Running for the Exit? International Bank Lending During a Financial Crisis

Ralph De Haas
European Bank for Reconstruction and Development

Neeltje Van Horen
De Nederlandsche Bank

We use loan-level data to examine how large international banks reduced their cross-border lending after the collapse of Lehman Brothers. Country, firm, and bank fixed effects allow us to disentangle credit supply and demand and to simultaneously control for the unobserved traits of banks and the countries and firms they lend to. We document substantial heterogeneity in the extent to which different banks retrenched from the same country. Banks reduced credit less to markets that were geographically close; where they were more experienced; where they operated a subsidiary; and where they were integrated into a network of domestic co-lenders. (*JEL* F36, F42, F52, G15, G28)

Cross-border lending dwindled rapidly during the 2008–09 financial crisis as funding constraints forced banks to reduce foreign exposures (Cetorelli and Goldberg 2011; De Haas and Van Horen 2012; Giannetti and Laeven 2012a). For example, according to data from Dealogic Loan Analytics syndicated cross-border lending shrank by 58% in the year following the Lehman Brothers collapse in September 2008. While internationally active banks sharply reduced their lending abroad, they increased the *proportion* of new credit to borrowers

The authors thank Jeromin Zettelmeyer for insightful discussions; Stephan Knobloch, Deimante Morkunaite, and Carly Petracco for excellent research assistance; and three anonymous referees, the Editor, Itai Agur, Erik Berglöf, Frédéric Boissay, Martin Brown, Giacinta Cestone, Stijn Claessens, Stefan Gerlach, Martin Goetz, Linda Goldberg, Charles Goodhart, Graciela Kaminsky, Ayhan Kose, Luc Laeven, Eduardo Levy Yeyati, Steven Ongena, Sergio Schmukler, and participants at the Bank of Finland/CEPR conference on Banking in Emerging Economies, the 13th DNB Annual Research Conference, the Basel Committee Research Task Force Transmission Channels Workshop, the 10th Annual Darden International Finance Conference, the 4th Swiss Winter Conference on Financial Intermediation, the 8th Workshop in International Economics and Finance (Lima), the 17th Dubrovnik Economic Conference, the 2011 ESCB Day-Ahead Conference on Financial Markets Research, the 26th Congress of the European Economic Association, and seminars at the Bank of Finland, Bank for International Settlements, Brunel University, Cass Business School, DNB, EBRD, ECB, George Washington University, Higher School of Economics (Moscow), IMF, Magyar Nemzeti Bank, New Economic School (Moscow), Oesterreichische Nationalbank, Tilburg University, Osnabrück University, and the Federal Reserve Banks of Boston, Chicago, and New York for useful comments. An earlier version of this paper was circulated under the title "Running for the Exit: International Banks and Crisis Transmission." The views expressed in this paper are those of the authors and not necessarily of the institutions they are affiliated with. Send correspondence to Ralph De Haas, European Bank for Reconstruction and Development, Office of the Chief Economist, One Exchange Square, London EC2A 2JN, United Kingdom; telephone: 0044-207338-7213, fax: 0044-207338-6110. E-mail: dehaasr@ebrd.com.

doi:10.1093/rfs/hhs113 Advance Access publication November 3, 2012

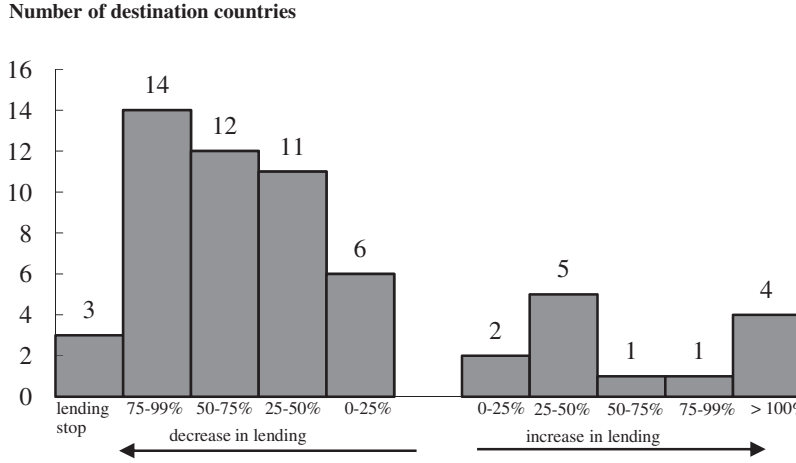

Figure 1
Change in cross-border lending after the Lehman Brothers collapse
This figure shows the distribution across destination countries of the change in cross-border syndicated lending inflows after the collapse of Lehman Brothers compared to the pre-crisis period. The pre-crisis period is July 2006–June 2007, and the post-Lehman Brothers period is October 2008–September 2009. Each bar indicates the number of destination countries that experienced a change in bank lending within the percentage bracket on the horizontal axis. For instance, there were 11 countries to which cross-border syndicated bank lending *declined* by between 25% and 50% while there were only five countries that experienced an *increase* in cross-border syndicated lending by between 25%−50%.

at home (Giannetti and Laeven 2012b) and hence somewhat insulated domestic borrowers from the crisis.[1]

A pertinent question is *how* crisis-hit banks reduce cross-border credit when they focus more on domestic borrowers. The recent crisis, which originated in the United States but spilled over to much of the developed and developing world, provides an ideal testing ground to answer this question. Figure 1 depicts the substantial cross-country heterogeneity in the lending decline after the collapse of Lehman Brothers. While this partly reflects differences in the adjustment of credit demand, we will show that banks also systematically varied their credit-supply response across countries. A better understanding of such patterns is important as sudden declines in the supply of cross-border credit can harm local industries that depend on external finance (Cowan and Raddatz 2011).

To structure our discussion, we start by outlining two retrenchment scenarios. In the first scenario, crisis-hit banks follow very similar patterns when deleveraging abroad. Any given destination country will therefore observe few

[1] In absolute terms the supply of domestic credit declined sharply too, in particular by funding-constrained banks. After the Lehman Brothers shock, U.S. banks that relied heavily on short-term debt had to shrink domestic credit more (Ivashina and Scharfstein 2010). Iyer et al. (2010) find similar evidence for Portuguese banks that depended on inter-bank borrowing.

differences between its cross-border lenders: they more or less retrench to the same extent. Such a general "run for the exit" may reflect that an increase in economic uncertainty triggered banks to retreat into their domestic shell by reducing cross-border credit across the board (Forbes and Warnock 2012). Alternatively, banks may have recalibrated their credit supply on the basis of broad destination-country characteristics that are equal to all lenders, such as political or macroeconomic risks. The key feature of this first scenario is that there is little within-country variation in the extent to which banks reduced cross-border lending during the crisis.

In the second scenario there is no generalized run for the exit. Deleveraging banks instead differentiate on the basis of characteristics that are specific to bank-country pairs. Banks compare the "franchise" value of future cross-border lending to determine where to retrench more and where to reduce credit less. Theory suggests that the closeness of a bank to a destination country plays an important role in this assessment. Banks find it easier to overcome information asymmetries when they are closer to borrowers (Hauswald and Marquez 2006), and this becomes especially important when default risk increases during a crisis (Ruckes 2004). In countries where a bank has established lending relationships, it may also possess local market power (Degryse and Ongena 2005), an advantage it can exploit during a crisis. In addition, banks with significant experience in a country can lend at lower costs as they know the local business sector well, know more domestic banks they can co-lend with, and are familiar with the legal, institutional, and accounting environment. Therefore, in this second scenario banks withdraw less from countries that are relatively "close" in a geographic sense or in terms of lending relationships.

In this paper we take both scenarios to data on cross-border syndicated lending to assess which retrenchment scenario describes the empirical patterns after the collapse of Lehman Brothers the best. Syndicates—groups of financial institutions that jointly provide large loans to corporate borrowers—are one of the main channels of cross-border debt finance to developed countries and emerging markets. In 2007, international syndicated loans made up over 40% of all cross-border debt funding of U.S. borrowers and more than two-thirds of cross-border flows to emerging markets.[2] This paper concentrates on the 117 largest banks in the cross-border syndications market, which jointly have a market share of over 95%. We use information on individual loans to construct for each of these banks a snapshot of their pre- and post-crisis lending to each destination country.

We explain the stability of cross-border lending through a set of variables that measure how close banks are to corporate borrowers. We observe multiple banks that lend to one and the same country (or firm), and this plays a crucial

[2] Cross-border debt funding is defined as the sum of international syndicated credit, international money market instruments, and international bonds and notes (Bank for International Settlements, Tables 10, 14a, and 14b).

part in our identification. It allows us to focus on variables specific to bank-country or bank-firm pairs and to empirically isolate the relationship between bank-borrower closeness and cross-border lending stability. In particular, by controlling for changes in credit demand and other unobserved country-level heterogeneity through country fixed effects, we can analyze how different banks change their lending to the same country differently (within-country comparison). We replicate this approach at the firm level using firm fixed effects (see Khwaja and Mian 2008). In both cases we also use bank fixed effects to analyze how a particular bank—given a certain funding shock—changes its lending to different countries or firms differently (within-bank comparison).

Using this identification strategy we show that during the financial crisis international banks did not cut cross-border lending in an indiscriminate manner: there was no overall run for the exit. Instead, and in line with our second scenario, bank-borrower closeness was strongly related to the resilience of cross-border credit. Banks continued to lend more to countries that were geographically close, where they were integrated in a network of domestic co-lenders, and where they had built up more lending experience. Banks that operated a local subsidiary were more stable providers of cross-border credit too, in particular in countries with weaker institutions. Our findings therefore suggest that deeper financial integration is associated with more stable cross-border credit during a crisis.

A paper closely related to ours is Giannetti and Laeven (2012b, henceforth GL). GL also use data on syndicated loans and show that during crisis periods banks shift from foreign to domestic lending. They find that this increase in home bias is the result of a "flight home" rather than a "flight to quality," as borrowers of different quality are equally affected. Our results complement and qualify the main finding of GL in an important way. By studying the reallocation of banks' foreign portfolios after the collapse of Lehman Brothers, we find that banks *do* differentiate between foreign borrowers but that they do so on the basis of closeness dimensions that are specific to bank-borrower pairs.[3]

While using the same database, methodologically our paper differs considerably from GL. While GL exploit a relatively long time dimension to link shocks to bank capital to changes in home bias, we instead focus specifically on the 2008–09 crisis and, through the use of bank fixed effects, abstract from the magnitude of shocks to individual banks. Second, we carefully distribute each loan over the actual providers of the funds instead of allocating the full loan to the lead arranger(s). This more laborious approach allows us to measure for each individual syndicate member the distance to each country, the experience it has in that country, the level of prior cooperation with domestic banks, and whether it has a subsidiary in the country.

[3] In one of their robustness tests, GL show that lead arrangers decrease their lending to remote borrowers to a larger extent when they experience a banking crisis at home. This is in line with our findings.

Our main contribution lies in providing a more nuanced picture of international banks' deleveraging process during a financial crisis. Our paper is therefore also closely related to Cetorelli and Goldberg (2012), who examine the reallocation of funds *within* multinational banks. They find that U.S. banks that experienced funding shocks during the 2008–09 crisis reduced internal funding more to peripheral than to core (relatively large) foreign affiliates.[4] We show that at the bank-country and bank-firm levels, banks make similar distinctions when lending directly across borders.

Our results also enrich the literature that asks whether certain types of cross-border flows provide better protection against "sudden stops"—sharp reversals of capital flows during a crisis—than others (Calvo 1998; Hutchison and Noy 2006; Reinhart and Rogoff 2009). Some consensus has emerged that portfolio flows are most volatile (Sarno and Taylor 1999; Calvo and Mendoza 2000) whereas foreign direct investment (FDI) is the most stable form of cross-border finance (Levchenko and Mauro 2007).[5] Gabriele, Boratav, and Parikh (2000) classify the volatility of bank lending as between that of portfolio flows and FDI, although recent evidence suggests that bank credit has become less stable (Milesi-Ferretti and Tille 2011). Our results add to this literature as we exploit loan-level information to analyze in which cases cross-border bank lending is especially volatile.

