *Economic Policy Review* (May). One factor in the need for funding in foreign markets during the crisis was the prior build-up of maturity and currency mismatches within and across currencies on the balance sheets of banks (BIS CGFS March 2010).

demonstrated that these internal capital market flows transmit policy-induced liquidity changes across markets and can impinge of the local effectiveness of monetary policy. Other indirect evidence supports the role of internal capital markets in the transmitting dollar funding shocks that hit a range of industrialized countries and influenced various modes of lending to emerging markets (Cetorelli and Goldberg 2011).

Yet, those studies are not able to provide a detailed assessment of how, specifically, internal capital markets worked, either during the Great Recession or in more normal times. In this paper, we conduct this type of assessment. We use detailed bank-specific data from confidential regulatory report on all U.S. global banks and trace their internal capital flows with affiliates across the globe. We examine the response of these flows to liquidity shocks originating during the Great Recession at different dates. We are able to test hypotheses on the types of banks that used this channel more extensively, and the types of affiliate conditions that were associated with greater adjustments in internal flows within organizations.

These particulars matter, since aggregate data – even at the level of individual parent banks - mask important dynamics within banking organizations and across countries. For example and as shown in Figure 1, in the very early stages of the crisis, the foreign affiliates of U.S. owned banks became, *in aggregate*, net recipients of funds from their parents. After the Lehman failure and during the peak of the crisis, and again later in 2009, the foreign affiliates were conduits for inflows of funds to their parent organizations in the United States. This directional inflow into the United States through internal capital markets for this same group of banks was reversed in 2010, when foreign affiliates related much more extensively on borrowing from their banking organizations compared with what previously had been the case. However, it is clear that regional patterns of aggregate changes differed sharply from the aggregate story. It also is clear from looking at bank-specific information (which is confidential and cannot be presented) that there are sharp differences in the use of internal capital markets across banks.

Our work directly builds on and complements three rich literatures. First, we build on the rich literature on international transmission and contagion during crisis events. Important studies focus on the co-movements between financial prices and refine the concept of international contagion, as achieved by Forbes and Rigobon (2002) and Edwards (2002). Some studies concentrate on identifying the reasons for contagion, whether through international trade linkages, exposure to common competitors in trade, reliance on the international interbank

market, or through foreign asset exposure. Acharya and Schnabl (2010) argue that commercial banks manufactured asset-backed commercial paper (ABCP) conduits around the world as a form of funding, and the importance of the initial funding crisis to markets globally was transmitted (to stock prices) through the use of these conduits by these banks, with the location of issuance driven by regulatory regimes instead of international trade routes.

Second, we deepen an understanding of the role of banks in international transmission. The analysis also is critical to our understanding of the international transmission role of banks in crises, building on insights from early studies by Peek and Rosengren 1997; van Rijckeghem and Weder 2003 common lender channels. In line with some of these papers, recent theoretical works by Devereux and Yetman (2010) [also Kollmann and Malherbe (in progress 2011)] argue that the recent crisis differs from earlier contagion episodes in that transmission recently was through the balance sheet constraints on global banks. Recent empirical work by de Haas and Lleyveld (2010), Popov and Udell (2010), Cetorelli and Goldberg (2011) and Buch, Koch, and Kotter (2011), and Puri, Rocholl, and Steffen (2010) demonstrate that international retail and syndicated lending reflect that stresses on parent banks during the global financial crisis. While some tests point to roles for internal capital markets in transmission [de Haas and Lleyveld (2010), Cetorelli and Goldberg (2011)], direct evidence on how these worked and contributed to transmission in the Great Recession is not yet available.

Third, and related to this last point, we provide direct evidence of transmission through the internal capital markets of global banks. Prior evidence by Cetorelli and Goldberg (forthcoming) contained direct tests in the context of monetary policy transmission, complementing other studies that provided *indirect* tests of internal capital markets in domestic or global banking organizations.[3] Conceptually, internal capital market flows are viewed as leading to a more efficient allocation of resources (see Stein (1997), Gertner, Scharfstein, and Stein (1994), and Stein (2002)), or as a managerial tool to mediate agency frictions existing

[3] That banks – as other business organizations – have active internal capital markets is not new, and evidence has been reported, among others and large for banks in the United States, in Houston, James and Marcus (1997), Campello (2002), Ashcraft (2006, 2008), and Ashcraft and Campello (2007). Recent contributions are by Schnabl 2009 and Khwaja and Mian 2008. This focus on internal capital markets of global banks is complementary to analysis of the entry decisions of foreign banks into specific destination markets (Claessens and van Horen 2008; Cerutti, Dell'Ariccia, and Martinez Peria 2007; Buch 2005). Much of that literature considers linkages between industrialized with emerging markets with most emphasis on lending activity. Our treatment subsumes these markets, but also considers the results of entry into markets where affiliates may draw funding, such as is the case in many industrialized countries.

within a firm, across separate divisions, (e.g., Rajan, Servaes, and Zingales (2000), Scharfstein and Stein (2000)). [4]

In the present paper, we utilize bank-specific data from quarterly regulatory reports of United States banks for the period 2006 through 2010. The specific data cover the international asset and liability positions of bank affiliates, including the internal borrowing and lending across locations. With a series of shocks over time that are assumed to differentially impact specific banking organizations or specific affiliate markets ex ante, we demonstrate that bank business models and country and institutional features play clear roles in international transmission and contagion through internal capital markets of banks. The business models of foreign-owned banks are dimensioned, by bank and across countries, on patterns of lending activity to particular markets and patterns of funding those markets through the balance of local funds versus parental support.

Overall, these lessons on patterns of liquidity management in global banking organizations are clearly important for understanding potential for international contagion through banks, and for properly constructing liquidity responses by official agencies in the event of market disruption, and lender-of-last-resort functions across central banks.

II. U.S. banks and their foreign affiliates

The sample of internationally active United States banks are those institutions that file the Federal Financial Institutions Examinations Council (FFIEC) Country Exposure Report (FFIEC 009), which captures quarterly bank-specific information on assets and exposures to foreign markets. This report must be filed by every U.S. chartered, insured, commercial bank in the United States, including the District of Columbia, Puerto Rico, and US territories and possessions, or it's holding company, provided that the bank (or holding company) has, on a fully consolidated bank basis, total outstanding claims on residents of foreign countries exceeding $30 million in aggregate. The reporters can be U.S. owned banks or foreign bank subsidiaries in the United States. Banks itemized their claims, assets, and liabilities by country. Reporting schedules detail the foreign-office liabilities and the amounts of internal borrowing and lending between the affiliates in various locations and the parent organizations.

[4] Another relevant literature argues that countries that are more remote suffer from more international financial volatility (Rose and Spiegel (2009).

The FFIEC 009 report is strictly confidential and therefore micro details cannot be made public. However, with its bank/country breakdown it is a unique source of information and precisely the type of data needed to further our understanding of liquidity management strategies of globally active banks. To the best of our knowledge this dataset has never been used before for research purposes.

The number of banks filing this U.S. report has declined from nearly 200 in the late 1980s to closer to 75 in the early 2000s (see Goldberg 2006 and Cetorelli and Goldberg 2006 for a broader description of this data over the last 20 years). Filers can be banks that are exclusively engaged in cross-border transactions, or could have a combination of activities that includes having local affiliates in foreign markets. Since our analytical focus is on internal capital markets and their rule in international transmission, we restrict the sample of banks to those that have foreign affiliates. In order to identify the existence of foreign affiliates, we look for positive local liabilities in foreign countries or affiliate receipt of support from the parent in those locations.[5] As shown in Table 1, using this screen the number of banks declines to more than 50 U.S. banking entities with foreign affiliates over the full sample, although closer to 40 at any single date, with some of these U.S. banking entities themselves with foreign parents.

These global banks have different degrees of internationalization. Many have overseas affiliate(s) in offshore financial centers.[6] Many foreign-owned banks have an affiliate in their parent country. Overall, at least 30 banks in every quarter have affiliates in at least two countries.[7] These affiliates are broadly dispersed around the globe and covering 121 countries. The geographic distribution of counts U.S. banks with affiliates in any foreign economy are graphically visualized in Figure 1, with the raw data in Appendix Table 1. Figure 2 shows the relative size of U.S. bank positions across these countries, with size measured by the total of local liabilities (in both local and foreign currency) and net inflows from the parent organization

[5] The existence of local lending in a country is a sufficient condition for a foreign affiliate, but is not used as a screen since not all affiliate offices engage in lending activity. We include the country-affiliate pair if local liabilities or net due flows are observed in any of the observations periods of all sample.

[6] According to the International Monetary Fund, there are 46 countries that meet the definition of offshore financial center. See Zerome (2007) for a discussion of alternative approaches to identifying OFCs.

[7] Note: for the purpose of this table and the econometric analysis which follows, we exclude the large institutions that became banks or had a change in entity status late in 2008Q4 and in 2009Q1/Q2. Examples of such excluded banks are Goldman, Morgan, GMAC, CIT, and American Express.

(without adjustment if there are net outflows).[8] Some countries have a large number of U.S. banks with affiliates, for example, Canada, Hong Kong, Ireland, Taiwan, and the United Kingdom, in addition to the Cayman Islands. A large number of countries, fully half of the sample, have only two or three U.S. banks operating in the local market. There is a wide variance in the total value of the liabilities across the bank affiliates within these countries. Totaled across affiliate banks in each country, the median country had about $5 billion in liabilities, while the largest countries had over $100 billion with the United Kingdom being an order of magnitude larger.

Table 2 provides specifics on characteristics of the parent bank organization. These specifics are based on two types of regulatory data at the bank or bank holding company level: *Federal Financial Institutions Examinations Council (FFIEC)* 031 "Call Reports" and *Country Exposure Report (FFIEC 009)*.[9] Relevant parent bank information includes size (total assets), solvency, liquidity, and total foreign lending focus, with the focus achieved through both cross-border and local claims. Additionally, by parent bank we construct Herfindahl indices that capture how broadly this overall foreign lending is distributed across foreign destinations. We also provide some descriptive information based on parent-country affiliate observations. We focus on the importance of local versus parental support in affiliate financing and the importance of lending to that country on an immediate counterparty basis, compared to all such lending across all countries in which a parent is engaged.

In any quarter, the average number of parent banks with global operations is 42. While the asset size distribution of these banks is broad, the median bank has less than $1 billion in assets. Thus, many within this sample of banks are much smaller as entities than the "large

[8] We do not address the issue of determinants of bank entry in specific foreign markets. As shown by Claessens and Van Horen (2008), foreign entry tends to be associated with common language, similar legal systems and banking regulations, and geographic proximity. These are measures of physical and institutional distance that are sometimes related to information costs.