Finally, our paper adds to the emerging literature on the international transmission of the 2008–09 financial crisis. A first strand of this literature uses data at the level of banking systems to show that cross-border lending declined more in the case of banking sectors that were vulnerable to U.S. dollar funding shocks (Cetorelli and Goldberg 2011), that displayed low *average* profitability or high *average* expected default frequency (McGuire and Tarashev 2008), and that had a poor *average* stock-market performance (Herrmann and Mihaljek 2010). A second set of papers employs bank-level data for a specific country or region (Rose and Wieladek 2011; Aiyar 2012; Paravisini et al. 2012). Such detailed data allow for neat identification strategies, and these papers show convincingly that banks transmitted funding shocks across borders during the 2008–09 crisis.[6] What remains unclear is to what extent banks—given a certain funding shock—reduce credit more to some countries than to others. This is where our contribution lies.

The paper proceeds as follows. Section 1 discusses the dimensions of bank-borrower closeness that we consider and their link with cross-border lending stability. Section 2 explains our data and econometric methodology, after which

[4] Peek and Rosengren (1997, 2000), Imai and Takarabe (2011), De Haas and Van Lelyveld (2010), Popov and Udell (2012), and Van Rijckeghem and Weder (2001, 2003) also highlight the role of multinational and multiregional banks as conduits for cross-border shock transmission.

[5] Claessens, Dooley, and Warner (1995) present evidence to suggest that FDI is as volatile as other flows.

[6] Earlier studies in this vein are Chava and Purnanandam (2011) and Schnabl (2012), who focus on the reduction in cross-border lending to U.S. and Peruvian banks, respectively, after the 1998 Russian default.

Section 3 describes our empirical findings and a set of robustness tests. Section 4 provides various extensions, and Section 5 concludes.

1. Bank-borrower Closeness and the Stability of Cross-border Bank Lending

We aim to find out whether during a crisis different banks retrench to the same extent from destination countries (scenario 1) or whether the severity of the retrenchment depends on characteristics specific to bank-country pairs (scenario 2). In the second scenario, banks compare the "franchise" value of future cross-border lending across countries to determine where to retrench more and where to reduce credit less. Theory suggests that this value is higher in countries that are closer. In such countries, information asymmetries between banks and borrowers may be less severe while future operating costs will be lower and market power higher. The literature highlights four key aspects of bank-borrower closeness that can affect the franchise value of cross-border credit and may therefore be positively related to lending stability during a crisis.

A first measure is the *geographical distance* between the bank and its borrowers. Banks may retrench more from distant countries if the screening and monitoring of borrowers becomes more important during a crisis (Ruckes 2004) and is more difficult for remote borrowers (Jaffee and Modigliani 1971; Hauswald and Marquez 2006).[7] The transaction and enforcement costs of lending over large distances may be higher too. For instance, banks find it harder to bilaterally negotiate or successfully recover if a defaulting borrower is further away (Mian 2006). For these reasons banks may cut lending more to firms in distant countries when they are triggered to reassess the attractiveness of lending across countries.

A second measure is the *lending experience* in a country. Through repeat lending banks reduce information asymmetries and build up proprietary information about borrowers (Rajan 1992; Boot 2000; Boot and Thakor 2000). They can reuse this information when lending to the same borrower (Greenbaum and Thakor 1995), and the more experienced banks become, the more they rely on this proprietary information (Agarwal and Hauswald 2010). Experienced banks thus face lower variable lending costs and may be more inclined to continue lending during a crisis.

Lending experience also gives banks market power over their borrowers (Degryse and Ongena 2005), which they can use to carve out local captive markets by creating adverse-selection problems for competitor banks

[7] Petersen and Rajan (2002) show that while distance matters for credit availability of small U.S. firms, its role has declined over time as more borrower information and better ways to process it have become available. In line with geographical credit rationing, Portes, Rey, and Oh (2001), Buch (2005), and Giannetti and Yafeh (2012) find a negative relationship between distance and international asset holdings, including bank loans.

(Dell'Ariccia 2001; Agarwal and Hauswald 2010). In particular during a crisis, captive firms will have little opportunity to switch to another bank and banks can exploit this by charging higher interest rates. Banks will be particularly reluctant to withdraw from countries where they built up lending relationships that involve implicit long-term contracting in which they accept low interest rates in the short run in the expectation of more profitable lending in the long run (Sharpe 1990). For these reasons, a bank with previous lending experience can continue to supply credit at lower cost and higher margins compared to an inexperienced bank. The former may therefore consider a country to be of special importance, whereas the latter does not.

A third measure that indicates how close a bank is to its (potential) borrowers is whether it has established a *local subsidiary*. First, a presence on the ground means that loan officers are closer to (potential) borrowers. This may allow a bank to continue lending during uncertain times because screening and monitoring can be stepped up quite easily (Mian 2006). Local staff can also help generate (and subsequently monitor) new cross-border deals. Second, banks with a subsidiary may have more local market power and this may provide them with an incentive to continue to lend during a crisis. Finally, the presence of a subsidiary may reveal a bank's strategic commitment to a country. Once a subsidiary is established and the associated entry costs are sunk, there may still be fixed costs associated with winding it down.[8] To the extent that local lending by the subsidiary and cross-border lending from the headquarters are complements, a bank's reluctance to close a subsidiary may also have a stabilizing impact on its cross-border lending to a country.

Yet, while a local subsidiary reduces the physical distance between loan officer and firm, it also creates a functional or hierarchical distance *within* the bank. Banks may experience difficulties in efficiently passing along (soft) information from the subsidiary to headquarters (Aghion and Tirole 1997; Stein 2002). Indeed, Liberti and Mian (2009) find that when the hierarchical distance between the information-collecting agent and the manager that approves a loan is large, less "soft" or subjective and more "hard" information is used. Alessandrini, Presbitero, and Zazzaro (2009) show for Italy that a greater functional distance between loan officers and headquarters adversely affects credit availability of local firms. Moreover, if the incentives of local officers are not aligned with those of the parent bank, internal agency costs may hamper cross-border lending as well (Scharfstein and Stein 2000). Such costs increase with distance if parent banks find it more difficult to supervise management in faraway places (Rajan, Servaes, and Zingales 2000). The presence of a subsidiary may hence be associated with more stable cross-border lending but

[8] Since we use data on banks that have already started lending to various countries, fixed *entry* costs that are sunk, as in Melitz (2003), cannot explain whether a bank continues to lend to a country or not. Moreover, entry costs are much lower for syndicated lending than for exports of manufactured goods.

only if the positive effect of local loan officers is not offset by higher within-bank information and agency costs due to an increased functional distance.

A fourth measure of bank-borrower closeness is the extent to which a bank *cooperates with domestic banks*. Banks may improve the information they have about new and existing foreign borrowers by cooperating with domestic banks that possess a comparative advantage in reducing information asymmetries vis-à-vis local firms (Mian 2006; Houston, Itzkowitz, and Naranjo 2007). Domestic banks are not only geographically closer to these firms but also share a common language and culture. Moreover, they may have a more intimate knowledge of local legal, accounting, and other institutions and their impact on firms.[9] Information sharing with domestic banks may also reduce adverse-selection problems (Pagano and Jappelli 1993), and through co-lending with domestic banks international banks may gradually increase their own knowledge of local firms. For these reasons we expect that international banks that are well integrated in a lending network of domestic banks are a more stable credit source during a crisis.

To examine whether different banks retrenched to different extents from one and the same country during the 2008–09 financial crisis, we proceed by testing whether bank-borrower closeness—measured as distance, lending experience, subsidiary presence, and cooperation with domestic banks—was correlated with changes in the credit supply of individual banks to individual countries.

2. Data and Econometric Methodology

2.1 Data

Our main data source is the Dealogic Loan Analytics database, which contains comprehensive information on virtually all syndicated loans since the 1980s. We download all syndicated loans that were extended to private borrowers worldwide during January 2000–September 2009 and split each loan into the portions provided by the syndicate members. Loan Analytics contains full information on loan breakdown for about 25% of all loans and for these loans we allocate the exact loan portions to the individual lenders. For the other 75%, we have to use a rule to allocate loan portions. For our baseline regressions, we use the simplest rule possible: we divide the loan equally among the syndicate members. Section 3.3 presents robustness tests that show that our results also hold when we allocate the 75% of the sample in other ways. For our main sample period, July 2006–September 2009, we split a total of 21,323 syndicated loans into 131,113 loan portions.

We then use these loan portions to reconstruct for each bank the country distribution of its cross-border lending. We define cross-border lending as loans

[9] Empirical evidence backs up the assertion that cooperation with domestic banks reduces agency problems. Nini (2004) finds that local bank participation leads to larger, longer, and cheaper syndicated loans. Esty (2004) shows that participation of domestic banks in lending syndicates reduces interest rates.

where the nationality of the (parent) bank is different from the nationality of the borrower and where the loan is provided by the parent (Citibank lending from the U.S. to a Polish firm) rather than by a subsidiary (Citibank Poland participating in a loan to a Polish firm). Over 94% of cross-border lending is of the former type and therefore included in our data set.[10]

Next, we identify all commercial, savings, cooperative, and investment banks that at the group level provided at least 0.01% of global syndicated cross-border credit and that participated in at least 20 cross-border loans in 2006. This leaves us with 117 banks from 36 countries, both advanced countries (75 banks) and emerging markets (42 banks).[11] Together these banks lent to firms in 59 countries and accounted for over 95% of all cross-border syndicated lending in 2006.

Appendix Tables A1 and A2 list all banks and destination countries in our sample. Table A1 also shows each bank's country of incorporation and its absolute and relative share of the market for cross-border syndicated lending. Most banks have a small pre-crisis market share, but there are a few big players, such as Deutsche Bank and Citigroup, with a share of over 3%.[12]

For each bank we calculate both the volume and the number of cross-border lending to individual destination countries in the pre-crisis period (July 2006–June 2007) and the period after the Lehman Brothers collapse (October 2008–September 2009). Note that for most of the analysis we disregard the intermediate period July 2007–September 2008 that encompasses the early stage of the crisis. This allows us to make a clean comparison between the most severe crisis period—the year after the unexpected collapse of Lehman Brothers in September 2008—and the pre-crisis period—the year before the market for short-term asset-backed commercial paper began to dry up in July 2007.

Our first cross-sectional dependent variable is a dummy *Sudden stop*, which is one for each bank-country pair where a bank completely stopped lending during the crisis (but where it was active before).[13] Our second and third dependent variables, *Volume* and *Number*, are the log difference of (1 plus) the amount (number) of cross-border lending by a bank to a country between the post–Lehman Brothers (October 2008–September 2009) and the pre-crisis period (July 2006–June 2007). To reduce the chance that our results are affected by

[10] In Section 4.3, we present robustness tests that indicate that our results remain unchanged when we include syndicated lending through bank subsidiaries.

[11] We define emerging markets as all countries except high-income OECD countries. Although Slovenia and South Korea were recently reclassified as high-income countries, we still consider them to be emerging markets.

[12] During our sample period, RBS acquired part of ABN Amro; Bank of America acquired Merrill Lynch; and Wells Fargo acquired Wachovia. We treat these merged banks as a single entity over our whole sample period by adding the number of loans their respective parts provided during the pre-merger period.

[13] Complete information is available to construct this variable (as well as *Number*). Even though we only have loan share information for 25% of the sample, we know the identity of all lenders in each syndicate.

Table 1
Summary statistics

	Unit	Obs	Mean	Median	St Dev	Min	Max
Country-level regressions							
Dependent variables							
Sudden stop	Dummy	1,913	0.44	0.00	0.50	0	1
Volume	Log change	1,913	−2.46	−2.20	2.30	−8.25	5.25
Number	Log change	1,913	−0.91	−0.92	0.83	−3.69	2.30
Closeness variables							
Distance	Km (in logs)	1,913	7.99	8.15	1.11	4.63	9.61
Experience	No. loans (in logs)	1,913	2.49	2.48	1.34	0	7.73
Subsidiary	Dummy	1,913	0.18	0.00	0.39	0	1
Domestic banks	No. lenders (in logs)	1,913	1.97	1.95	1.15	0	6
Other							
Exposure	Share	1,913	0.05	0.02	0.09	0	0.84
Arranger	Dummy	1,913	0.81	1.00	0.40	0	1
Change trade	Log change	1,913	−0.02	−0.01	0.24	−0.98	0.99
Change bank FDI	Log change	1,913	0.04	0.00	0.26	−1.10	1.10
Firm-level regressions							
Dependent variable							
Exit	Dummy	2,326	0.57	1.00	0.50	0	1
Closeness variables							
Distance	Km (in logs)	2,326	8.18	8.63	1.10	4.63	9.61
Experience	No. loans (in logs)	2,326	0.71	0.69	0.73	0	3.22
Subsidiary	Dummy	2,326	0.38	0.00	0.49	0	1
Domestic banks	No. lenders (in logs)	2,326	3.20	2.83	1.74	0	6.18
Other							
Exposure	Share	2,326	0.14	0.05	0.19	0	0.84
Arranger	Dummy	2,326	0.26	0.00	0.44	0	1
Change trade	Log change	2,326	−0.06	−0.06	0.20	−0.98	0.84
Change bank FDI	Log change	2,326	0.07	0.00	0.23	−1.00	1.10

This table shows summary statistics for our main variables. Table A3 in the Appendix contains information on all variable definitions, the units and period of measurement, and the data sources.

outliers, we winsorize by setting the upper and lower tail values equal to the values of the 1st and 99th percentile for both *Volume* and *Number*.

We also create a dependent variable at the bank-firm level. Here we use a sample of firms that borrowed from at least two banks in our sample before the crisis and borrowed at least once after the Lehman Brothers collapse. *Exit* is a dummy variable that is one in case a bank was lending to a particular firm before the crisis but was no longer among the syndicate members during the crisis.

Table 1 shows that our data set includes 1,913 different bank-country pairs and 2,326 bank-firm pairs. On average an international bank was lending to firms in 16 different countries before the demise of Lehman Brothers. Banks reduced their lending on average by 52% to a destination country during the crisis. The variables *Sudden stop* and *Exit* indicate that banks even completely stopped lending to 44% (57%) of the countries (firms) they were lending to before the crisis.

As discussed in Section 1, we create four variables that measure different aspects of bank-borrower closeness for all bank-country and bank-firm pairs (the *Closeness* variables in Table 1). We first use the great circle distance formula to calculate the geographical *Distance* between a bank's headquarters and its various countries of operation as the number of kilometers (in logs) between the capitals of both countries. The average *Distance* to a foreign borrower is 4,731 km, but there exists considerable variation (the standard deviation is 3,765 km).[14]

Second, we create a measure of a bank's prior experience in syndicated lending to a country. *Experience* is the number of loans that a bank provided to a country since 2000 and that had matured by July 2006. This average number of prior loans is 36 and ranges between 0 and 2,277. At the firm level, a bank participated on average in two loans. We exclude loans still outstanding during the pre-crisis year in order to avoid a mechanical correlation with our dependent variable. Because the relationship between *Experience* and lending stability may be concave, we use the natural log.

Third, we link our banks to Bureau van Dijk's BankScope database to collect detailed information on their ownership structure. For each banking group we identify all majority-owned foreign bank subsidiaries. We create a dummy variable *Subsidiary* that is one in each country where a bank owns a subsidiary. A typical bank owns a subsidiary in three foreign countries, and in 18% of our bank-country pairs a subsidiary is present.

Fourth, we count for each bank and in each of its countries of operation the number of different domestic banks with which it has cooperated in a syndicate since 2000. The log of this number is the variable *Domestic banks*. On average a bank has worked with 16 different domestic banks in a country. Variation is large, however, with some banks never cooperating with domestic banks whereas others cooperate with dozens of different banks.

Table A4 in the Appendix contains a pairwise correlation matrix of the closeness variables. The correlations are low to moderate, between −0.10 and 0.52. We are therefore confident that the variables provide sufficient independent information and that multicollinearity is not an issue.

2.2 Econometric methodology

To examine whether bank-borrower closeness is related to lending stability, we use the bankruptcy of Lehman Brothers as an exogenous event that triggered a sudden stop in cross-border lending. We compare, in a cross-sectional setting, lending in the year after the Lehman Brothers collapse to lending in the year before the financial crisis. We then test whether the heterogeneity in this change

[14] In Table 1 the summary statistics for *Distance*, *Experience*, and *Domestic banks* are expressed in logs, as this is how we use these variables in our regression framework.

in cross-border bank lending is associated with differences in banks' closeness to borrowers in various destination countries.

We use country fixed effects to focus on differences *across* banks *within* countries. A key advantage of this approach is that it allows us to neatly control for changes in credit demand at the country level. Here we follow Khwaja and Mian (2008), who control for credit demand at the firm level by using firm fixed effects in regressions based on a data set of firms that borrow from multiple banks [see Schnabl (2012) for a similar application]. Since our data set contains information on multiple banks that lend to the same country, we use country fixed effects to rigorously control for credit demand. This is important because the crisis hit the real economy of countries to a different extent and with a different lag. Firms' credit demand to finance working capital and investments was consequently affected to varying degrees.[15] The use of country fixed effects means that we do not speak to the question of whether banks in general retrenched more from certain types of countries, such as more risky ones. Instead, we exploit variation at the bank-country level to analyze whether two banks reduce lending to one and the same country to a different extent.

Since banks are active in multiple countries, we include bank fixed effects to control for bank-specific factors that might affect changes in lending. Whereas Khwaja and Mian (2008) include bank-level *control variables* alongside a bank-specific funding measure (their variable of interest), we prefer bank *fixed effects* because the combination of bank *and* country fixed effects allows us to focus on closeness variables that link bank i to country j. Our cross-sectional baseline specification is

$$\Delta L_{ij} = \beta' \cdot C_{ij} + \varepsilon_i + \varphi_j + \eta_{ij}, \tag{1}$$

where subscripts i and j denote banks and destination countries, respectively; β' is a coefficient vector; C_{ij} is a matrix of closeness variables; ε_i and φ_j are vectors of bank- and country-fixed effect coefficients, respectively; and η_{ij} is the error term. ΔL_{ij} is either *Sudden stop* (a dummy that is one for each bank-country pair where bank lending came to a complete halt during the crisis), or *Volume* or *Number* (the log change in lending by bank i to country j).

Second, we estimate firm-level regressions on a sample of firms that borrowed from at least two banks in our sample before the crisis and borrowed at least once after the Lehman Brothers collapse. The dependent variable *Exit* is the probability that bank i, a creditor of firm k before the crisis, was no longer among the syndicated lenders to firm k after the default of Lehman Brothers. We can now use *firm*-level fixed effects to control for changes in credit demand:

$$E_{ik} = \beta' \cdot C_{ik} + \varepsilon_i + \varphi_k + \eta_{ik}, \tag{2}$$

[15] Cetorelli and Goldberg (2011) follow a similar approach on the basis of country-level data on lending from 17 developed countries to 94 emerging markets.

where subscripts i and k denote individual banks and firms, respectively; β' is a coefficient vector; C_{ik} is a matrix of closeness variables; ε_i and φ_k are vectors of bank and firm fixed effect coefficients, respectively; and η_{ik} is the error term. E_{ik} is an *Exit* dummy that is one if bank i stopped lending to firm k during the financial crisis and is zero otherwise.

In all specifications, we control for *Exposure*, which measures for each bank-country and bank-firm pair the number of outstanding syndicated loans as a percentage of the bank's total number of syndicated loans at the time of the Lehman Brothers collapse. On average this country *Exposure* was close to 5% of the bank's syndicated lending. We have no strong prior about the impact of this variable on lending stability. Banks may have adjusted lending more where they had high pre-crisis exposures, for instance because risk limits became more binding for such countries. On the other hand, banks may have retrenched more from "marginal" countries while staying put in core markets. In the *Volume* and *Number* regressions, we also control for the number of pre-crisis loans, so that our results are not driven by artificially large changes in the dependent variable in marginal countries.

We include the variable *Arranger* in all specifications. This dummy is 1 if the bank acted at least once as an arranger in a particular country or for a specific firm. A syndicate consists of two tiers: arrangers and participants. The arrangers comprise the senior tier and negotiate the terms with the borrower. They allocate a substantial part of the loan to a junior tier, the participants, who assume a more passive role. Arrangers usually act to some extent as delegated monitors for the participants (Sufi 2007). We therefore expect that banks that previously arranged a loan for a client are relatively well informed. Arrangers may also be more stable lenders because they expect fee income from ancillary business, such as underwriting a future bond issue, as part of a longer-term relationship.

Finally, we include two bank-country pair control variables: *Change trade* and *Change bank FDI*. *Change trade* is the log change in total export plus import volume in U.S. dollars between the home country of bank i and destination country j. Following Tinbergen (1962), a voluminous literature has developed on gravity models that link trade flows to the distance between trading partners. Since stable trade relations may be associated with stable financial integration, we expect a positive relationship between *Change trade* and the stability of cross-border lending.

Our second country-pair variable, *Change bank FDI*, measures the log change in the year after the Lehman Brothers collapse in the number of banks from the home country of bank i that own a subsidiary in country j[based on information from Claessens and Van Horen (2011)]. To the extent that financial FDI (foreign-bank ownership) and financial trade (cross-border lending) are complements (Brainard 1997), we expect that a reduction in bilateral FDI would be associated with a decline in cross-border bank lending.

We use OLS to estimate the *Volume* and *Number* regressions and a linear-probability model for the *Sudden stop* and *Exit* regressions.[16] Standard errors are heteroscedasticity robust and double clustered by bank and country (firm).

3. Empirical Results

3.1 Baseline results

Table 2 presents the results of our country- and firm-level baseline specifications. We include our four closeness variables, as well as bank and destination country (or firm) fixed effects and the control variables, *Exposure* and *Arranger*. The first six columns show the specifications at the bank-country level and the last two columns those at the bank-firm level. In all regressions we include the bilateral controls *Change trade* and *Change bank FDI*, with the exception of columns 4–6 where we replace these with country-pair fixed effects. Even without the latter, we explain 45%, 36%, 63%, and 44% of the variation in *Sudden stop*, *Volume*, *Number*, and *Exit*, respectively.

Our four closeness variables turn out to be strongly correlated with bank-lending stability during the financial crisis. This indicates that the severity of the retrenchment from a particular country differed between banks and depended on characteristics that were specific to each bank-country pair.

First, we find a significant and robust negative relationship between *Distance* and lending stability. The probability of a sudden stop increases with *Distance* to the destination country, and during the crisis banks continue to lend more to borrowers that are geographically close. Distance constraints are therefore not only negatively related to the amount of cross-border credit in tranquil times, as documented in earlier studies, but also with its stability. Based on column 1 in Table 2, we estimate that a one-standard-deviation increase in *Distance* is linked to an increased probability of a sudden stop of 4.6 percentage points. In addition, column 2 shows that a 10% increase in *Distance* aggravates the decline in the amount of cross-border lending by almost 3%. This finding is in line with GL, who document that banks decrease lending to distant borrowers more when they experience a banking crisis in their home country.

Second, a bank's previous *Experience* with cross-border syndicated lending to a particular country is strongly and positively related to lending stability during the crisis. A one-standard-deviation increase in *Experience* is linked to a decrease in the probability of a *Sudden stop* by 8.2 percentage points (column 1 in Table 2). Furthermore, a 10% higher *Experience* level comes with a smaller decline in the cross-border lending *Volume* of almost 5% (column 2).

Third, we find that cross-border lending to countries where a bank owns a *Subsidiary* declines less than to countries where that same bank does not own an affiliate. The results in column 1 in Table 2 indicate that the probability of

[16] We also estimated logit regressions for the dependent variables *Sudden stop* and *Exit*. The findings are similar in terms of both economic and statistical significance and hence are not reported.