[9] Through the FFIEC 031 report, we used the following variables: total assets (RCFD2170), total loans (RCFD2122), total foreign loans (RCFN2122), equity (RCFD3210), and liquid assets constructed as the sum of securities, trading assets, and (RCFD1754+RCFD3545+RCFD1350). From the FFIEC 009, we have for the bank (or holding company), on a fully consolidated bank basis, the following variables: total cross border claims constructed as the sum of cross border claims by banks, public, and other (C915+C916+C917), total foreign office claims on local residents in non-local and local currency constructed as the sum of foreign office claims by banks, public, and other, and foreign office claims in local currency (C918+C919+C920+C922), net due to (or due from) own related offices in other countries (8595), and foreign office liabilities constructed as the sum of foreign office liabilities in non-local currency and in local currency (C938+C939).

global banks" that characterize the full spectrum of the U.S. banking system and are in the top 5 percentile of the size distribution of all banks.

In the period preceding the crisis, foreign loans (which is the "external lending" of the organization) tended to be 4 to 5 percent of bank total assets. The median quarterly value of total lending by parent bank organizations to the sum of their affiliates was positive. The mean value close to zero implies that larger flows tended to be more negative, meaning that parent banks were more likely to be described as net lenders to affiliates. Liquid asset shares tended to be lower than is generally observed across the full sample of U.S. banks (not shown), while bank equity was generally close to 8 percent of bank total assets.

The lower panel of Table 2 considers features of the foreign affiliates of U.S. banks. In any quarter, there is an average of 550 total observations of banks with affiliates across a range of foreign markets. While some banks have affiliates only in a single foreign country, many U.S. global banks have affiliates in over ten foreign countries and a few have in excess of 50 countries in which they have affiliates. The rows of the local power capture some of the broad differences across affiliates. Two particular features are the method of financing of the affiliates, and the relative importance of the affiliates to the parent organization. On a flow basis, banks report the degree to which they have affiliate financing from local markets and also report the degree of financing coming through internal capital market support of parents.[10] For our bank-affiliate sample in 2007Q2, the median observation is that about 75 percent of financing is locally drawn, while 25 percent is parent bank support. The average value is closer to 60 percent locally financed.

[10]The data used for this analysis is collected by bank and by affiliate country, capturing, for each country in which the reporter has an office or offices, the net liabilities (or claims) of that office or those offices on all other offices of the respondent that are located in other countries. If the offices in a given country taken together have a net "due to" position with all related offices in all other countries combined, a positive figure should be reported and indicates that the affiliate is borrowing from the rest of the banking organization; a net "due from" position should be indicated by a negative sign and indicates that the affiliate is lending to the rest of the banking organization. http://www.ffiec.gov/PDF/FFIEC_forms/FFIEC009_201103_i.pdf Schedule 1.a memorandum item reporting.

How large in aggregate were the net due positions of US banks with these respective affiliates located in foreign countries? For this comparison, we sum over all reporting banks and consolidate across all countries in each region. The period presented includes the interval prior to the financial crisis, and continues through the end of 2010. In the very early stages of the crisis, the foreign affiliates of U.S. owned banks became, on balance and in aggregate, net recipients of funds from their parents. After the Lehman failure and during the peak of the crisis, and again later in 2009, the foreign affiliates were conduits for inflows of funds to their parent organizations in the United States. This directional inflow into the United States through internal capital markets for this same group of banks was reversed in 2010, when foreign affiliates related much more extensively on borrowing from their banking organizations compared with what previously had been the case.

Yet, Figure 3 masks difference in the pattern of affiliate borrowing and lending through internal capital markets across different regions. As shown in the panels of Appendix Figure 1, U.S. bank affiliates in Europe were strong net borrowers of funds from their parent organizations leading up to the crisis. This borrowing of dollars expanded in the early stages of the crisis, before collapsing from a peak in early 2009 and then reverted back to being net destinations for U.S. funds. Affiliated banks in Central and South America were net sources of funds for their banking organizations for the entire sample period, with this role sharply expanded in late 2008 and through 2009 before reverting back. Affiliates in Asia, Africa, and Australia, had less internal capital market borrowing and lending with different patterns over time.

It is important to note that while internal capital market flows can have a mirror reflection in local market lending by these same banks, this need not be the case. That is, if foreign-owned banks within local markets are sending an increased amount of funds to affiliates outside of those markets (or receiving less support from their affiliates), does this imply that there is reduced lending within local markets by those same affiliates? Looking at a range of home countries and a range of host markets, Cetorelli and Goldberg (2011) showed that, during the crisis and controlling for changes in local loan demand, there is indirect evidence that shocks to parent banks were transmitted to emerging markets through cross-border lending and that there was a smaller contraction in lending done directly by the affiliates. Kamil and Rai (2010) confirm this pattern for Latin American countries, but also show that the local lending activities by the

foreign banks – especially when heavily funded by local deposits instead of parent bank's resources or wholesale markets – reduced the amount of contagion from the international liquidity squeeze.[11] For our study, however, the additional interesting observation is that many of the foreign affiliates of U.S. banks do not engage in local lending in normal or crisis periods. Across the sample of banks that we study, **** of the affiliate-bank observations have zero local claims and use funds collected domestically for other purposes, including flows to affiliates outside of the local markets.

In the sections that follow, we focus specifically on the response of internal capital markets to shocks in the recent crisis, and explore how transmission of liquidity shocks occurred across the affiliates of the U.S. banks with global operations. Our methodology is geared at controlling for the common effects (net liquidity supply) from foreign markets, and focusing on how internal capital market transfers vis-à-vis the rest of the global banking organization were dependent on the ex ante revealed business model of the banking organizations by market. This business model differs according to commitment to local market borrowers and reliance on local market sources of funds. Thus, we provide direct evidence on a specific channel of transmission, adding to our understanding of contagion and common bank lender effects and supporting via analysis of micro banking data the insights on contagion and transmission that have been explored in more macroeconomic studies.

III. Econometric Analysis of Transmission through Internal Capital Markets

III.1 The econometric methodology

Cetorelli and Goldberg (forthcoming) has provided evidence that global banks manage liquidity globally, activating internal capital markets in response to local funding shocks. Building on that theme, the goal of the present paper is to delve deeper into this issue and identify factors governing the inner dynamics of intra-organizational borrowing and lending. Said differently, we go beyond the question of whether global banks do manage liquidity globally, exploring instead how this allocation of resources is done. Pursuing this research furthers our understanding of global banking, and it refines knowledge regarding the broader

[11] Claessens, Dell'Ariccia, Igan and Laeven (2010) provide cross-country evidence on the spreading of the crisis into macroeconomic and financial performance metrics, also finding that bank dependency on wholesale funding markets played a significant role in amplification.

macroeconomic consequences of global banking activity including the role of such transfers in international transmission and contagion.

We explore two main conjectures highlighting two important dimensions of the global banking business model: a) local (foreign) market funding strategies and, b) relative investments in a bank's "portfolio" of local markets.

Global banks differ in terms of their reliance on local liabilities to fund local investments, and there is also heterogeneity in local funding reliance for a given bank across foreign locations. We exploit the intra-bank heterogeneity and conjecture that, in the event of a shock to the parent, internal funds are more likely to be drawn from locations where the global bank is more reliant on local funding pools.

At the same time, global banks also differ in their investment strategies as reflected by the relative amount of lending extended and other claims held in each foreign location. Any heterogeneity is likely to capture, among other things, an overall strategy of business expansion and market penetration specific to each bank. We thus conjecture that in response to a shock to the parent, funds are drawn more intensely from "periphery" locations – those representing a smaller share of total foreign claims - than from "core" locations.

Focusing on these two specific dimensions of global banks' business model, we go beyond the observation of internal capital markets in aggregate, between parent and its foreign affiliates as a whole, and we are able instead to track the direction and the intensity of internal borrowing and lending in and out of each global bank's own entire set of foreign locations.

As we pursue this identification strategy we recognize the role of country and bank specific factors as affecting banks' funding and investment choices and therefore as likely co-determinants in liquidity management strategies. In particular, among country characteristics, we investigate the role of maintaining offices in offshore financial centers, the choice of locations based on the geographic distance from the U.S. parent, the degree of capital account openness of each location, and the prevalent exchange rate regime with respect to the U.S. dollar. Among bank characteristics, we focus on the role of size, solvency and liquidity of the parent, and the degree of investment diversification among foreign locations.

Establishing the causes of transfers, whether due to a shock to the parent bank's balance sheet or the foreign market in which the affiliate resides, requires separating potential contamination of each by concomitant changes in the other. This identification is long

recognized in the literature on international contagion as a difficult issue to address, as summarized by Rose and Spiegel (2010) and earlier addressed by Forbes and Rigobon (2002) and Edwards (2002). In our structure, we deal with identification by bringing to bear highly detailed data and building on a difference-in-difference identification strategy, similar to that employed, for instance, in Khwaja and Mian (2008) and also utilized in Cetorelli and Goldberg (2011). This identification strategy relies on two points: 1) the initial liquidity shock is *not* felt homogeneously across individual banks, and 2) many countries have affiliates from more than one bank. A difference-in-difference approach facilitates isolation of bank-specific versus affiliate market effects. Our dependent variable will be the change in internal capital market borrowing (or lending if negative in sign) of an affiliate in a foreign location with the rest of the parent banking organization.[12] We first provide a range of OLS results for specifications and then conduct a range of fixed effects specifications to consider the robustness of our results to the type of demand-supply causality contamination addressed in the prior literature.

Following that approach, the basic supply schedule for bank *i* internal lending with its' affiliates in country *j* at time *t*, L_{ij}, is expressed in terms of (log) changes from before to after the shock as

$$(1) \qquad \Delta L_{ij} = \beta_0 + \beta_1 \cdot \Delta D_i + \eta_j + \varepsilon_{ij}$$

β_0 is a constant term, ΔD_i the indicator of the funding shock sustained by parent bank *i*, and η_j an unobservable term capturing simultaneous market shocks to affiliates in country *j*. The term ΔL_{ij} captures the change in internal lending from before to after the event, and banks that were hit more by an adverse liquidity shock should be those that rely more on changes in internal lending with affiliates. The parameter β_1 can be expanded, as discussed below, to characterize which *i* and *j* features contribute to transmission.

[12] FFIEC 009, schedule 1a, item Net Due to Own Related Offices in Other Countries. Reports for each country in which the reporter has an office or offices, the net liabilities (or claims) of that office or those offices on all other offices of the respondent that are located in other countries (e.g., the net amount a German branch has "due to" or "due from" the head office and all other consolidated non-German offices of the parent). Only a single net figure should be reported for all the offices of the reporter in a given country. For the purposes of this report, the computation of net due to or due from should include unremitted profits and capital contribution accounts of branch offices and the equity investment in consolidated subsidiaries.