Table 2
Closeness and cross-border bank lending stability—Baseline results

	Country						Firm	
	Sudden stop	Volume	Number	Sudden stop	Volume	Number	Exit	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.041**	−0.279***	−0.077***				0.030**	
	(0.027)	(0.000)	(0.001)				(0.035)	
Experience	−0.074***	0.481***	0.178***	−0.057**	0.494***	0.182***	−0.122***	−0.130***
	(0.000)	(0.000)	(0.000)	(0.046)	(0.000)	(0.000)	(0.000)	(0.000)
Subsidiary	−0.047**	0.280**	0.151***	0.040	−0.105	0.078	0.029	0.019
	(0.043)	(0.033)	(0.003)	(0.186)	(0.567)	(0.352)	(0.289)	(0.614)
Domestic banks	−0.102***	0.211	0.019	−0.096**	0.251	0.026	−0.063**	−0.028
	(0.001)	(0.119)	(0.661)	(0.030)	(0.256)	(0.664)	(0.016)	(0.548)
Arranger	−0.113***	0.236	−0.079	−0.083	−0.019	−0.047	−0.088***	−0.078**
	(0.001)	(0.221)	(0.206)	(0.200)	(0.949)	(0.630)	(0.007)	(0.042)
Exposure	0.072	−0.878	0.969**	−0.540	3.668**	1.663*	−0.129	−1.044***
	(0.749)	(0.270)	(0.026)	(0.284)	(0.030)	(0.075)	(0.345)	(0.002)
Change trade	0.074	−0.173	0.056				−0.017	
	(0.157)	(0.598)	(0.552)				(0.793)	
Change bank FDI	−0.035	0.238	−0.010				0.040	
	(0.349)	(0.112)	(0.849)				(0.448)	
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Firm FE	No	No	No	No	No	No	Yes	Yes
Country-pair FE	No	No	No	Yes	Yes	Yes	No	Yes
Observations	1,913	1,913	1,913	1,913	1,913	1,913	2,079	2,079
R-squared	0.452	0.362	0.633	0.748	0.702	0.820	0.438	0.597

This table shows estimations to explain the decline in cross-border lending from bank i to destination country j (first six columns) and from bank i to firm k (last two columns) after the Lehman Brothers default. Table A3 in the Appendix contains definitions of all variables. *Experience* and *Arranger* are measured at the bank-country level in the country-level regressions and at the bank-firm level in the firm-level regressions. We show a linear probability OLS model for the *Sudden stop* and *Exit* regressions, while for the *Volume* and *Number* regressions we show an OLS model in which we control for the no. of pre-crisis loans. The firm-level regressions in columns [7]–[8] are based on a sample of firms that borrowed from at least two different lenders in our data set during the pre-crisis period. All specifications include bank fixed effects. The specifications in columns [1]–[6] also include destination country fixed effects, those in columns [4]–[6] country-pair fixed effects, and those in columns [7]–[8] firm fixed effects. All standard errors are double clustered by bank and country (firm). Coefficients are marginal effects. Robust p-values appear in parentheses, and ***, **, * correspond to the 1%, 5%, and 10% levels of significance, respectively.

a full lending stop is almost 5 percentage points lower when a bank owns a local affiliate, all else equal. Moreover, in countries where a bank operates a subsidiary, the amount of cross-border loans during the crisis is 28 percentage points higher.

Fourth, we find that international banks that cooperate with many domestic banks are more stable sources of cross-border credit. The probability of a sudden stop is 11.7 percentage points less in case a bank's level of cooperation with domestic banks increases by one standard deviation. We find no impact of cooperation with *Domestic banks* on the *Number* or *Volume* of loans during the crisis.

As expected, we find that banks that previously operated at least once as an *Arranger* in a country prove to be more resilient during a crisis. There is an 11.3% lower probability that they completely cut lending to a country. We find no apparent link between a bank's outstanding *Exposure* to a country, expressed as a percentage of the total number of syndicated loans, and the change in lending after the fall of Lehman Brothers.[17] Finally, we find no clear relationship between our country-pair control variables *Change trade* and *Change bank FDI* and bank lending stability.[18]

We combine country and bank fixed effects to focus on variables at the bank-country level. Since these fixed effects capture (un)observed characteristics of banks and destination countries, concerns about omitted-variable bias should be limited. Such concerns are further attenuated by controlling for *Change trade* and *Change bank FDI*. Any possible bias must therefore stem from other omitted country-pair variables that are correlated with both our closeness variables and lending stability.

However, to alleviate any concerns about omitted-variable bias, we examine in columns 4–6 of Table 2 whether or not our results hold when we include country-pair fixed effects. We now compare banks from the same home country that operate in the same destination country. This prevents us from estimating the effect of geographical *Distance*. Adding bilateral fixed effects also substantially reduces data variation, making estimation more challenging. In order to estimate bilateral fixed effects, we need at least two different banks from the same home country that were lending to the same destination country before the crisis. Furthermore, given that the bilateral fixed effects take out the average across country pairs, we also require substantial variation in the

[17] This is also true if we express *Exposure* as a percentage of total assets instead of the total number of syndicated loans. We also ran regressions where we include *Exposure* but exclude our closeness variables. This parsimonious specification shows a statistically significant negative correlation between *Exposure* and the probability of a *Sudden stop* (or firm-level *Exit*) and a statistically significant positive relationship with *Number*. This disproves the notion that banks mainly cut credit where pre-crisis exposures were large and where they ran into tighter country-risk limits. Yet, once we include our four closeness variables, each of which measures a different aspect of a bank's pre-crisis activity, *Exposure* no longer has any explanatory power over and above these variables.

[18] This remains the case if we express these variables in levels rather than differences or if we measure *Bank FDI* as the number of subsidiaries in country j owned by banks from the home country of bank i as a percentage of all banks in country j.

remaining closeness variables among the banks in the same country pair. In our data, which cover over 95% of the international syndicated loan market, this variation is simply quite limited. In over 75% of the observations, less than five banks from the same country are active in the same destination country.

Columns 4–6 in Table 2 nevertheless show that our results hold up in this very restricted specification: lending stability is higher for experienced banks and banks that cooperate more with domestic banks. The coefficient for *Subsidiary* is imprecisely estimated, but this likely reflects the limited within-destination country variation among banks from the same home country.

So far our identification strategy has relied on controlling for changes in credit demand through country fixed effects. Although we follow Khwaja and Mian (2008), our approach is coarser as we apply it at a higher aggregation level (bank-country pairs instead of bank-firm pairs). If country fixed effects imperfectly control for changes in credit demand, this could bias our results if heterogeneity in credit demand at the firm or sector level would not be orthogonal to our closeness variables. To get around this issue, we analyze in columns 7–8 in Table 2 whether or not our closeness variables determine lending stability at the firm level as well. We now use fixed effects at the firm level and also measure *Experience* and *Arranger* at the firm level.

These firm-level regressions confirm our earlier findings. The probability that a pre-crisis lender is no longer part of the syndicate during the crisis increases if the firm is more distant, if the bank has not cooperated much with domestic banks, and if the bank does not have substantial lending experience with the firm. At the firm level we do not find an association between the presence of a local subsidiary and the likelihood that a bank continues to lend during the crisis.

The economic impact of our closeness variables remains significant too. A one-standard-deviation increase in *Distance* increases the probability that a bank is no longer part of the syndicate during the crisis by 3.3 percentage points. A one-standard-deviation increase in *Experience* decreases this probability by 8.9 percentage points. Finally, increasing the cooperation level with *Domestic banks* by one standard deviation reduces the probability that a bank is no longer a member of the syndicate by 11.0 percentage points.

To conclude, we uncover empirical patterns at both the bank-country and the bank-firm level that strongly favor our second retrenchment scenario. Crisis-hit banks clearly differed in the extent to which they retrenched from similar countries, and bank-borrower closeness, measured along a number of dimensions, is a defining characteristic of cross-border lending stability during a crisis.

3.2 Bank-borrower closeness and lending during normal times: A placebo test

We put forward the idea that bank-borrower closeness is associated with cross-border lending stability *during a crisis*. The results in Table 2 are in line with

this, but it is possible that the strong relationship we find is not specific to our sample period. To be clear, we do not expect closeness to be irrelevant before the crisis. After all, there exists a sizeable literature on the impact of bank-borrower closeness on the quantity of bank lending and we cite the main contributions in Section 1. We expect instead that the importance of bank-borrower closeness increased during the crisis and that closeness explains a substantial part of the heterogeneity in the lending reversal.

To analyze the importance of our closeness variables before and during the crisis in more detail, we first perform a placebo test on out-of-sample data over July 2005–June 2007. This period ends just when the market for asset-backed commercial paper (ABCP) started to contract and the British bank Northern Rock experienced a run. We divide this "crisis-free" placebo period into two subperiods of equal length (July 2005–June 2006 and July 2006–June 2007) and calculate our four dependent variables by comparing the last with the first period. Our independent variables, such as *Experience*, are also recalculated over these placebo periods.

Next, we split our crisis period into two separate periods of equal length: the early (August 2007–July 2008) and the late crisis (October 2008–September 2009).[19] First, we estimate the correlation between our closeness variables and the change in lending between August 2007 and July 2008 (early crisis) and July 2006 and June 2007 (pre-crisis). We refer to this as our early-crisis regression. This allows us to test whether some of the effects we document in Table 2 had already started to materialize during the early stage of the crisis when banks experienced ABCP-related funding problems.[20] In addition, we compare October 2008–September 2009 (late crisis) with August 2007–July 2008 (early crisis). We refer to this as the late-crisis regression. It allows us to check whether the relationship between bank-borrower closeness and lending stability strengthened further after the fall of Lehman Brothers.[21]

The first four columns of Table 3 show our baseline regression, the placebo regression, and the early and late crisis regressions. Columns 5–8 then present the results from one-sided t-tests that examine whether the coefficients of our closeness variables differ significantly between various pairs of specifications. For instance, in column 5 we test whether the coefficients in the baseline specification (column 1) are larger than those in the placebo specification (column 2). Likewise, in column 6 we test whether the coefficients in the early

[19] This latter period equals our original crisis period.

[20] BNP Paribas of France stopped withdrawals from funds invested in mortgage-backed securities and suspended the calculation of net asset values on August 9, 2007. See Acharya, Schnabl, and Suarez (2012) for more details on the run in the ABCP market.

[21] We also followed a slightly different approach based on out-of-sample data for April 2004–June 2007. We divide this "crisis-free" placebo period into three subperiods (April 2004–March 2005; April 2005–June 2006; and July 2006–June 2007) and calculate our dependent variables by comparing the last and the first period, just like we do for our real sample. We then compare the impact of our closeness variables in the placebo period to that in our real crisis period and find that they become (more) significant during the actual crisis.

Table 3
The impact of bank-borrower closeness before and during the crisis

	Country - Sudden stop							
					T-test (*p*-value)			
	Baseline	Placebo	Early crisis	Late crisis	Baseline >Placebo	Early >Placebo	Late >Placebo	Late >Early
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.041**	0.005	0.022	0.063***	0.00	0.07	0.00	0.01
	(0.027)	(0.520)	(0.135)	(0.001)				
Experience	−0.074***	−0.016**	−0.049***	−0.065***	0.00	0.00	0.00	0.16
	(0.000)	(0.021)	(0.000)	(0.000)				
Subsidiary	−0.047**	−0.006	0.023	−0.041**	0.01	0.94	0.01	0.00
	(0.043)	(0.664)	(0.320)	(0.033)				
Domestic banks	−0.102***	0.002	−0.046*	−0.102***	0.00	0.01	0.00	0.03
	(0.001)	(0.833)	(0.065)	(0.006)				
Observations	1,913	1,919	1,913	1,586				
R-squared	0.452	0.325	0.378	0.455				
	Country - Volume							
Distance	−0.279***	−0.102*	−0.151**	−0.407***	0.01	0.22	0.00	0.00
	(0.000)	(0.091)	(0.025)	(0.000)				
Experience	0.481***	0.279***	0.339***	0.505***	0.00	0.20	0.00	0.03
	(0.000)	(0.000)	(0.000)	(0.000)				
Subsidiary	0.280**	0.112	−0.028	0.244*	0.08	0.89	0.13	0.02
	(0.033)	(0.268)	(0.821)	(0.075)				
Domestic banks	0.211	0.083	0.194	0.219	0.10	0.12	0.12	0.43
	(0.119)	(0.138)	(0.113)	(0.170)				
Observations	1,913	1,919	1,913	1,586				
R-squared	0.362	0.360	0.361	0.373				
	Country - Number							
Distance	−0.077***	−0.060*	−0.068***	−0.096***	0.27	0.39	0.10	0.13
	(0.001)	(0.063)	(0.002)	(0.000)				
Experience	0.178***	0.139***	0.162***	0.204***	0.07	0.19	0.01	0.08
	(0.000)	(0.000)	(0.000)	(0.000)				
Subsidiary	0.151***	0.087**	0.094**	0.123**	0.08	0.42	0.24	0.29
	(0.003)	(0.020)	(0.012)	(0.047)				
Domestic banks	0.019	0.246***	0.193***	0.029	1.00	0.88	1.00	1.00
	(0.661)	(0.000)	(0.000)	(0.629)				
Observations	1,913	1,919	1,913	1,586				
R-squared	0.633	0.481	0.482	0.611				

(*continued*)

crisis specification (column 3) are larger than those in the placebo specification (column 2).

The topmost panel of Table 3 summarizes our results for the dependent variable *Sudden stop*. When we compare columns 1 and 2, it becomes clear that most of our results were absent in the placebo period. The very low *p*-values in column 5 underline this. While *Experience* was correlated with growth in bank lending before the crisis, the size of the coefficient increases almost five times during the crisis. A comparison of columns 3 and 4, which is formally done in column 8, indicates that bank-borrower familiarity became particularly important after the fall of Lehman Brothers.

The second panel in Table 3, for *Volume*, shows again how the correlations between bank-borrower closeness and lending stability became much larger

Table 3
Continued

	Firm - Exit							
					T-test (*p*-value)			
	Baseline	Placebo	Early crisis	Late crisis	Baseline >Placebo	Early >Placebo	Late >Placebo	Late >Early
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.030**	0.011	0.018*	0.019	0.05	0.26	0.24	0.46
	(0.035)	(0.276)	(0.094)	(0.136)				
Experience	−0.122***	−0.091***	−0.097***	−0.097***	0.06	0.37	0.37	0.49
with firm	(0.000)	(0.000)	(0.000)	(0.000)				
Subsidiary	0.029	0.024	0.008	0.013	0.59	0.21	0.31	0.59
	(0.289)	(0.202)	(0.695)	(0.622)				
Domestic banks	−0.063**	−0.025	−0.046***	0.028	0.03	0.10	1.00	1.00
	(0.016)	(0.154)	(0.007)	(0.277)				
Observations	2,079	4,057	3,657	1,848				
R-squared	0.438	0.458	0.422	0.520				

This table compares our baseline results in column [1] with similar estimations for three alternative sample periods. The results in column [2] are based on regressions in which the dependent variables are measured as the change between July 05–June 06 and July 06–June 07 ("Placebo"). The results in column [3] are based on regressions in which the dependent variables are measured as the change between July 2006 and June 2007 and August 2007 and July 2008 ("Early crisis"). The results in column [4] are based on regressions in which the dependent variables are measured as the change between August 2007 and July 2008 and October 2008 and September 2009 ("Late crisis"). All country-level regressions include the variable *Arranger* measured at the bank-country level, the variable *Exposure* measured at the beginning of the second part of the sample period, *Change trade* and *Change bank FDI* between the start and end year of the sample period, and bank and country fixed effects. In the *Volume* and *Number* regressions we also control for the no. of pre-crisis loans. Firm-level regressions include the variable *Arranger* measured at the bank-firm level, *Exposure*, *Change trade* and *Change bank FDI*, and bank and firm fixed effects. All regressions are estimated with (linear probability) OLS. Standard errors are double clustered by bank and country (firm). Robust *p*-values appear in parentheses, and ***, **, * correspond to 1%, 5%, and 10% levels of significance, respectively. Columns [5]–[8] show *p*-values of one-sided *t*-tests to check whether the estimated coefficients based on different sample periods are significantly different. Table A3 in the Appendix contains all variable definitions.

during the crisis (see the *p*-values in column 5). Column 8 shows that this was again mainly due to the post–Lehman Brothers period. The correlation between *Distance* and the change in lending becomes four times larger after the Lehman Brothers collapse compared to the placebo period. The effect for *Experience* almost doubles, while the impact of having a *Subsidiary* only becomes significant during the late crisis phase.

Our results in the third panel in Table 3 are for the dependent variable *Number.* When we compare the effect of *Distance* in the late crisis with the placebo period, the statistical significance increases and the coefficient is about 1.5 times larger (significant at the 10% level). The link between *Experience* and the change in the *Number* of loans also becomes significantly larger at the height of the crisis compared to before the crisis. The impact of *Subsidiary* also increases during the crisis, as reflected in the magnitude of the parameters, but this increase is not always significant. The effect of *Domestic banks* is present before and during the early stage of the crisis but then disappears.

Finally, the last panel in Table 3 shows the results at the bank-firm level. In contrast to the country-level regressions, where the sample of bank-country pairs remains similar across periods, here the sample of borrowers changes quite

a bit across periods. This is especially true for the late-crisis regressions because only a subset of (high-quality) firms borrowed both in the early *and* in the late-crisis period. This partially explains why we observe only limited differences between the early and late-crisis regressions and the placebo regressions. Nevertheless, when we compare our baseline with the placebo regression, the impact of all our closeness variables (except *Subsidiary*) is significantly stronger during the crisis compared to the tranquil placebo period (column 5). Furthermore, the relationship between *Distance* and *Exit* is insignificant in the placebo period but marginally significant in the early ($p=0.09$) and late crisis regression ($p=0.14$). We therefore document a strong relationship between *Distance* and *Exit* in our baseline specification (column 1). Likewise, the relationship between *Domestic banks* and *Exit* is not significant in the placebo period but becomes important during the early crisis.

Overall, Table 3 reflects that the relationship between our four closeness variables and cross-border lending either appeared or strengthened—in economic and statistical terms—during the crisis. This supports our second scenario in which the retrenchment intensity differs between banks that lend to one and the same country and depends on how close each bank is to borrowers in that country. In the alternative scenario of a general run for the exit, one would expect that any pre-crisis correlations between closeness and credit growth would have broken down or weakened during the crisis. We find the opposite: correlations appear or strengthen during the crisis. This process started during the early stage of the crisis and increased further after the fall of Lehman Brothers.

3.3 Robustness

Table 4 presents a battery of robustness tests to check whether or not our main results are sensitive to changes in variable definitions or estimation techniques. For ease of comparison, columns 1, 6, 14, and 20 replicate our baseline results. First, columns 2, 7, 15, and 21 show regression results where we include syndicated lending by bank subsidiaries. So far we have focused on pure cross-border lending: loans where the nationality of the (parent) bank is different from the nationality of the borrower *and* where the loan is provided by the parent rather than by a subsidiary. However, in about 6% of all loans, it is a local subsidiary rather than the parent bank that holds the loan on its balance sheet.[22] When we include these loan portions, our results continue to hold. We note that GL also find a flight-home effect independent of whether they include or exclude loans by subsidiaries.

Columns 3, 8, 16, and 22 in Table 4 show the results of regression specifications where we exclude the variable *Exposure*. Excluding *Exposure*

[22] Foreign subsidiaries typically do not participate in syndicated loans as the amounts involved are too large for their balance sheet (in particular when the host-country regulator enforces large-exposure limits). Funds are therefore provided directly by the bank's headquarters. Subsidiaries are often still involved by providing the parent bank with local information, which is one of the closeness impacts we analyze.

Table 4
Closeness and cross-border bank lending stability—Robustness checks

	Country												
	Sudden stop					Volume							
	Base	Including lending subs	Excluding *Exposure*	> 25 pct number pre-crisis loans	Excluding LBO and MLA	Base	Including lending subs	Excluding *Exposure*	> 25 pct number pre-crisis loans	Excluding LBO and MLA	Exclude outliers <1% and >99%	50% allocation rule	Model-based allocation rule
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Distance	0.041**	0.035**	0.041**	0.055**	0.040**	−0.279***	−0.242***	−0.274***	−0.328***	−0.270***	−0.277***	−0.298***	−0.284***
	(0.027)	(0.045)	(0.025)	(0.012)	(0.041)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Experience	−0.074***	−0.077***	−0.072***	−0.064***	−0.071***	0.481***	0.462***	0.472***	0.593***	0.436***	0.408***	0.472***	0.461***
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Subsidiary	−0.047**	−0.062**	−0.047**	−0.013	−0.033	0.280**	0.332**	0.292**	0.087	0.305**	0.249**	0.304**	0.324**
	(0.043)	(0.014)	(0.042)	(0.490)	(0.237)	(0.033)	(0.019)	(0.029)	(0.469)	(0.039)	(0.043)	(0.023)	(0.015)
Domestic banks	−0.102***	−0.106***	−0.100***	−0.114**	−0.093***	0.211	0.210*	0.194	0.249	0.209*	0.186	0.232*	0.241*
	(0.001)	(0.000)	(0.001)	(0.011)	(0.001)	(0.119)	(0.091)	(0.145)	(0.117)	(0.092)	(0.142)	(0.086)	(0.086)
Observations	1,913	1,918	1,913	1,338	1,783	1,913	1,913	1,913	1,338	1,783	1,873	1,913	1,898
R-squared	0.452	0.456	0.452	0.477	0.459	0.362	0.360	0.362	0.438	0.370	0.360	0.352	0.346

(*continued*)

Table 4
Continued

	Country						Firm			
	Number						Exit			
	Base	Including lending subs	Excluding *Exposure*	> 25 pct number pre-crisis loans	Excluding LBO and MLA	Exclude outliers <1% and >99%	Base	Including lending subs	Excluding *Exposure*	Excluding LBO and MLA
	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]
Distance	−0.077***	−0.070***	−0.081***	−0.109***	−0.072***	−0.069***	0.030**	0.039***	0.038***	0.045***
	(0.001)	(0.007)	(0.000)	(0.000)	(0.002)	(0.001)	(0.035)	(0.004)	(0.009)	(0.009)
Experience	0.178***	0.139***	0.186***	0.236***	0.177***	0.173***	−0.122***	−0.099***	−0.124***	−0.110***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Subsidiary	0.151***	0.144**	0.166***	0.132**	0.165***	0.145***	0.029	0.012	0.030	0.033
	(0.003)	(0.017)	(0.001)	(0.031)	(0.001)	(0.004)	(0.289)	(0.646)	(0.264)	(0.282)
Domestic lenders	0.019	−0.015	0.036	0.069	0.018	0.020	−0.063**	−0.058**	−0.065***	−0.066**
	(0.661)	(0.733)	(0.460)	(0.292)	(0.680)	(0.667)	(0.016)	(0.029)	(0.006)	(0.015)
Observations	1,913	1,913	1,913	1,338	1,783	1,862	2,079	2,310	2,079	1,708
R-squared	0.633	0.603	0.631	0.636	0.637	0.601	0.438	0.439	0.437	0.416

This table shows robustness tests for our baseline regressions to explain the decline in cross-border lending from bank i to destination country j (firm k) after the Lehman Brothers default. Table A3 in the Appendix provides variable definitions. We use a linear probability OLS model for the *Sudden stop* and *Exit* regressions and an OLS model for the *Volume* and *Numbers* regressions. Columns [1], [6], [14], and [20] replicate the baseline results from Table 2. Columns [2], [7], [15], and [21] are based on a sample that includes syndicated loans by local subsidiaries. Columns [3], [8], [16], and [22] are based on regressions that exclude *Exposure*. Columns [4], [9], and [17] exclude the quartile of bank-country pairs with the smallest number of pre-crisis loans. Columns [5], [10], [18], and [23] are based on a sample that excludes loans for LBOs or M&As. Columns [11] and [19] are based on a sample that excludes outliers (1% of the distribution on both sides). Column [12] shows a regression where *Volume* is based on an allocation rule where half of the loan is allocated to the participants and half to the arrangers. Column [13] shows a regression where the allocation of loans over the syndicate members is based on predicted values from a regression model. All country-level regressions include the control variables *Arranger, Exposure*, *Change trade*, and *Change bank FDI*, and bank and country fixed effects. In the *Volume* and *Number* regressions we also control for the no. of pre-crisis loans. Firm-level regressions include the variable *Arranger* measured at the bank-firm level, *Exposure*, *Change trade* and *Change bank FDI*, and bank and firm fixed effects. All standard errors are double clustered by bank and country (firm). Coefficients are marginal effects. Robust p-values appear in parentheses, and ***, **, * correspond to 1%, 5%, and 10% levels of significance, respectively.

does not affect the statistical or economic significance of our closeness variables. Next, in columns 4, 9, and 17 we present results based on a sample where we exclude the quartile of bank-country pairs with the smallest number of pre-crisis loans. In this way we check whether our results are driven by artificially large changes in countries with only few pre-crisis loans. This turns out not to be the case.