In this particular estimating framework, as shown by Khwaja and Mian, basic OLS could generate biased estimates of $\hat{\beta}_1$ if there is a correlation with simultaneous liquidity demand shocks embedded in the unobservable term η_j. Country fixed effects on model specification (1) can absorb any liquidity demand driven contamination thus resolving the bias problem affecting the OLS estimation. The resulting model specification is

$$(2) \qquad \Delta L_{ij} = \gamma_1 \cdot \Delta D_i + \gamma_j \cdot FE_j + \varepsilon_{ij}$$

with γ_1 now unbiased and γ_j being a vector of fixed effect coefficients. In essence, this alternative model specification achieves identification comparing the impact on internal lending of separate banks *i* to their own affiliates in the *same* country *j*. Any common shock to funding demand factors in country *j* would be absorbed by its own country indicator variable, thus leaving the coefficient $\gamma_1$as an unbiased estimator of changes affecting the net supply of funding of each parent.

How do we identify the funding shock ΔD_i ? As it has been widely described, the crisis materialized in the second half of 2007 in the form of a broad shortage of U.S. dollar funding. Banks and other financial institutions, both in the U.S. and abroad, had been accumulating substantial dollar denominated assets, mainly long-term securities derived from real estate activity, and they had funded such positions mainly through short-term dollar liabilities. The asset-backed commercial paper (ABCP) market had been a crucial component in dollar funding activities in the years prior to the crisis. As documented in, e.g., Acharaya and Schnabl (2010), Acharaya, Schnabl and Suarez (2009), and Kacperczyk and Schnabl (2010), commercial paper had grown to be the largest instrument in total U.S. short-term funding, with the ABCP component representing the lion share. While ABCP is issued by entities that are not directly related to financial institutions, they operate with the direct backing of such institutions, either through the existence of liquidity or credit enhancements, or both. Large commercial banks, both U.S. and foreign – mainly European – were among the largest providers of such enhancements (they still are today, albeit in a largely scaled down market).

As argued in Acharaya, Schnabl and Suarez (2009), these forms of off-balance sheet commitments by banks resulted in massive absorptions of the assets of the many ABCP entities that were unable to continue issuing new paper in the second half of 2007, once investors became concerned about the overall quality of the assets backing commercial paper issuance.

Consequently, ex-ante large off-balance sheet exposures to the ABCP market materialized as a severe funding shock on many banks' balance sheet. Indeed, as evidenced in Acharaya, Schnabl and Suarez (2009), banks that were ex-ante highly exposed to the ABCP market experienced larger drops in stock prices in the months subsequent to the onset of the crisis. Using their data we construct a measure of individual banks' exposure to ABCP in the time just prior to the crisis (early 2007).[13] We then use this ex-ante indicator in our basic model specification to observe dynamics in internal borrowing and lending in the following quarters. Banks with high ABCP exposure are treated as those that suffered the largest liquidity and funding shock (the ABCP exposure measure is the ΔD_i in model specification (1).

III.2. Identifying events during the crisis

For the purpose of our analysis, we take the *pre-crisis period* as beginning in 2006Q1 and continuing to mid 2007. Figure 4 displays the time series of benchmark funding rates. Short-term dollar funding markets exhibited no sign of turmoil throughout the end of July and early August. We then define the period 2007Q3 to 2007Q4 as a "first shock" period to capture the dollar funding pressure resulting from the events described above. We conjecture that global banks that that had been more highly exposed in the ABCP market before the crisis started would face larger funding imbalances. These same banks would therefore have larger needs to activate internal borrowing and lending with their foreign affiliates. Thus, for each bank-affiliate observation we construct average ~~NetDue~~Net Due (affiliate borrowing from the rest of the banking organization) over the quarters in this pre-crisis period and the average over 2007Q3 and 2007Q4.

We end the first shock period at 2007Q4 to coincide with the subsequent Federal Reserve institution of the Term Auction Facility in late December 2007, to provide emergency funding to banking institutions. This intervention was by all accounts unprecedented and very large in size. Hence, we define the period 2008Q1 through 2008Q2 as a "second shock" period, to capture the effects of this policy intervention. Essentially we treat this event as a *positive* liquidity shock on banks' balance sheet, and we look for any subsequent change in behavior by the same sets of

[13] We thank Viral Acharya and Philipp Schnabl for sharing this data. The conduit group comes from Moody's Investor Service reports. Acharya and Schnabl match conduits to sponsoring organizations and then match the sponsor to the consolidated financial company. We match these consolidated financial companies to the U.S filers of regulatory report FFIEC 009. If there are U.S. filers without Moody's rated conduits, we treat the ABCP value as zero. For each filer, the conduit value is scaled relative to 2007Q2 bank equity.

banks, as differentiated according to their same pre-crisis ABCP exposure. The second Δ for estimation takes the pre-period as 2007Q3 and 2007Q4, and compares this with the first half of 2008.[14]

We purposefully end our empirical exercise before the events associated with the failure of Lehman in September 2008: since our identification strategy relies upon banks' pre-crisis exposure to the ABCP market, observing behavior based on balance sheet characteristics more than twelve months apart would probably introduce noise that would be hard to control.

III.3. Refining the identification strategy.

As said earlier, our dataset allows us to push further the identification strategy, having for the first time an in-depth look at where exactly global banks may be may be drawing funds from and where they may be directing funds to in times of shocks. In particular, we test the importance of local funding pools and the potential different role of core and periphery locations for each global bank in determining the choice of internal capital market activity.

Likewise, both country and parent bank characteristics may also be important determinants of specific internal funding dynamics. Hence, we will conduct the empirical exercise using the broader model specification

$$(3) \qquad \Delta L_{ij} = \beta_0 + \eta_i + \delta_j + \beta_1 \cdot \Delta D_i + \varepsilon_{ij}$$

where we allow for

$$(4) \qquad \beta_1 = \beta_0 + \overline{\beta}_i \overline{X}_i + \overline{\beta}_j \overline{X}_j + \overline{\beta}_{ij} \overline{X}_{ij},$$

and vectors of characteristics of parent banks ($\overline{X}_i$), affiliate countries ($\overline{X}_j$), and affiliate bank pairs ($\overline{X}_{ij}$) are introduced (see Table 3 overview).

[14] The facilities fall under the heading of liquidity facilities versus lending facilities. The more traditional provision of short-term liquidity to banks and other depository institutions occurred through the traditional discount window, the Term Auction Facility and through the bilateral currency swap agreements approved and in some cases later expanded with 14 foreign central banks. The Federal Reserve's Section 12(3) Lending Families were introduced in two waves, First, in March 2008 the Term Securities Lending Facility (TSLF) and Primary Dealer Credit Facility (PDCF) were introduced. In the Period from September through November 2009, the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), Commercial Paper Funding Facility (CPFF), Money Market Fund Liquidity Facility (MMIFF), and Term Asset-Backed Securities Loan Facility (TALF) were introduced. See "The Federal Reserve's Section 13(3) Lending Facilities to Support Overall Market Liquidity: Function, Status, and Risk Management, Office of Inspector General (November 2010). http://www.federalreserve.gov/oig/files/FRS_Lending_Facilities_Report_final-proof_Nov16_10.pdf.

III.4 Regression variables

The dependent variable in the regressions is the change in the borrowing by the foreign affiliate of bank *i* in location *j* from the rest of the banking organization (change in "net due"). A positive value can reflect either an increase in borrowing by that affiliate or a reduction in affiliate lending to the rest of the banking organization.

The ex ante exposure to dollar funding shocks is assumed to be proportional to the bank's ratio of ABCP to ~~it's~~its equity. We alternatively refer to this as $ABCPexposure_i$ or $Exposure_i$.

As bank-country specific measures, we construct:

- $Localfinance_{ij}$. This variable is the local liability share in total local funding, and is intended to capture affiliate reliance on local deposits and other funding sources.
- $Loanshare_{ij}$. This variable captures the importance of each particular affiliate market to the total foreign lending of a parent bank. We use two alternative metrics of lending for construction: local claims only, or the sum of cross-border claims and local claims, both measured on an immediate counterparty basis.

Starting with parent bank characteristics, we expect the (altered) use of internal capital markets potentially to be strongest for banks that ex ante have weaker liquidity positions, more solvency difficulties, less focus on foreign markets in lending, and more geographically diversified foreign affiliates. All parent bank metrics are constructed using data as of 2007Q2, which we take as the end of the pre-crisis period. To capture these conjectures, we introduce:

- Size ($Totalassets_i$). Measured as total parent assets.
- Solvency ($Solv_i$). Constructed as the ratio of bank equity to total assets.
- Parent bank liquidity ($Liquidity_i$). Liquidity is measured as the sum of liquid assets relative to bank total assets.
- External diversification ($Herf_i$). This variable that reflects the parent bank's diversification of foreign affiliates around the globe. It is constructed as a Herfindahl index over total liabilities of affiliates across all countries in which such liabilities exist.

- Foreign owner ($Fowner_i$). We distinguish between immediate owners from the United States or a foreign country using a dummy variable that takes the value of 1 if foreign. It would be expected that these are subsidiaries in the United States (branches are measured through alternative reporting) that have a primary focus on U.S. operations.

Returning to our conjectures that pertain to affiliate country features, we expect that affiliates in countries that are more distant from the parent along a range of dimensions will tend to have a larger response of internal capital markets in the event of a shock to the parent organization. For this purpose, distance reduces the commitment of the parent organization to a stable net supply of funds to the affiliate and leads to larger changes in net due flows. Metrics for distance are:

- Physical distance ($Ldistnyc_j$). (Log) physical distance is the great circle distance of the affiliate country from New York City, from Rose and Spiegel (2009).[15]
- Institutional Distance ($Polity_j$). Under the assumption that institutional comparisons with the United States provide a metric of effective distance, we use a scalar variable that captures country ratings on a scale ranging from strongly democratic (+10) to strongly autocratic (-10).[16]
- Monetary policy distance ($Exrate_j$). As a measure of monetary policy distance, we consider whether the country appears to have a defacto exchange rate pegs with the U.S. dollar. We start with the coarse metrics in Ilzetski, Reinhart and Rogoff (2009), in which a country with a de facto peg or crawling peg has a rating 1 or 2, plus include whether the central currency of the peg as the U.S. dollar. For countries missing from that classification, we take observed recent exchange rate movements for comparable guidance. $Exrate_j$ =1 if a defacto dollar peg or crawl, 0 otherwise.

[15] http://faculty.haas.berkeley.edu/arose/MIMIC2.pdf

[16] Produced by the Center for Systemic Peace, Polity IV Project. The data source and related discussion of construction are available at: http://www.systemicpeace.org/inscr/inscr.htm and http://www.systemicpeace.org/inscr/p4manualv2009.pdf

- Financial frictions ($KAopen_j$). Bank internal capital market flows may be managed differently for countries with stricter capital controls in place. To capture the extent of this financial friction we use the Chinn and Ito (2008) capital control measure.[17]
- Offshore financial center status (OFC_j). We use the International Monetary Fund definition of offshore financial centers. This encompasses locations that primarily orient business toward non-residents, have favorable regulatory environments, low or zero taxation schemes, disproportion in size of financial sector and domestic financing needs, primary dealings in non-local currencies, and entrepot business (Zerome 2007, Table 1).