In columns 5, 10, 18, and 23 in Table 4 we then exclude loans that were provided to finance leveraged buyouts (LBOs) or mergers and acquisitions (M&As). To the extent that these loans are more cyclical, we may not fully control for the fall in demand for such loans during the crisis. However, when we limit our sample to loans that were used for general corporate purposes rather than restructuring activities, our results continue to hold (the coefficient for *Subsidiary* is estimated less precisely here).

In columns 11 and 19 in Table 4, we do not winsorize but instead exclude all outliers in the 1st and 99th percentile of the distribution of *Volume* or *Number*. Our results do not appear to be sensitive to the way we handle outliers. Finally, as explained in Section 2.1, Loan Analytics only provides information on the loan breakdown for about 25% of all loans. So far we have used a rather simple rule to distribute the other 75% of the loans: we assumed that each lender provided the same amount. To minimize the risk that we introduce a measurement error by choosing a particular distribution rule, we recalculate our *Volume* variable using two alternative methods.

In column 12 in Table 4, we allocate half of each loan to the arrangers and half to the participants (this reflects the average loan allocation across both lender types in our full-information sample). Within both groups we divide the loan equally. Our results remain very similar. In column 13 we use the 25% of our sample with full information to estimate a model in which the loan amount of individual lenders is the dependent variable. As explanatory variables, we use the average loan amount (loan amount divided by the number of lenders), a dummy that indicates whether a lender is an arranger or a participant, an interaction term between this arranger dummy and a variable that measures whether or not the borrower is a repeat borrower, an interaction term between the arranger dummy and a post–Lehman Brothers time dummy, and a set of bank and country dummies. We then use the estimated coefficients to predict the loan portion for those lenders for whom we do not know the actual amounts (we replace negative predicted values with zero and predicted values exceeding the total loan amount with this amount). Our results are also robust to using this alternative rule.

4. Extensions

4.1 Distance: Geography, culture, or institutions?

We find robust evidence for a strong negative relationship between geographical *Distance* and cross-border lending stability. However, cross-border lending

may also be impaired by cultural and institutional differences. For instance, notwithstanding a long geographical *Distance*, Spanish banks may have continued to lend to Mexican firms during the financial crisis because the cultural and historical ties between both countries made Spanish banks more at ease in dealing with Mexican firms than with, say, Turkish firms (which are closer in geographical than cultural terms). Similarly, banks may feel more confident, particularly during a crisis, when lending to firms in countries where the institutional and legal environment resembles that in their home country.

To look into the relative importance of geographical, cultural, and institutional distance, we create three non-geographical distance measures: a dummy variable that indicates whether or not the home and destination country share a common language; the difference between an index of credit information availability in the home and the destination country; and the difference between an index of creditor protection in the home and the destination country.

In the even columns in Table 5, we add these alternative distance measures to our baseline specification while we replicate our base specifications in the odd columns. It becomes clear that geographical *Distance* is a very robust determinant of lending stability. When we add our three cultural and institutional distance measures, geographical *Distance* continues to be statistically strongly related to lending stability. Moreover, the size of the coefficients is only marginally reduced.

As expected, our proxy for cultural proximity, *Common language*, is significantly and negatively correlated with the probability of a country-level *Sudden stop*, although not at the firm level. All else equal, a common language reduces the probability of a *Sudden Stop* by 8.4 percentage points. When home and destination countries share a *Common language*, the change in the *Amount* and *Number* of cross-border loans during the crisis was substantially higher too. We find similar results for the two measures of institutional distance: *Dif credit information* and *Dif creditor protection*. Cross-border lending is less stable if banks are protected less in the destination country compared to what they are used to in their home country and when less creditor information is available in the destination compared to the home country. A one-standard-deviation increase in *Dif credit information* (*Dif creditor protection)* increased the probability of a *Sudden Stop* by 6.7 (6.6) percentage points. In conclusion, cross-border credit is more stable when banks and borrowers are geographically, culturally, and institutionally closer.

4.2 Bank, borrower, and country heterogeneity

The importance of bank-borrower closeness for cross-border lending stability may vary across different types of borrowers and destination countries, as well as across different types of lenders. If closeness allows banks to rely more on lending relationships and to generate information about new borrowers, this may be particularly important when lending to opaque borrowers in

Table 5
Distance and cross-border bank lending stability

	Country						Firm	
	Sudden stop		Volume		Number		Exit	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Distance	0.041**	0.035**	−0.279***	−0.242***	−0.077***	−0.069***	0.030**	0.031**
	(0.027)	(0.043)	(0.000)	(0.003)	(0.001)	(0.006)	(0.035)	(0.029)
Common language		−0.084**		0.508***		0.115**		0.023
		(0.026)		(0.003)		(0.046)		(0.530)
Dif credit information		0.040***		−0.191***		−0.088***		0.260**
		(0.000)		(0.000)		(0.000)		(0.035)
Dif creditor protection		0.060***		−0.267***		−0.040***		−0.005
		(0.000)		(0.000)		(0.000)		(0.980)
Experience	−0.074***	−0.074***	0.481***	0.483***	0.178***	0.179***	−0.121***	−0.120***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Subsidiary	−0.047**	−0.042*	0.280**	0.249*	0.151***	0.140***	0.029	0.030
	(0.046)	(0.077)	(0.034)	(0.058)	(0.005)	(0.007)	(0.283)	(0.277)
Domestic banks	−0.102***	−0.101***	0.211	0.207	0.019	0.018	−0.063**	−0.078***
	(0.001)	(0.001)	(0.119)	(0.135)	(0.656)	(0.677)	(0.016)	(0.001)
Observations	1,913	1,913	1,913	1,913	1,913	1,913	2,079	2,079
R-squared	0.45	0.45	0.36	0.37	0.63	0.63	0.44	0.44

This table uses different distance measures to explain the decline in cross-border lending from bank i to destination country j (firm k) after the Lehman Brothers default. We use a linear probability OLS model for the *Sudden stop* and *Exit* regressions and an OLS model for the *Volume* and *Number* regressions. Table A3 in the Appendix contains variable definitions. All country-level regressions include the control variables *Arranger, Exposure*, *Change trade* and *Change bank FDI*, and bank and country fixed effects. In the *Volume* and *Number* regressions we also control for the no. of pre-crisis loans. Firm-level regressions include the variable *Arranger* measured at the bank-firm level, *Exposure*, *Change trade* and *Change bank FDI*, and bank and firm fixed effects. All standard errors are double clustered by bank and country. Coefficients are marginal effects. Robust p-values appear in parentheses, and ***, **, * correspond to the 1%, 5%, and 10% levels of significance, respectively.

difficult lending environments. To see whether this is the case, we exploit such heterogeneity in Table 6.

We first analyze whether the extent to which banks reduced their cross-border lending during the crisis varied across different borrower groups. In columns 1–2 in Table 6, we compare the importance of closeness for lending to first-time versus repeat borrowers. We define first-time borrowers as those firms in country j that had never borrowed from bank i before the collapse of Lehman Brothers. Repeat borrowers are firms in country j to whom bank i had lent at least once between 2000 and the start of the sample period. We include two observations for each bank i–country j pair: one where the dependent variable captures lending to first-time borrowers and a second one for lending to repeat borrowers.[23] We interact the closeness variables with a dummy that is one if the observation concerns lending to first-time borrowers. If loans to repeat borrowers are plagued by fewer agency problems, we expect closeness to have less impact on the reduction in cross-border lending.[24] However, we do not find

[23] Note that some pairs only occur once because for a number of bank i–country j pairs, lending did not take place to both types of borrowers in the pre-crisis period.

[24] Prior loans and the associated borrower reputation can attenuate information asymmetries (Diamond 1991; Gorton and Pennachi 1995). In line with this, De Haas and Van Horen (2010) find that arrangers of syndicated loans need to retain less of repeat loans.

Table 6
Closeness and cross-border bank lending stability (*Borrower, bank, and country heterogeneity*)

X →	First-time borrowers		Banks		Arrangers		Credit information		Creditor protection	
	Sudden stop	Volume	Sudden stop	Volume	Sudden stop	Volume	Sudden stop	Volume	Sudden stop	Volume
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Distance	0.042***	−0.206**	0.034*	−0.218***	−0.017	−0.038	0.041**	−0.305***	0.036*	−0.296***
	(0.010)	(0.014)	(0.055)	(0.003)	(0.593)	(0.783)	(0.045)	(0.002)	(0.068)	(0.001)
Distance * X	0.014	−0.056	−0.043*	0.092	0.068**	−0.292**	−0.001	0.075	0.016	0.033
	(0.454)	(0.624)	(0.065)	(0.328)	(0.048)	(0.034)	(0.976)	(0.532)	(0.535)	(0.790)
Experience	−0.068***	0.423***	−0.071***	0.470***	−0.049**	0.233*	−0.074***	0.549***	−0.071***	0.534***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.045)	(0.074)	(0.000)	(0.000)	(0.001)	(0.000)
Experience * X	−0.036*	−0.009	0.047	−0.440***	−0.030	0.273**	−0.009	−0.132	−0.010	−0.119
	(0.097)	(0.934)	(0.202)	(0.003)	(0.266)	(0.038)	(0.729)	(0.374)	(0.733)	(0.450)
Subsidiary	−0.045**	0.212*	−0.057**	0.298**	−0.129	0.431	−0.009	0.089	−0.006	0.046
	(0.033)	(0.076)	(0.046)	(0.035)	(0.163)	(0.362)	(0.700)	(0.557)	(0.811)	(0.746)
Subsidiary * X	0.005	−0.050	0.067	−0.137	0.093	−0.199	−0.107***	0.502***	−0.097***	0.540**
	(0.866)	(0.805)	(0.183)	(0.482)	(0.318)	(0.666)	(0.000)	(0.009)	(0.006)	(0.017)
Domestic banks	−0.075***	−0.044	−0.121***	0.275**	−0.134***	0.155	−0.066*	0.064	−0.083**	0.131
	(0.002)	(0.710)	(0.000)	(0.039)	(0.000)	(0.376)	(0.069)	(0.640)	(0.048)	(0.456)
Domestic banks * X	0.013	0.188	0.128***	−0.428***	0.034	0.112	−0.078	0.303	−0.033	0.170
	(0.631)	(0.180)	(0.000)	(0.002)	(0.283)	(0.485)	(0.157)	(0.285)	(0.542)	(0.435)
X	−0.002	−0.243	0.359*	0.304	−0.666**	1.940*				
	(0.989)	(0.807)	(0.081)	(0.710)	(0.018)	(0.071)				
Observations	3,140	3,140	2,505	2,505	1,913	1,913	1,913	1,913	1,913	1,913
R-squared	0.409	0.270	0.470	0.347	0.445	0.367	0.457	0.364	0.455	0.364

This table shows estimations to explain the decline in cross-border lending from bank i to destination country j after the Lehman Brothers default. Table A3 in the Appendix contains variable definitions. Columns [1]–[2] test whether closeness is more important when lending to first-time compared to repeat borrowers. Here the data contain two observations for each bank i–country j pair: one where the dependent variable is a dummy that indicates whether there was a sudden stop in lending from bank i to first-time borrowers in country j and a similar one for lending to repeat borrowers. Columns [3]–[4] test whether closeness is more important when lending to other banks as compared to non-bank borrowers. Columns [5]–[6] test whether closeness matters more for arrangers than for participants. Columns [7]–[8] test whether closeness is more important in countries where collateral and bankruptcy laws facilitate lending less than in the median country in our sample. We use a linear probability OLS model for the *Sudden stop* regressions and an OLS model for the *Volume* regressions. All specifications include destination country and bank fixed effects as well as the control variables *Arranger*, *Exposure*, *Change trade*, and *Change bank FDI*. Constant not shown. All standard errors are double clustered by bank and country. Coefficients are marginal effects. Robust p-values appear in parentheses, and ***, **, * correspond to the 1%, 5%, and 10% levels of significance, respectively.

a clear difference in the relationship between bank-borrower closeness and the stability of credit to first-time versus repeat borrowers.[25]

In columns 3–4 in Table 6, we compare the relationship between bank-borrower closeness and lending stability for lending to banks versus non-banks. We again include two observations for each bank i–country j pair: one where the dependent variable captures lending to bank borrowers and a second one for lending to non-bank borrowers. We interact the closeness variables with a dummy that is one if the observation concerns lending to bank borrowers.