Other country specific characteristics certainly could play a role in shaping the importance of a particular market as a source or destination for internal capital market transfers. One theme mentioned more extensively in the aftermath of the crisis, and discussed in the context of potentially limiting the stability of local operations of foreign-owned banks, is the distinction between whether a bank can enter a market through subsidiaries or through branches. Subsidiaries are sometimes viewed as having a more stable presence as more local capital is typically required than is the case for branch operations. The regulatory reports filed by U.S. banks do not distinguish participation through branches versus subsidiaries, and the country positions could even reflect an amalgam of both. From a country perspective, The World Bank database on Bank Regulation and Supervision [18]does consider legal restrictions across countries. Subsidiaries are generally allowed. Almost all of the countries in our sample also allow entry through branches.

In all regression specifications, residuals are clustered by parent bank identity. Some regressions contain various groupings of explanatory variables or fixed effects. The relative importance of groups of variables are tested and interpreted.[19]

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[17] For some offshore financial centers with missing Chinn-Ito observations, and after discussions we Chinn and Ito, we assign high values of openness to these countries.

[18] Questions 1.12.1-1.12.4 ask: Are foreign entities prohibited from entering through acquisition, subsidiary, branch, or joint venture.
http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20345037~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

[19] Note. To be addressed and as suggested by Kristin Forbes: the magnitude of the liquidity crunch and/or economic slowdown in each counterpart country and the amount of government support provided for the banking system during the crisis. Rose and Widlesk have a new paper that argues that UK banks that got govt. support were more "protectionist" in that they were more biased against lending abroad. Are our internal capital market flows different

III.5 Estimation Results

The econometric results are provided in Tables 4 through 11. Tables 4 through 7 contain specifications associated with shock1, in which the allocation of borrowing of bank affiliates in the pre-crisis period is compared with borrowing in the second half of 2007. The first two tables (4 and 5) use a data sample that contains the full cohort of FFIEC 009 reporting banks, regardless of whether these banks are U.S. owned or foreign owned. The next two tables (6 and 7) provide the same regression specifications, but instead include only the U.S. owned reporting banks. Tables 8 through 11 have the same pattern, but instead compare the affiliate bank borrowing average quarterly patterns of the second half of 2007 with their average quarterly patterns in the first half of 2008. For each sample of banks, and each shock, there are two tables. Below, we walk the reader through the interpretation of the first set of tables and respective columns, and then summarize the findings from the remaining tables.

Table 1 column (1) provides an OLS regression specification which considers whether the change in lending of banks affiliated with a parent with some degree of ABCP exposure was proportionate to that exposure after the dollar funding shock hit markets in the second half of 2007. The constant term is negative, suggesting that, on average, affiliates reduced net borrowing from the parent organization (or raised net lending to the parent organization) but that this effect was offset to some degree for banks with higher ex ante ABCP exposure. Recognizing that the OLS results may be biased due to shocks in affiliate markets, column (2) shows the ABCP exposure coefficient under a regression specification that includes country fixed effects. While exposure is clearly statistically significant as a magnifier of affiliate internal lending changes, we next consider whether the pattern of significance is instead better explained by introducing a range of variables capturing features of each bank in their respective affiliate markets. Columns (3) and (4) introduce both the share of local liabilities in total liabilities of that affiliate bank and the importance of that affiliate market in the total foreign lending of that bank. Column (4) provides the coefficients that are unbiased by affiliate market fixed effects, which are common across the affiliates of all reporting banks that are active in any location. Note that the sample

for countries that were more engaged in "financial protectionism" ? For this analysis, may introduce data from Stolz and Michael Wedow (ECB 2010) on extraordinary support across EU countries.

size is smaller in the fixed effect regressions. This occurs because the controls require us to drop any affiliate country in which there is only one U.S. parent bank in operation.

The key results of this table, robust across specifications, is that in response to the initial funding shock: 1) on average all affiliates of U.S. banks reduced borrowing from the parent organization or increased lending to the parent organization; 2) there was differentiation across banks that was related to the size of the parent balance sheet shock, proxied by ABCP exposure; 3) there was more of a net outflow from affiliates relying more on locally raised liabilities; and 4) some of the net outflows were mitigated when the affiliate market was larger in terms of the overall foreign lending of that U.S. global bank. The next table, Table 5, explores this net borrowing activity further, now introducing an additional set of variables that interact ABCP exposure with affiliate country variables and with parent bank variables. The OLS specifications are provided in columns (1) to (3). Column (1) includes the country variables, column (2) includes the parent bank variables, and column (3) includes the full spectrum of these. Column (4) is a specification which includes country fixed effects. Specification (5) introduces all of the same country and bank variables in levels, as well as interacting with the ABCP exposure term. The coefficients of the variables in level are not shown. These full specifications are presented in Appendix Table 1.

The first observation from Table 5 is that the combination of country and bank interactions provides little overall additional explanatory power to the entire regression. The only additional and robust insight is that the net borrowing of the affiliates were more protected or declined less when the parent banking organizations were larger.

Tables 6 and 7 are specifications run dropping from the sample those U.S.-chartered banks that are in fact subsidiaries of a foreign higher holder. As such, these banks could have access to broader internal capital markets, which are obviously outside the scope of U.S. regulatory reporting requirements. All else equal, we would expect stronger results on a set of banks (the U.S.-owned reporters) for which we can observe the entire network of foreign banking affiliates. Table 6 shows a similar pattern of results to those in Table 4. As before, the average change in net borrowing by affiliates was (statistically) unchanged in the aftermath of the shock and differences across affiliates were similarly driven by the characteristics of the banks within the respective locations where they operated. The more liquid, ex ante, was the parent bank balance sheet, the more supported was the borrowing of the affiliates after the initial

dollar funding shock. Table 7 also confirms the basic patterns observed in the previous tables. A comparison of the estimated coefficients seems to indicate slightly larger internal funding movements for the restricted set of U.S.-owned reporters.

We ran more precise exercises to gauge the economic significance of the local finance and loan share variables, using as a reference the results of column 4, Table 6. Starting with the local finance coefficient, we calculated the additional change in internal borrowing/lending for a bank at the 75th percentile of the ABCP exposure distribution (a high ex-ante ABCP exposure bank), between a location at the 75th percentile of the local finance distribution (a relatively important local funding pool for the banking organization) and a location at the 25th percentile. First, as a term of reference, the average Net Due value prior to the crisis for banks of high ex-ante exposure, in relatively important local funding pool locations, was $ -1,094 million. In other words, the average high local funding pool location for such banks would carry a net claim vis-à-vis the rest of the banking organization of about one billion dollars. Now, performing the above mentioned exercise, we calculate that the location at the 75th percentile of local finance expands its claim position by an additional $ 345 million relative to the location at the 25th percentile. Given the pre-crisis average position for such locations, the regression result suggests that relatively important local funding locations expanded their support to the rest of the organization by about 30 percent, a non-negligible contribution.

Likewise, we calculated the differential change in internal position for locations at the 75th percentile of the loan share distribution (a "core" investment location) relative to locations at the 25th percentile (a "periphery" location). The average Net Due value for core locations in pre-crisis quarters was $+1,902 million, thus indicating that such locations would normally carry a net liability position vis-à-vis the rest of the organization. The computation indicates that during the first phase of the crisis, core investment locations contribute less to the internal funding reallocation by about $168 million, or about 9% of their pre-crisis position. Note that the positive sign for the loan share interaction may not imply an actual increase in internal *borrowing* for the core locations in response to the shock to the parent, but rather a contribution of lower degree by these locations to the overall support to the parent.

The remaining tables consider the second shock, which we interpret as a positive funding shock to parent banking organizations following the introduction of the Term Auction Facility.. Indeed, the response of net borrowing by affiliates was in the opposite direction, and related to

the very same bank and affiliate features, thus suggesting a reversal of patterns in response to the innovation in potential funding availability for the parent through the Fed facility (Table 8). Table 9 shows that parent bank solvency features also played a more prominent role in the second shock. The higher the solvency of the parent, the more the affiliate continued to have access to net borrowing from the rest of the organization (or did not increase net lending to the rest of the organization). Additionally, this access was more supported when parent banks had global operations that were more concentrated internationally (as indicated by the coefficients on the herfindahl index). In the U.S.-owned only sample, the results suggest, as before, slightly larger effects (Table 10), and regarding additional variables (Table 11), better parent bank liquidity as well as better parent bank solvency helped support the affiliate.

We gauged the economic magnitude of the local finance and loan share variables for the second shock as well, using as a term of reference the results in column 4, Table 10. On local finance, we calculate that in response to the positive funding shock to the parent during the first half of 2008, the location at the 75th percentile of local finance received about $ 654 million more funding than a location at the 25th percentile (or it decreased its previous claim position by that amount). Given that the average Net Due value in the second half of 2007 for banks of high ex-ante exposure, in relatively important local funding pool locations, was $-2,534 million, this differential effect amounts to about 25% of its previous position.

Similarly, in response to the second shock, core investment locations decreased their liability position by about $142 million more than periphery locations. Given the average position by such locations in the second half of 2007 was about $+4,731 million, the change corresponds to about 3% of their previous position.

Overall, given a funding shock to the parent bank, it does not appear that funds are reallocated to the same degree across all foreign affiliate markets. There appear to be core and periphery features of affiliate operations, in which features like the local funding base and the size of local markets for overall parent bank foreign markets matter significantly in determining the relative volatility of net support vis-à-vis the parent organization.

V. Concluding remarks

Issues related to global liquidity management by banking institutions are at the forefront of current policy undertakings. The need for global banks to enhance internal practices for the management of liquidity risk is one of the pillars enunciated by the Basel Committee on Banking Supervision in its renewed "Principles for Sound Liquidity Risk Management and Supervision" (BCBS, June 2008 and BCBS, December 2009). For instance:

> "Cross-entity funding channels are a mechanism through which liquidity pressures can spread through the group. An entity that provides regular funding to other entities of the group may be unable to continue providing this funding when it faces its own liquidity strain or when another entity is in need of extraordinary funding. For example, to mitigate the risk of contagion, a bank may establish internal limits on intragroup liquidity risk. A bank may also have limits at the subsidiary and branch level to restrict the reliance of related entities on funding from elsewhere in the bank. Internal limits also may be set for each currency used by a bank. The limits should be stricter where ready conversion between currencies is uncertain, particularly in stress situations." (BCBS, December 2009, p. 23).