Compared to other sectors, banks are intrinsically difficult to screen and monitor since they themselves are delegated monitors of a portfolio of sub-projects (Diamond 1984). Agency problems in inter-bank lending are difficult to resolve as there is not one (physical) project or factory that a potential lender can visit and inspect. Due diligence of a bank borrower is a more onerous process that involves assessing the bank's risk and operational systems, as well as the quality of a sample of the loan book. A bank's high leverage exacerbates these agency problems (Morgan 2002). During the crisis, short-term inter-bank lending virtually dried up in many countries and the extreme rise in uncertainty also had repercussions for longer-term inter-bank lending.

In line with this reasoning, Table 6 shows that bank-borrower closeness matters less for inter-bank lending. *Distance*, *Experience*, and cooperation with *Domestic banks* appear to be less important for lending to banks. This suggests that the "rules of the game" in inter-bank lending were different after the collapse of Lehman Brothers: agency problems and mistrust in the inter-bank market may simply have been too severe for banks to mitigate them in a meaningful way.

Next, we focus on lender heterogeneity by analyzing whether bank-borrower closeness mattered more for arrangers than for participants. The former take the lead in negotiating the lending terms with the borrower and in performing the due diligence, while the latter have a more passive role. Although banks specialize to some extent in either of these functions, there is substantial variation over time in the role that banks play in subsequent syndications. So far, we have not distinguished much between both types of roles that lenders can play.[26] When constructing our dependent variables, we aggregated all lending by a bank to a country regardless of whether or not that bank acted as an arranger or as a participant in the underlying deals.

We create two dependent variables for each bank i–country j pair: one where the dependent variable captures lending by the bank as an arranger

[25] The finding that closeness is important for both first-time and repeat borrowers shows that our baseline results do not merely reflect a shift to repeat borrowers (who may be concentrated in "closer" countries). The percentage of first-time borrowers did not decline much after the Lehman Brothers collapse (from 42.4% to 41.0%), possibly because concerns about high corporate leverage made repeat lending less attractive.

[26] Note that if closeness to borrowers would be inconsequential for participant banks and only matter for arrangers, this would work against finding an impact of our closeness variables on overall lending stability as our dependent variables aggregate the lending by both types of banks.

and a second one for lending done by the bank as a participant. We then interact the four closeness variables with *Arranger* in columns 5–6 in Table 6. We find some but no overwhelming evidence that closeness matters more for arrangers. A potential explanation for the absence of a clear differential impact of our closeness variables on the stability of lending is that while participants "outsource" part of the screening and monitoring to arrangers, in particular the administrative aspects, they are likely to perform independent due diligence as well. Sufi (2007, p. 642) provides evidence from practitioner interviews to this effect: "Two main factors drive participation in syndicates, specifically, the quality of the firm and how well the participant bank 'knows' the firm. The measure of information asymmetry I construct therefore attempts to capture how well participating banks know the firm absent any information relayed by the lead arranger." Indeed, Sufi then shows how information asymmetries between the participant bank and the firm influence whether a loan is provided or not.[27]

Finally, we look at the impact of destination-country heterogeneity. Table 5 showed that institutional *differences* between home and destination countries are negatively correlated with cross-border lending stability. We now analyze whether the *level* of credit information and creditor protection in destination countries influences the link between closeness and credit stability.

On the one hand, it is possible that if closeness allows banks to rely more on lending relationships and to generate information about new borrowers, it may matter more in countries where less public borrower information is available, where legal protection of creditors is below par, and where loan contracts are costly to enforce (Jappelli, Pagano, and Bianco 2005; Mian 2006). In such countries, adequate screening and monitoring may be particularly important to complement scant public information and to prevent the need to seek legal recourse.[28] We should then find a stronger relationship between closeness and cross-border lending stability to these countries.

On the other hand, bank-borrower closeness may also matter for reasons unrelated to information asymmetries. For instance, closer banks may find it easier to extract rents if nearby borrowers face lower transportation costs (Lederer and Hurter 1986) or if distant competitor banks face higher monitoring costs that they need to pass on to borrowers (Sussman and Zeira 1995; Almazan 2002). Such issues may have been particularly relevant during the crisis when many lenders left the syndications market and remaining banks could exploit "captive" borrowers. If such effects dominate, bank-borrower closeness matters for lending stability independent of the institutional environment.

[27] In line with this, Nini (2004) shows that the presence of local participants increases loan size and maturity and conjectures that this is because local banks do a better job in screening and monitoring local borrowers.

[28] The law and finance literature as developed by La Porta et al. (1998) finds that better creditor protection during bankruptcy procedures makes banks lend more. Qian and Strahan (2007) show that creditor protection is also associated with longer tenures and lower interest rates.

To analyze to what extent our data support the idea that closeness matters more in institutionally difficult countries, we distinguish between countries with ample versus scarce public *Credit information* and with strong versus weak *Creditor protection* (columns 7–10 in Table 6).[29] In both cases, a higher value of the institutional measure indicates institutions of worse quality.

When we interact our closeness variables with *Creditor information* or *Creditor protection*, our base (level) effects for *Distance*, *Experience*, and *Domestic banks* continue to hold (although the coefficients for the latter variable are in some cases estimated imprecisely). For instance, regardless of how creditor-friendly the institutional framework is, *Distance* reduces lending stability while lending *Experience* increases stability. Yet, while we find little unequivocal evidence that bank-borrower closeness is more important in institutionally difficult countries, a clear and interesting exception is that the presence of a *Subsidiary* appears to be particularly important in institutionally weak countries.

5. Conclusions

In the wake of the 2008–09 financial crisis, the virtues and vices of financial globalization are being reevaluated. Financial linkages between countries, in particular in the form of bank lending, have been singled out as a key channel of crisis transmission and the IMF and G20 have identified the volatility of cross-border capital as a priority for global financial reform (IMF 2010). These concerns among policy makers are understandable in view of an increasing body of academic evidence that shows that international banks played a pivotal role in transmitting the Lehman Brothers shock across borders.

What has so far remained unclear is whether different banks retrenched to the same extent from any given country. When we take the perspective of a particular destination country, was there a general run for the exit or did certain banks turn out to be more stable lenders than others? This question is not only pertinent from an academic perspective but also from the viewpoint of policy makers who want to gauge international banks' commitment to *their* particular country. After all, sharp reversals in cross-border credit can destabilize local financial systems and exacerbate output declines if and when domestic financial systems cannot fill the gap left by international lenders.

To answer this question, we construct a detailed data set on international bank lending during the recent financial crisis and develop an empirical strategy to identify the relationship between bank-borrower closeness and the stability of bank lending. Our results show that banks continued to lend more to countries and firms they were closer to. We find a strong and robust negative link

[29] In similar but unreported specifications, we also look at the impact of the level of economic development; the complexity of business regulation; the quality of governance; the level of corruption; and the extensiveness of political rights.

between geographical distance and lending stability. Banks also remained more committed to countries in which they had built up pre-crisis lending experience and where they were well integrated into a network of domestic co-lenders. We also find that owning a local subsidiary stabilized cross-border lending, in particular to countries with weaker institutions.

The observation that banks that are further from their customers are less reliable lenders during a crisis is in line with studies that document a persistent regional segmentation of the syndicated loan market. Carey and Nini (2007) find that borrowers tend to issue syndicated loans in their own regional market (Europe, United States, or Asia) and that banks overweight their portfolios in favor of their regional market. Houston, Itzkowitz, and Naranjo (2007) show that information costs prevent domestic borrowers from issuing syndicated loans abroad. Our results suggest that geographical segmentation may gradually be overcome if banks build up lending relationships with local borrowers and banks.

Our results clearly bear on the policy debate on financial globalization. On the upside, financial integration can increase the quality and quantity of financial services available to firms and households, especially in emerging markets. This may stimulate domestic demand, reduce global imbalances (Pongsaparn and Unteroberdoerster 2011), and allow countries to specialize more in line with their comparative advantage (Kose, Prasad, and Terrones 2003). Yet, shocks at the core of the global financial system may make cross-border lending fickle and sudden stops can have devastating consequences for local economies. Can countries reap the benefits of financial integration while reducing negative side effects? This paper provides a number of insights to help answer this question.

First, our findings indicate that financial integration is a gradual process. Through fostering lending relationships with domestic borrowers and banks, international banks become more embedded in a local economy. We find that such entrenched banks are less likely to "run." This may partly explain why periods of rapid credit inflows often turn to busts: banks have not had the time to forge durable lending relationships. Macro-prudential policies to manage lending inflows may therefore make sense if they allow for a more gradual deepening of such relationships.

A second and related implication is that it matters *which* banks lend to a country. A country's vulnerability to capital outflows depends on the geographical proximity and experience of its creditors. For countries and firms that depend on banks that are remote and have less local experience, the risk of a significant homebound retrenchment by foreign lenders will be higher, all else equal.

Third, we find that international banks with a local presence tend to be more stable lenders in countries with relatively weak institutional environments. In such countries, trustworthy public or "outside" borrower information is less readily available, creditors are legally less well protected, and banks may be less successful in recovering bad loans. For countries that are considering opening their banking system, this implies that stimulating banks to "set up shop" may

kill two birds with one stone. Not only do foreign-bank subsidiaries provide for a relatively stable credit source themselves, but their presence may also stabilize cross-border debt flows.

Finally, our findings suggest that local financial development remains important and funding cannot be completely "outsourced" to foreign lenders. Domestic banks that are close to local borrowers may continue to have a comparative advantage in screening and monitoring them. Their ability to do so may, however, usefully be leveraged by co-lending with international banks.

Appendix

Table A1
List of international lenders

		Share of cross-border in total lending (percent)		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
	Name	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis
Australia	ANZ	37	43	6,597	4,916	91	73	0.37
Australia	Commonwealth Bank of Australia	32	24	5,215	2,530	59	28	0.29
Australia	National Australia Bank	50	12	10,207	752	79	15	0.57
Australia	Westpac	30	20	5,156	2,118	61	34	0.29
Austria	BAWAGPSK	90	100	380	236	17	3	0.02
Austria	Erste Group Bank AG	93	83	5,099	1,063	185	16	0.28
Austria	Hypo Alpe-Adria-Bank	100	50	1,253	67	18	1	0.07
Austria	Oesterreichische Volksbanken AG	98	88	1,379	323	31	6	0.08
Austria	RZB	89	55	9,540	1,957	312	37	0.53
Bahrain	Arab Banking Corp - BSC	96	41	1,684	195	28	5	0.09
Bahrain	Gulf International Bank BSC	100	100	2,185	75	32	1	0.12
Belgium	Dexia	63	74	7,276	2,573	58	23	0.40
Belgium	Fortis	80	74	32,985	10,363	473	118	1.83
Belgium	KBC	86	81	15,402	4,045	219	54	0.85
Canada	BMO Capital Markets	50	41	12,762	6,876	206	131	0.71
Canada	CIBC World Markets	46	10	6,898	904	70	16	0.38
Canada	RBC Capital Markets	52	57	14,099	10,962	140	97	0.78
Canada	Scotia Capital	74	68	31,210	20,390	279	178	1.73
Canada	TD Securities Inc	33	38	5,819	6,640	63	71	0.32
China	Agricultural Bank of China	67	3	574	65	17	1	0.03
China	Bank of China Ltd	79	63	8,647	5,555	155	54	0.48
China	Bank of Communications Co Ltd	79	7	1,478	893	36	13	0.08
China	China Construction Bank Corp	79	5	2,163	635	58	14	0.12
China	China Merchants Securities Co Ltd	13	3	50	397	6	9	0.00
China	CITIC Group	36	5	322	568	19	7	0.02
China	Industrial & Commercial Bank of China	69	14	2,365	2,042	54	29	0.13
Denmark	Danske Bank	79	43	12,023	2,430	107	22	0.67
Egypt	National Bank of Egypt	79	59	547	86	47	1	0.03
France	Banque Federative du Credit Mutuel	53	73	11,008	7,384	102	48	0.61
France	BNP Paribas	80	85	85,012	49,411	744	432	4.71