Increased emphasis on macro-prudential supervision and regulation can have direct repercussions on liquidity management practices by global banks and may lead to the introduction of possible guidelines and constraints to such practices. Changes in such practices may have the effect of altering the transmission of liquidity shocks across markets in ways that are not well-understood. Our analysis points to key bank and country features that have influenced transmission to date, with those features including the extent of local funding of affiliates and the importance of that affiliate market to the business of the banking organization. The results thus point at a significant management of liquidity on a global scale by banks with global operations, and at important idiosyncrasies, based on individual banks' choices in their global business model. These results have immediate normative implications, suggesting, for instance, that the patterns of international shock transmissions (through a global bank lending channel) would seem more the result of specific banks' operations and less due to common country factors. Of course, all of our results are drawn from a sample of banks that already have chosen to operate globally, and already have made decisions about the foreign markets in which they will operate. It is at that first stage of entry that the common country factors could be even more of a consideration. While our analysis does not speak to whether this global liquidity management potential that is being invoked has influenced the entry decision, presumably it has

played some role. If global regulation changes, an open question is how the location and scope of internationalization of global banks likewise would adjust.

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Table 1 Counts of U.S. banks that have foreign affiliates

	2006q1	2007q1	2008q1	2009q1	2010q1
ALL banks					
Total	42	41	39	43	44
US-owned	27	26	26	25	25
foreign-owned	15	15	13	18	19

Source: Authors' computations based on FFIEC 009 reporting by quarter.

Table 3 Summary of Explanatory Variables

	By Banking Organization	By Affiliate Location	By Bank-Affiliate Country	Initial shock scaling
Regression Sample	$\overline{X}_i$	$\overline{X}_j$	$\overline{X}_{ij}$	
	$Solv_i$	$Distance_j$	$LLshare_{ij}$	$ABCP_i$
	$Liquid_i$	$Polity_j$	$ImmUltdiff_{ij}$	
	$FMshare_i$	$Dollarpeg_j$		
	$Herf_i$	$ChinnKC_j$		
	$Fowner_i$	OFC_j		

Table 2: Basic Balance Sheet Information of U.S. Banks with Foreign Affiliates, 2007Q2 unless otherwise indicated

Statistics on U.S. Banking Organization		**All Banks**	**Lower LL**	**Higher LL**	**Lower IC**	**Higher IC**
Number of parent banks (2006Q1-2010Q4 average quarterly)		42	23	25	32	33
Bank asset size (billions USD)	median	552.6	552.56	1395.62	552.56	539.87
	mean	862.5	835.75	1218.49	993.32	732.06
Total Net Due From / assets (%)	median	0.74	0.88	1.77	0.74	0.74
	mean	-0.01	0.87	-0.78	-0.005	-0.02
Foreign loans / assets (%)	median	4.11	4.11	4.11	4.11	4.30
	mean	5.06	4.66	4.78	4.34	5.55
Bank liquid assets / total assets (%)	median	7.75	7.75	24.24	7.75	7.45
	mean	11.02	11.59	15.29	11.52	10.51
Bank solvency ratio (%)	median	7.61	7.61	6.07	6.95	7.91
	mean	7.79	8.22	7.10	7.70	7.89
Statistics by Affiliated Banking Organizations						
Number of bank-affiliate observations (2006Q1-2010Q4 average quarterly)		550	180	180	264	264
Local liabilities/ total affiliate liabilities [LL] (%)	median	77.63	20.45	100.00	79.86	60.56
	mean	62.21	29.09	95.33	64.76	75.38
Local and cross broder claims / total affiliate local and cross border claims (immediate counterpary basis) [IC] (%)						
	median	0.50	1.04	0.85	0.05	2.19
	mean	3.82	4.64	5.72	0.11	7.51

Source: quarterly Call Report forms and FFIEC 009, 2006Q1 to 2010Q4. Note: Solvency is the ratio of equity to total assets. Liquid assets are the sum of total held-to maturity securities, total trading asset, and federal funds sold and securities purchased under agreements to resell in domestic offices of the bank and of its edge and agreement subsidiaries and in IBFs. Total affiliate liabilities is the sum of local liability and net due borrowing of affiliates (if positive).

Table 4
Net Internal Borrowing Dynamics During the Crisis - Shock1
All U.S. Reporting Banks

	(1) OLS	(2) Country FEs	(3) OLS	(4) Country FEs
ABCP exposure$_i$	**168.2*** **	**193.5*** **	-8.134	-23.52
	(27.10)	(49.40)	(65.48)	(56.92)
*Exp$_i$*Local finance$_{ij}$*			**-400.6*** **	**-465.1*** **
			(82.09)	(68.71)
*Exp$_i$*Loan share$_{ij}$*			**8,955*** **	**9,405*** **
			(1,282)	(1,308)
Constant	**-68.15***		-7.915	
	(34.34)		(45.16)	
Observations	546	512	546	512
R-squared	0.014	0.159	0.174	0.298

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2007q3-q4 and 2006q1-2007q2. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 2 and 4 report fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. In this table all U.S. reporting banks are included. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 5 Net Internal Borrowing Dynamics During the Crisis - Shock1
All U.S. Reporting Banks, Country and Bank Controls

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls included
ABCP exposure$_i$	-535.0	-406.2	-1,615	-1,392	**-4,223***
	(796.2)	(466.3)	(1,488)	(1,485)	(2,219)
*Exp$_i$*Local finance$_{ij}$*	**-313.6****	**-849.2*****	**-890.3*****	**-811.6*****	**-908.4*****
	(132.4)	(270.7)	(305.3)	(263.2)	(322.0)
*Exp$_i$*Loan share$_{ij}$*	**8,865*****	**10,603*****	**10,863*****	**10,483*****	**10,866*****
	(1,458)	(1,167)	(1,317)	(1,276)	(1,328)
Country variables					
*Exp$_i$*OFC$_j$*	-92.80		20.27	59.38	**88.08****
	(115.4)		(66.98)	(55.32)	(42.75)
*Exp$_i$*kaopen$_j$*	-6.343		-0.0642	20.51	5.486
	(33.51)		(38.80)	(42.17)	(20.21)
*Exp$_i$*ldistnyc$_j$*	62.21		158.2	100.7	108.6
	(90.07)		(127.7)	(115.3)	(94.25)
*Exp$_i$*exrate$_j$*	**80.73***		-80.40	34.24	-39.86
	(42.31)		(131.1)	(157.8)	(134.4)
Bank variables					
*Exp$_i$*Total asset$_i$*		**0.304****	**0.457*****	**0.376***	0.0791
		(0.128)	(0.160)	(0.203)	(0.296)
*Exp$_i$*Liquidity$_i$*		1,171	762.5	1,114	13,844
		(1,379)	(1,576)	(2,464)	(8,342)
*Exp$_i$*Solvency$_i$*		5,344	3,567	5,476	**32,642***
		(4,287)	(4,592)	(7,503)	(17,610)
*Exp$_i$*Loan Herfindhal$_i$*		-709.4	-680.4	-185.5	-391.7
		(627.4)	(822.8)	(1,274)	(1,393)
Constant	-6.103	**-89.85***	-90.88		-381.6
	(44.65)	(53.33)	(54.79)		(829.0)
Observations	500	546	500	475	500
R-squared	0.193	0.202	0.234	0.332	0.244

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2007q3-q4 and 2006q1-2007q2. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 4 reports fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. Column 5 reports results of a specification where all country and bank variables were included in levels (non interacted) as well, but the coefficients are not reported. Full set of results from such specifications are reported in Appendix Table 1. In this table all U.S. reporting banks are included. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 6 Net Internal Borrowing Dynamics During the Crisis - Shock1
Only U.S. Owned Banks

	(1) OLS	(2) Country FEs	(3) OLS	(4) Country FEs
ABCP exposure$_i$	**184.8***** (18.98)	**209.7***** (34.25)	-18.90 (64.97)	-35.91 (55.34)
Exp$_i$**Local finance*$_{ij}$			**-425.4***** (90.09)	**-520.3***** (85.45)
Exp$_i$**Loan share*$_{ij}$			**9,918***** (578.6)	**10,279***** (515.2)
Constant	**-77.64***** (39.31)		5.187 (52.64)	
Observations	464	430	464	430
R-squared	0.017	0.252	0.192	0.400

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2007q3-q4 and 2006q1-2007q2. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 2 and 4 report fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. In this table regressions were run on the subset of U.S.-owned banks. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 7 Net Internal Borrowing Dynamics During the Crisis - Shock1
Only U.S. Owned Banks, Country and Bank Controls

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls included
ABCP exposure$_i$	-599.8	-3,660	-5,603	-2,562	**-7,307****
	(1,037)	(3,807)	(4,445)	(2,902)	(3,291)
*Exp$_i$*Local finance$_{ij}$*	**-337.5****	**-1,014*****	**-1,128****	**-1,062****	**-1,100****
	(144.1)	(357.1)	(433.6)	(385.5)	(422.1)
*Exp$_i$*Loan share$_{ij}$*	**9,857*****	**12,032*****	**12,540*****	**11,993*****	**12,454*****
	(785.9)	(1,223)	(1,351)	(1,067)	(1,315)
Country variables					
*Exp$_i$*OFC$_j$*	-100.5		6.630	**91.49****	**92.43****
	(133.6)		(70.64)	(41.77)	(42.52)
*Exp$_i$*kaopen$_j$*	-6.983		14.86	21.90	4.144
	(39.07)		(40.24)	(36.59)	(22.17)
*Exp$_i$*ldistnyc$_j$*	68.26		**255.8***	**118.9****	**139.0***
	(117.6)		(147.5)	(44.20)	(76.66)
*Exp$_i$*exrate$_j$*	**95.47****		-112.6	39.43	-13.79
	(37.09)		(159.9)	(188.8)	(132.4)
Bank variables					
*Exp$_i$*Total asset$_i$*		1.563	1.772	1.126	-0.0172
		(1.289)	(1.308)	(1.031)	(1.394)
*Exp$_i$*Liquidity$_i$*		**3,477***	**2,942***	1,283	**25,215***
		(1,723)	(1,712)	(1,101)	(14,491)
*Exp$_i$*Solvency$_i$*		-6,564	**-10,061***	-6,972	37,974
		(5,674)	(5,782)	(5,633)	(35,644)
*Exp$_i$*Loan Herfindhal$_i$*		24,071	24,135	11,467	10,227
		(25,006)	(24,804)	(19,510)	(22,422)
Constant	7.221	-81.06	-78.43		-891.3
	(51.30)	(52.19)	(52.01)		(1,199)
Observations	423	464	423	398	423
R-squared	0.215	0.234	0.277	0.451	0.291

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2007q3-q4 and 2006q1-2007q2. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 4 reports fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. Column 5 reports results of a specification where all country and bank variables were included in levels (non interacted) as well, but the coefficients are not reported. Full set of results from such specifications are reported in Appendix Table 1. In this table regressions were run on the subset of U.S.-owned banks. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 8 Net Internal Borrowing Dynamics During the Crisis – Shock 2
All U.S. Reporting Banks

	(1) OLS	(2) Country FEs	(3) OLS	(4) Country FEs
ABCP exposure$_i$	-14.09	8.306	-13.74	59.21
	(26.66)	(40.63)	(46.77)	(40.44)
*Exp$_i$*Local finance$_{ij}$*			**780.0****	**872.4*****
			(289.5)	(247.3)
*Exp$_i$*Loan share$_{ij}$*			**-6,333*****	**-7,912*****
			(1,574)	(1,252)
Constant	**92.73****		14.07	
	(37.21)		(55.03)	
Observations	559	525	559	525
R-squared	0.000	0.075	0.118	0.218

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2008q1-q2 and 2007q3-q4. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 2 and 4 report fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. In this table all U.S. reporting banks are included. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 9 Net Internal Borrowing Dynamics During the Crisis – Shock 2
All U.S. Reporting Bank, Country and Bank Controls

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls
ABCP exposure$_i$	**3,757*** **	**-1,384*** **	**2,895***	**3,269***	**4,827*** **
	(1,349)	(427.2)	(1,527)	(1,798)	(1,544)
Exp$_i$**Local finance*$_{ij}$	**646.4***	**1,122*** **	**1,104*** **	**1,072*** **	**1,123*** **
	(356.0)	(194.3)	(278.4)	(273.0)	(275.2)
Exp$_i$**Loan share*$_{ij}$	**-6,275*** **	**-7,096*** **	**-7,279*** **	**-8,283*** **	**-7,310*** **
	(1,717)	(1,550)	(1,751)	(1,450)	(1,734)
Country variables					
Exp$_i$**OFC*$_j$	337.2		187.0	157.5	164.1
	(291.8)		(231.7)	(249.7)	(208.8)
Exp$_i$**kaopen*$_j$	-71.98		-85.16	-117.3	-94.13
	(75.32)		(71.64)	(90.87)	(65.33)
Exp$_i$**ldistnyc*$_j$	**-432.9*** **		**-502.4*** **	**-553.8*** **	**-472.7*** **
	(146.4)		(168.6)	(174.3)	(143.7)
Exp$_i$**exrate*$_j$	-9.296		79.07	181.3	144.3
	(232.6)		(171.3)	(213.9)	(144.1)
Bank variables					
Exp$_i$**Total asset*$_i$		**-0.229** **	**-0.287** **	**-0.242** **	**-0.693*** **
		(0.103)	(0.109)	(0.118)	(0.110)
Exp$_i$**Liquidity*$_i$		**2,545***	2,483	2,945	-3,194
		(1,397)	(1,546)	(2,128)	(3,054)
Exp$_i$**Solvency*$_i$		**9,922*** **	**11,540*** **	**14,074** **	-3,435
		(3,048)	(3,639)	(5,331)	(5,532)
Exp$_i$**Loan Herfindhal*$_i$		**1,677*** **	**1,642*** **	1,003	-30.68
		(577.0)	(598.7)	(778.7)	(929.2)
Constant	0.456	**73.33***	**68.03***		120.9
	(65.18)	(38.83)	(37.43)		(376.5)
Observations	513	559	513	488	513
R-squared	0.154	0.140	0.186	0.267	0.195

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2008q1-q2 and 2007q3-q4. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 4 reports fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. Column 5 reports results of a specification where all country and bank variables were included in levels (non interacted) as well, but the coefficients are not reported. Full set of results from such specifications are reported in Appendix Table 1. In this table all U.S. reporting banks are included. Standard errors are clustered by banks. *** indicate significance at the 1% level.

Table 10 Net Internal Borrowing Dynamics During the Crisis – Shock 2
Only U.S. Owned Banks

	(1) OLS	(2) Country FEs	(3) OLS	(4) Country FEs
ABCP exposure$_i$	-19.12	0.0694	0.826	**76.33****
	(27.65)	(38.57)	(42.27)	(35.98)
Exp$_i$**Local finance*$_{ij}$			**832.0****	**923.6*****
			(311.3)	(284.5)
Exp$_i$**Loan share*$_{ij}$			**-7,188*****	**-8,681*****
			(947.8)	(662.8)
Constant	**103.6****		1.379	
	(43.13)		(65.64)	
Observations	479	445	479	445
R-squared	0.000	0.134	0.133	0.286

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2008q1-q2 and 2007q3-q4. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 2 and 4 report fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. In this table regressions were run on the subset of U.S.-owned banks. *** indicate significance at the 1% level.

Table 11 Net Internal Borrowing Dynamics During the Crisis – Shock 2
Only U.S. Owned Banks,Country and Bank Controls

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls
ABCP exposure$_i$	**4,706*** **	**-2,565***	1,508	-1,643	2,273
	(1,132)	(1,486)	(1,850)	(2,104)	(1,572)
Exp$_i$**Local finance*$_{ii}$	**713.9***	**1,261*** **	**1,307*** **	**1,282*** **	**1,310*** **
	(381.2)	(116.9)	(144.1)	(131.1)	(148.3)
Exp$_i$**Loan share*$_{ij}$	**-7,170*** **	**-8,151*** **	**-8,479*** **	**-9,490*** **	**-8,471*** **
	(1,077)	(816.1)	(863.5)	(520.4)	(884.1)
Country variables					
Exp$_i$**OFC*$_i$	406.2		225.1	72.19	135.9
	(332.5)		(260.1)	(199.1)	(224.0)
Exp$_i$**kaopen*$_i$	-96.68		-118.3	**-120.5***	-108.1
	(74.62)		(71.16)	(59.33)	(66.26)
Exp$_i$**ldistnyc*$_i$	**-538.0*** **		**-629.2*** **	**-597.1*** **	**-591.7*** **
	(122.4)		(164.8)	(101.7)	(149.1)
Exp$_i$**exrate*$_i$	-36.68		74.83	200.0	176.8
	(246.4)		(161.9)	(225.4)	(125.4)
Bank variables					
Exp$_i$**Total asset*$_i$		-0.0193	0.138	0.661	-0.272
		(0.305)	(0.250)	(0.494)	(0.308)
Exp$_i$**Liquidity*$_i$		1,489	**2,601** **	**6,030*** **	3,229
		(1,197)	(961.9)	(1,850)	(2,983)
Exp$_i$**Solvency*$_i$		**28,687*** **	**33,900*** **	**43,845*** **	**32,702*** **
		(4,602)	(3,642)	(6,080)	(7,465)
Exp$_i$**Loan Herfindhal*$_i$		-405.0	4,061	12,629	-791.4
		(4,939)	(3,917)	(8,607)	(4,879)
Constant	-13.41	20.89	33.48		310.8
	(74.54)	(32.12)	(30.10)		(578.5)
Observations	438	479	438	413	438
R-squared	0.180	0.169	0.230	0.353	0.233

The dependent variable is the change in internal borrowing of foreign affiliates of bank i in country j between 2008q1-q2 and 2007q3-q4. ABCP exposure is the ratio of total ABCP outstanding of conduits sponsored by each bank i divided by total equity. Local finance is the ratio of locally raised funds to total liabilities of affiliates of bank i in country j. Loan share is the ratio of total claims of bank i in country j divided by total claims of bank i aggregated over all countries. Column 4 reports fixed effect specifications. Country indicator variables are included but the coefficients are not reported. In the FE specifications we drop country records if there is only one bank in that country. Colun 5 reports results of a specification where all country and bank variables were included in levels (non interacted) as well, but the coefficients are not reported. Full set of results from such specifications are reported in Appendix Table 1. In this table regressions were run on the subset of U.S.-owned banks. *** indicate significance at the 1% level.

Figure 1: Number of U.S. Banks with Affiliates in Countries

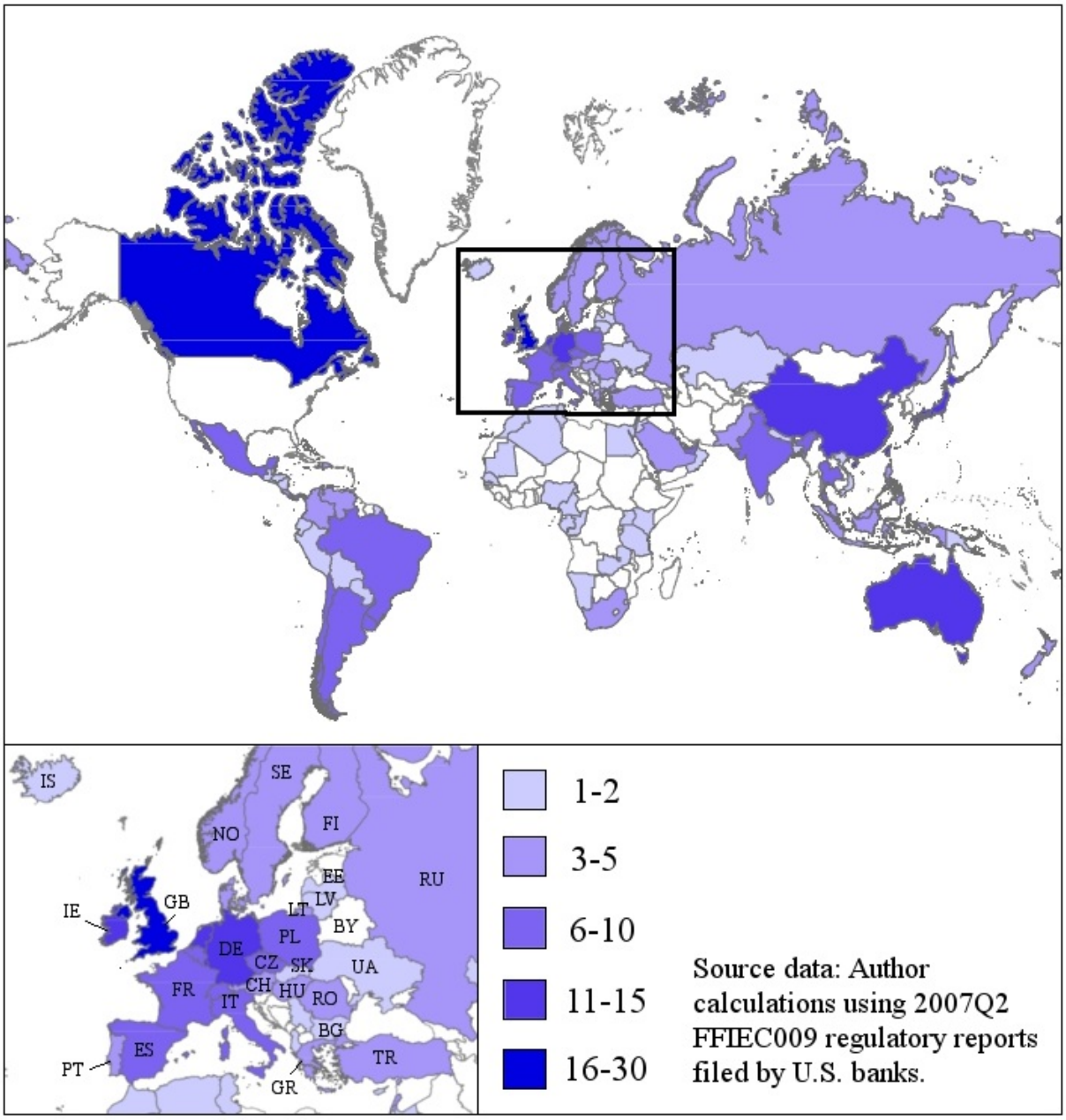


Figure 2: Value of U.S. Bank Affiliate Liabilities in Countries Worldwide (Million US $)

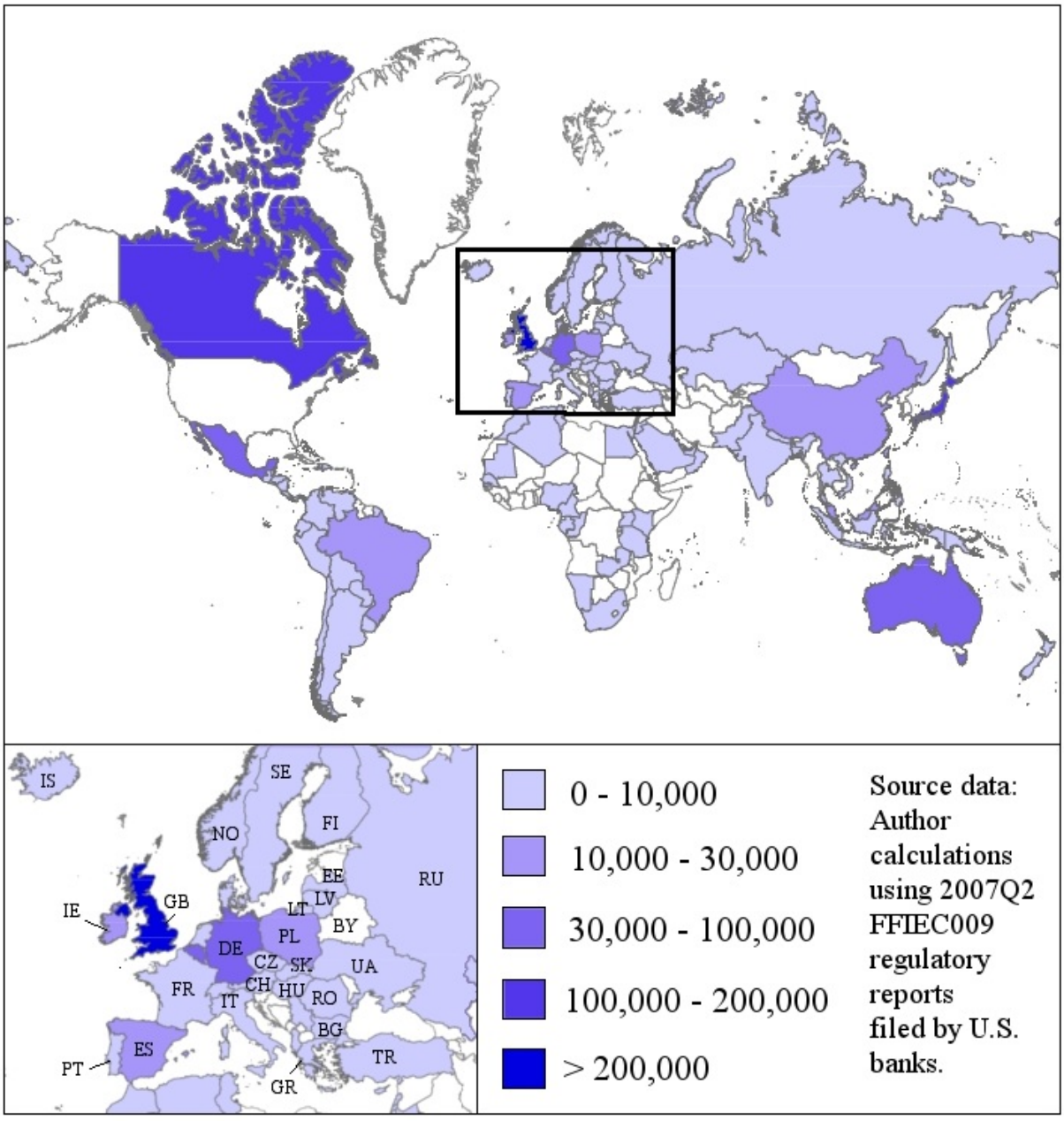
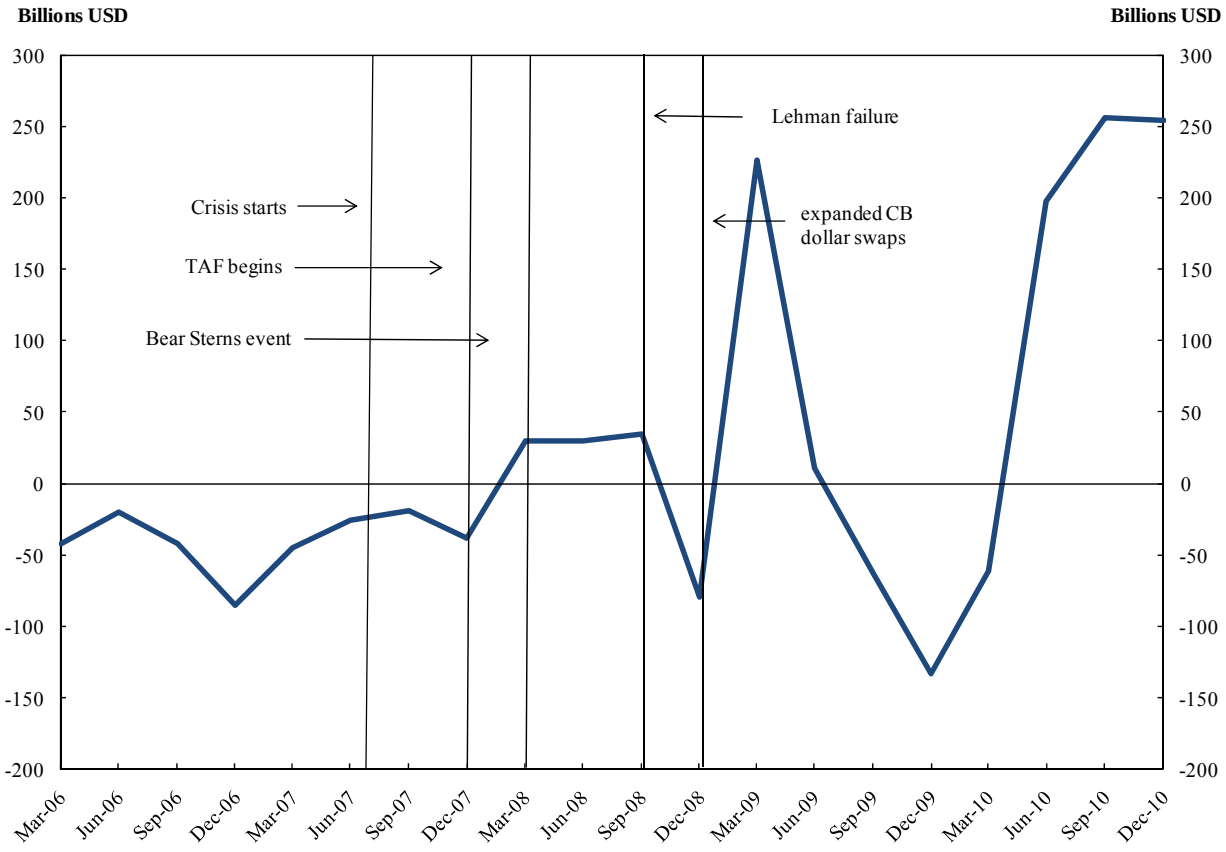


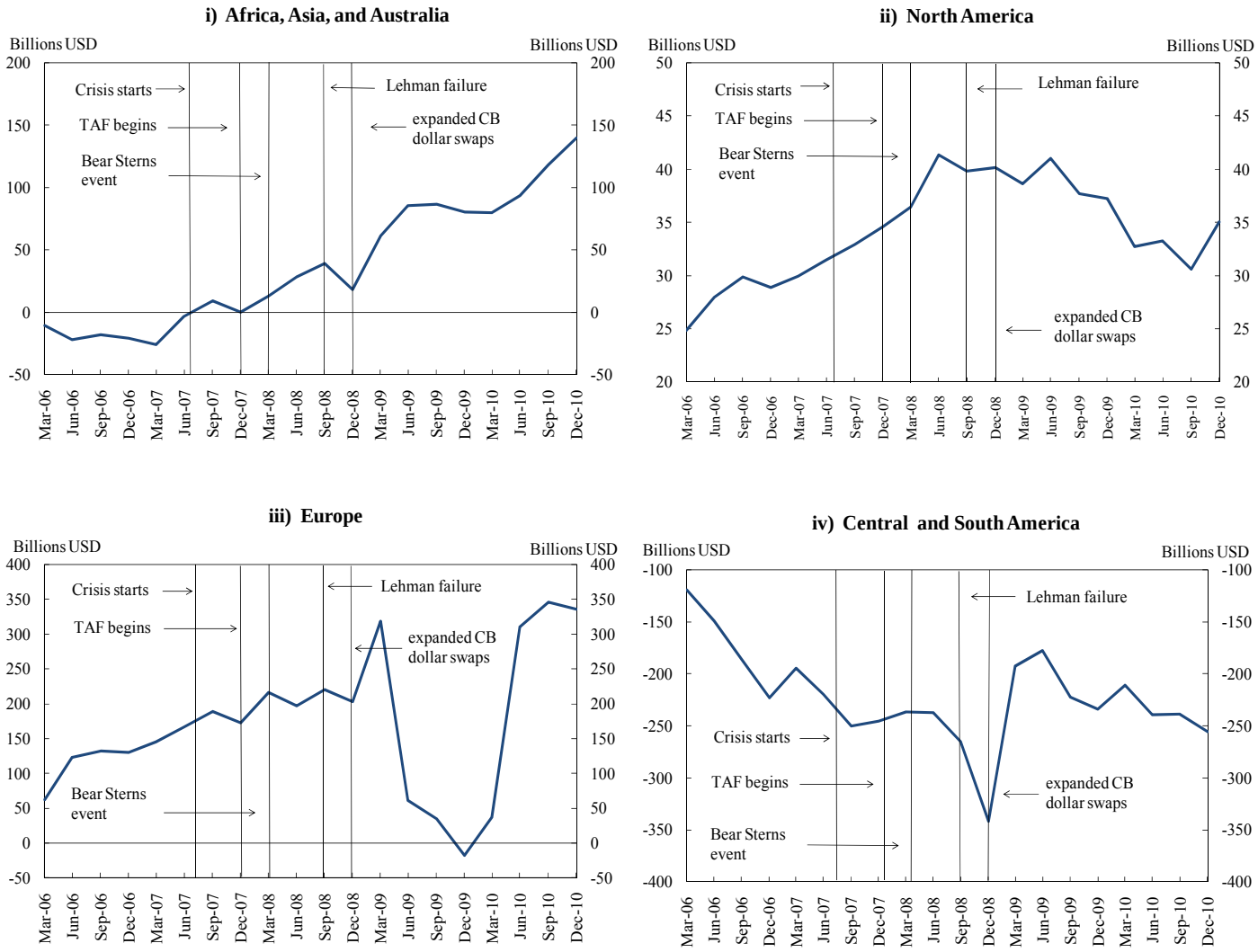
Figure 3 Net Related Borrowing by Overseas Affiliates of U.S. Banks



Source: Authors' construction using FFIEC 009 data across U.S. reporting banks.
Sample of banks excludes new reporters as of 2008Q1 and 2009Q1 and banks that entered the sample only for a single period.

[Figure 4 on Benchmark dollar funding rates to be inserted]

Appendix Figure 1 Net Related Borrowing by Overseas Affiliates of U.S. Banks, by Affiliate Location



Source: Authors' construction using FFIEC 009 data across U.S. reporting banks.
Affiliate countries for region i) *Africa, Australia, and Asia* include Algeria, Australia, Bahrain, Bangladesh, Brunei, Cameroon, China (including Hong Kong and Macau), Congo (Democratic Republic of the), Egypt, Gabon, India, Indonesia, Ivory Coast, Israel, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Malaysia, Mauritania, Mauritius, Morocco, Namibia, Nepal, New Zealand, Nigeria, Oman, Pakistan, Palau, Papua New Guinea, Philippines, Qatar, Saudi Arabia, Senegal, Seychelles, Singapore, South Africa, South Korea, Sri Lanka, Taiwan, Tanzania, Thailand, Tunisia, Uganda, United Arab Emirates, Vietnam, and Zambia; ii) *North America* include Canada and Mexico; iii) *Europe* include Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Channel Islands and Isle of Man, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, and United Kingdom; iv) *Central and South America* include Argentina, British West Indies, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, French Guiana, French West Indies, Grenada, Guatemala, Honduras, Jamaica, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Trinidad, Trinidad and Tobago, Uruguay, and Venezuela.
Sample of banks excludes new reporters as of 2008Q4 and 2009Q1.

Appendix Table 1 Countries (of 121) and Affiliates of U.S. Banks in Sample, By Country

Affiliate country	Counts (avg)	Affiliate country	Counts (avg)	Affiliate country	Counts (avg)
Albania	1	Grenada	1	Palau	1
Algeria	1	Guatemala	2	Panama	8
Argentina	9	Haiti	1	Papua New Guinea	1
Australia	11	Honduras	2	Paraguay	2
Austria	4	Hong Kong	14	Peru	2
British West Indies	8	Hungary	4	Philippines	5
Bahamas	11	Iceland	1	Poland	6
Bahrain	4	India	8	Portugal	4
Bangladesh	2	Indonesia	4	Qatar	2
Barbados	5	Ireland	12	Romania	3
Belgium	8	Israel	4	Russia	4
Belize	1	Italy	9	Saudi Arabia	4
Bermuda	9	Ivory Coast	1	Senegal	1
Bolivia	1	Jamaica	2	Serbia And Montenegro	1
Bosnia And Herzegovina	1	Japan	11	Seychelles	1
Brazil	8	Jordan	2	Singapore	12
Brunei	1	Kazakhstan	2	Slovakia	2
Bulgaria	2	Kenya	1	South Africa	4
Cameroon	1	Korea	10	Spain	10
Canada	21	Kuwait	3	Sri Lanka	1
Cayman Islands	30	Latvia	1	Sweden	5
Channel Islands & Isle Of Man	8	Lebanon	3	Switzerland	7
Chile	7	Lithuania	1	Taiwan	10
China	11	Luxembourg	12	Tanzania	1
Colombia	5	Macau	2	Thailand	6
Congo, Democratic Rep.	1	Malaysia	5	Trinidad	2
Costa Rica	3	Malta	1	Trinidad And Tobago	3
Cyprus	2	Mauritania	1	Tunisia	1
Czech Republic	6	Mauritius	5	Turkey	5
Denmark	4	Mexico	10	Uganda	1
Dominican Republic	4	Monaco	2	Ukraine	2
Ecuador	2	Morocco	1	United Arab Emirates	6
Egypt	2	Namibia	1	United Kingdom	18
El Salvador	2	Nepal	1	Uruguay	8
Finland	4	Netherlands	11	Venezuela	4
France	1	Netherlands Antilles	5	Vietnam	2
French Guiana	8	New Zealand	5	Zambia	1
French West Indies	1	Nicaragua	2		
Gabon	1	Nigeria	1		
Germany	12	Norway	5		
Gibraltar	2	Oman	1		
Greece	4	Pakistan	3		

Appendix Table 2 Country Features of Top 20 Countries By Total Claims Size in 2007Q2

Affiliate country	Total Claims[1] (Billions USD)	Log Physical distance from NYC[2]	Capital Account Openness[3]	Polity Index[4]	OFC[5]	$Peg[6]
United Kingdom	396.2	8.1	2.5	10	0	0
Japan	141.5	8.8	2.5	10	0	0
Canada	136.2	7.4	2.5	10	0	0
Germany	104.6	8.3	2.5	10	0	0
Mexico	89.8	7.6	1.1	8	0	0
Cayman Islands	83.5	7.8	2.5		1	1
Korea	78.9	8.8	-0.1	1	0	0
Netherlands	70.9	8.2	2.5	10	0	0
Australia	64.7	9.3	1.1	10	0	0
France	60.5	8.2	2.5	9	0	0
India	44.6	9.0	-1.1	9	0	1
Spain	39.8	8.2	2.5	10	0	0
Brazil	36.6	8.2	0.4	8	0	0
Italy	35.8	8.4	2.5	10	0	0
Singapore	35.4	9.2	2.5	-2	1	0
Ireland	34.1	8.0	2.5	10	1	0
Luxembourg	32.0	8.2	2.5		1	0
China	29.6	8.9	-1.1	-7	0	0
Hong Kong	25.6	9.0	2.5		1	1
Switzerland	23.8	8.3	2.5	10	0	0

[1] Total claims is the sum local claims and cross border claims, from authors' computations based on FFIEC 009 reporting by quarter.
[2] Log physical distance is the great circle distance of the affiliate country from New York City, from Rose and Spiegel (2009).
[3] Index ranges in value from −1.8 in the case of full control to 2.5 in the case of complete liberalization, from Chinn and Ito (2008).
[4] Country ratings on a scale ranging from strongly democratic (+10) to strongly autocratic (-10), from Center for Systemic Peace, Polity IV Project.
[5] Variable takes the value 1 if affiliate country is an offshore financial center, 0 otherwise, from International Monetary Fund.
[6] Variable takes the value 1 if currency of affiliate country is de facto dollar peg or crawl, 0 otherwise, from Ilzetski, Reinhart and Rogoff (2009).

Appendix Table 3 Net Internal Borrowing Dynamics During the Crisis
Full specifications with level and interaction controls

	All reporter Shock 1	U.S.-owned only Shock 1	All reporter Shock 2	U.S.-owned only Shock 2
ABCP exposure$_i$	**-4,357***	**-8,208****	**5,370*****	**4,505****
	(2,319)	(3,413)	(1,573)	(1,987)
Exp$_i$**Local finance*$_{ij}$	**-690.8*****	**-790.2****	**1,100*****	**1,264*****
	(253.2)	(313.6)	(307.0)	(157.5)
Exp$_i$**Loan share*$_{ii}$	**10,744*****	**11,944*****	**-8,258*****	**-9,264*****
	(1,154)	(992.7)	(1,429)	(720.5)
Exposure$_i$**OFC*$_j$	**80.02****	**66.25****	122.5	132.5
	(35.54)	(26.52)	(200.9)	(226.6)
Exposure$_i$**kaopen*$_j$	-2.408	-9.258	-83.82	-103.6
	(23.10)	(27.77)	(62.43)	(64.73)
Exposure$_i$**ldistnyc*$_j$	102.2	112.5	**-507.0*****	**-616.0*****
	(95.41)	(71.38)	(145.9)	(157.9)
Exposure$_i$**exrate*$_i$	-36.30	-2.147	126.2	129.2
	(138.1)	(133.0)	(147.6)	(145.1)
Exposure$_i$**Total asset*$_i$	0.105	-0.390	**-0.744*****	**-0.745***
	(0.307)	(1.392)	(0.133)	(0.431)
Exposure$_i$**Liquidity*$_i$	14,658	**31,183****	-4,029	1,707
	(8,767)	(14,654)	(3,082)	(2,631)
Exposure$_i$**Solvency*$_i$	**33,771***	56,784	-6,125	13,568
	(18,940)	(34,738)	(5,589)	(12,884)
Exposure$_i$**Loan Herfindhal*$_i$	-292.2	6,192	514.2	-1,250
	(1,448)	(22,618)	(1,100)	(5,312)
OFC$_j$	-84.68	-79.24	82.34	147.6
	(101.6)	(114.6)	(94.66)	(113.8)
kaopen$_i$	-1.953	19.91	-2.348	-17.57
	(50.63)	(71.14)	(30.68)	(42.22)
ldistnyc$_j$	52.47	127.2	11.16	-8.939
	(83.04)	(117.2)	(54.73)	(80.67)
exrate$_i$	-51.85	**-127.5***	-56.30	-66.27
	(65.32)	(68.49)	(95.51)	(118.1)
Total asset$_i$	-0.104	0.117	**0.440*****	**0.335***
	(0.169)	(0.234)	(0.0885)	(0.171)
Liquidity$_i$	-3,522	**-7,395***	713.1	-532.6
	(2,162)	(3,593)	(640.1)	(736.4)
Solvency$_i$	-218.7	-2,098	982.0	1,581
	(2,061)	(2,579)	(912.9)	(1,943)
Loan Herfindhal$_i$	337.4	275.2	-83.05	-56.02
	(295.6)	(212.6)	(235.4)	(348.4)
Local finance$_{ij}$	**-286.4***	**-419.0***	43.76	64.84
	(154.8)	(208.2)	(161.2)	(166.7)
Loan share$_{ii}$	-142.7	273.2	**1,647****	1,929
	(427.7)	(571.2)	(812.1)	(1,232)
Constant	-324.1	-805.7	-387.9	-237.5
	(822.2)	(1,144)	(496.1)	(755.8)
Observations	500	423	513	438
R-squared	0.253	0.305	0.213	0.250