(*continued*)

Table A1
Continued

		Share of cross-border in total lending (percent)		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
	Name	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis
France	Calyon	67	74	57,164	31,448	501	283	3.17
France	CASDEN Banque Populaire	20	25	497	190	23	4	0.03
France	Natixis	65	73	28,675	12,453	335	145	1.59
France	SG Corporate & Investment Banking	76	82	46,586	30,521	445	264	2.58
Germany	Commerzbank Group	71	68	54,574	19,022	661	143	3.02
Germany	Deutsche Bank	91	88	110,371	41,424	530	268	6.11
Germany	DZ Bank	73	52	11,401	4,548	194	54	0.63
Germany	NordLB	70	62	5,409	1,805	95	22	0.30
Germany	WGZ	46	11	1,102	71	61	3	0.06
Greece	Alpha Bank	65	100	1,692	39	84	1	0.09
Greece	National Bank of Greece	46	95	996	662	79	21	0.06
Hong Kong	Bank of East Asia	54	67	657	670	28	15	0.04
India	ICICI Bank	53	57	1,052	511	34	5	0.06
India	SBI Capital Markets Ltd	54	72	2,135	1,754	78	28	0.12
Ireland	Allied Irish Banks plc	97	92	16,820	2,567	203	49	0.93
Ireland	Bank of Ireland	94	96	18,206	4,590	193	58	1.01
Israel	Bank Hapoalim BM	100	100	2,064	106	62	2	0.11
Israel	Bank Leumi Le-Israel BM	49	6	672	28	14	1	0.04
Israel	Israel Discount Bank Ltd	87	52	755	250	21	7	0.04
Italy	Gruppo Banco Popolare di Verona e Novara	40	1	1,779	16	35	1	0.10
Italy	Intesa Sanpaolo	69	74	19,101	13,930	259	100	1.06
Italy	Monte dei Paschi	39	16	1,930	554	56	13	0.11
Italy	UniCredit Group	70	57	36,206	9,451	456	97	2.00
Japan	Mitsubishi UFJ Financial Group	48	27	56,086	36,810	599	321	3.11
Japan	Mizuho	52	18	51,672	16,305	540	147	2.86
Japan	Nomura	70	58	11,474	976	44	6	0.64
Japan	Norinchukin Bank Ltd	22	5	1,943	549	20	8	0.11
Japan	Sumitomo Mitsui Financial Group, Inc	44	16	39,685	15,419	449	172	2.20
Jordan	Arab Bank Group	100	100	2,822	870	53	9	0.16
Luxembourg	BCEE	68	16	642	48	30	1	0.04
Macao	Tai Fung Bank Ltd	100	100	206	55	16	3	0.01
Malaysia	CIMB Group	22	65	335	112	21	3	0.02
Malaysia	Maybank Investment Bank Bhd	79	57	1,320	325	35	9	0.07
Netherlands	ING	86	81	45,900	17,530	468	163	2.54
Netherlands	NIBC Bank	84	44	3,366	396	35	8	0.19
Netherlands	Rabobank	79	78	17,532	9,109	231	120	0.97
Norway	DnB NOR Bank ASA	70	66	11,327	3,455	112	37	0.63
Oman	Bank Muscat SAOG	73	100	613	10	26	1	0.03
Portugal	Banco BPI	96	55	2,439	306	21	3	0.14
Portugal	Banco Espirito Santo de Investimento	92	65	5,938	738	59	15	0.33
Portugal	Caixa Geral de Depositos SA - CGD	74	89	5,528	2,874	87	19	0.31
Qatar	Commercial Bank of Qatar QSC	66	0	400	0	12	0	0.02
Qatar	Doha Bank QSC	74	23	202	67	18	3	0.01
Qatar	Qatar National Bank	66	2	1,190	10	23	1	0.07
Singapore	DBS	97	93	8,417	4,407	147	88	0.47
Singapore	Oversea-Chinese Banking Corp Ltd	84	73	2,188	908	65	25	0.12

(*continued*)

Table A1
Continued

		Share of cross-border in total lending (percent)		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
	Name	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis
Singapore	UOB	87	83	7,158	1,311	97	27	0.40
South Africa	Standard Bank	69	92	2,308	1,592	98	14	0.13
Spain	BBVA	69	58	23,120	13,884	224	103	1.28
Spain	Banco Santander SA	46	53	19,671	15,381	153	88	1.09
Spain	Caja Madrid	45	45	8,294	3,392	44	16	0.46
Sweden	Nordea Bank AB	73	81	14,440	8,232	140	61	0.80
Sweden	SEB	67	73	8,384	4,816	70	38	0.46
Sweden	Svenska Handelsbanken AB	82	89	8,031	4,460	54	29	0.44
Sweden	Swedbank Markets	65	77	2,112	1,398	44	8	0.12
Switzerland	Credit Suisse	95	88	81,554	26,640	412	149	4.52
Switzerland	UBS	93	85	47,557	21,462	330	159	2.63
Taiwan	Bank of Taiwan	54	40	1,646	738	70	17	0.09
Taiwan	Cathay United Bank Co Ltd	37	8	713	72	28	7	0.04
Taiwan	Chang Hwa Commercial Bank Ltd	68	50	2,898	1,384	63	28	0.16
Taiwan	Chinatrust Commercial Bank	19	36	404	577	18	21	0.02
Taiwan	First Commercial Bank Co Ltd	58	66	1,905	2,226	64	21	0.11
Taiwan	Fubon Financial Holding Co Ltd	30	30	1,139	627	27	9	0.06
Taiwan	Hua Nan Commercial Bank Ltd	34	29	874	381	44	10	0.05
Taiwan	Shanghai Commercial & Savings Bank	30	7	223	18	25	2	0.01
Taiwan	Mega International Commercial Bank	59	54	2,417	1,504	92	30	0.13
Taiwan	Taiwan Cooperative Bank	23	11	337	164	28	10	0.02
Thailand	Bangkok Bank	70	17	610	70	36	6	0.03
Turkey	Turkiye Garanti Bankasi	100	100	945	68	45	2	0.05
UAE	Emirates NBD PJSC	48	19	1,426	257	56	2	0.08
UAE	Mashreqbank PSC	74	3	1,407	14	48	1	0.08
UK	RBS / ABN AMRO	73	79	139,710	53,457	1,014	407	7.74
UK	Barclays Capital	54	62	76,230	31,854	438	220	4.22
UK	HSBC	70	79	51,119	36,294	588	347	2.83
UK	Lloyds Banking Group	54	60	30,000	12,200	305	103	1.66
UK	NM Rothschild	88	100	2,581	11	28	1	0.14
UK	Standard Chartered Bank	79	91	15,361	9,274	299	148	0.85
US	Bank of America - Merrill Lynch	16	11	36,096	9,881	232	112	2.00
US	Bank of New York Mellon Corp	5	5	1,549	695	52	16	0.09
US	Citi	41	32	84,845	27,222	560	171	4.70
US	Comerica Bank	10	8	1,397	618	28	14	0.08
US	GE Capital Markets	19	22	8,001	3,248	74	23	0.44
US	Goldman Sachs	29	16	23,971	4,053	73	18	1.33
US	JPMorgan	21	18	55,034	18,313	275	114	3.05
US	Morgan Stanley	42	23	27,756	4,935	89	35	1.54
US	PNC Bank	42	26	14,706	5,834	294	120	0.81
US	Wells-Wachovia	6	4	7,692	2,532	138	41	0.43

This table lists all 117 banks in our sample, ordered by country of incorporation. *Pre-crisis* refers to the period from July 2006 to June 2007 and *post-Lehman* to the period October 2008–September 2009. *Share of cross-border in total lending* measures the volume of cross-border syndicated lending of the bank divided by the total volume of syndicated lending by that bank (in percent). *Volume of cross-border lending* measures the total volume of cross-border syndicated lending by the bank in U.S. dollar millions. *Number of cross-border loans* measures the number of cross-border syndications the bank took part in. *Market share* measures the market share of the bank in 2006 in the global market for cross-border syndicated lending (in percentage points).

Table A2
Overview of destination countries

Country	Volume of cross-border lending (USD m)		Number of cross-border loans		Number of cross-border loan portions		Number of active banks	
	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman
Argentina	432	623	3	4	4	13	10	10
Australia	41,608	19,628	92	80	375	275	40	47
Austria	5,554	337	8	4	39	14	21	7
Azerbaijan	758	307	8	3	60	12	13	8
Belgium	35,552	7,785	33	14	229	64	45	30
Brazil	30,849	3,050	32	16	191	51	32	24
Bulgaria	400	48	4	2	35	2	10	1
Canada	58,932	29,215	181	145	594	380	45	54
Chile	4,485	862	16	5	117	14	24	11
China	13,046	3,764	74	41	470	126	50	37
Croatia	453	790	2	5	16	18	13	11
Czech Republic	2,574	900	12	3	49	7	12	5
Denmark	29,203	17,220	32	9	192	33	42	23
Egypt, Arab Rep.	2,081	1,360	8	5	39	31	23	20
Finland	9,352	8,269	19	16	106	68	30	26
France	113,117	26,183	182	47	821	160	62	39
Germany	134,283	51,265	132	31	788	197	64	49
Greece	8,260	1,186	31	4	114	14	29	12
Hong Kong, China	11,346	5,113	68	29	368	146	53	40
Hungary	6,209	527	10	2	70	16	20	14
Iceland	6,998	5,146	17	1	202	11	38	10
India	17,348	2,712	85	22	682	53	67	26
Indonesia	2,705	4,105	28	19	115	55	29	23
Ireland	6,799	4,427	19	20	100	39	24	15
Italy	33,901	27,830	79	61	287	175	41	36
Japan	20,024	10,698	94	31	208	113	32	28
Kazakhstan	11,137	673	31	3	345	16	60	15
Korea, Rep.	10,097	4,948	51	27	241	109	50	30
Kuwait	2,479	3,311	13	7	83	19	40	10
Latvia	2,064		12		122		32	
Luxembourg	28,037	44,588	16	10	161	108	46	38
Malaysia	4,494	1,217	21	10	68	18	22	10
Mexico	16,176	7,061	35	18	213	109	34	32
Netherlands	76,906	14,375	68	27	465	153	61	48
New Zealand	8,585	5,380	44	32	115	92	12	20
Nigeria	2,452	811	7	7	34	12	8	6
Norway	16,858	5,222	65	24	260	53	45	18
Oman	591		5		19		19	
Peru	1,096	680	5	4	46	8	7	7
Philippines	693	1,432	9	7	66	41	20	19
Poland	2,588	2,663	11	5	58	26	20	14
Portugal	3,931	2,548	7	5	71	27	25	16
Qatar	6,963	4,470	14	7	106	37	24	19
Romania	1,753	709	16	4	87	16	23	12
Russian Federation	64,166	12,236	128	20	1,098	120	76	33
Saudi Arabia	9,799		7		71		28	
Slovenia	2,352	1,487	9	6	79	38	22	19
South Africa	11,700	2,993	16	7	138	36	31	29
Spain	96,521	27,389	94	54	440	220	45	36
Sweden	26,519	4,895	38	11	190	30	41	15
Switzerland	42,966	19,022	36	15	324	154	55	46
Taiwan, China	4,321	1,120	35	47	121	73	24	18

(*continued*)

Table A2
Continued

Country	Volume of cross-border lending (USD m)		Number of cross-border loans		Number of cross-border loan portions		Number of active banks	
	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman	Pre-crisis	Post-Lehman
Thailand	2,087	315	13	5	53	20	27	15
Turkey	24,626	8,880	54	18	665	227	69	49
Ukraine	4,464	236	42	4	273	10	37	7
United Arab Emirates	24,837	3,963	41	7	319	22	53	16
United Kingdom	167,532	46,627	256	82	1,048	392	71	72
United States	530,075	302,361	1,627	917	4,457	2,744	81	82
Vietnam	897	465	7	5	14	14	5	13

This table lists all 59 destination countries in our sample. Pre-crisis refers to July 2006–June 2007 and post-Lehman to October 2008–September 2009. *Volume of cross-border lending* measures the total volume of cross-border syndicated lending to the country by the banks in our sample in U.S. dollar millions. *Number of cross-border loans* measures the number of cross-border loans to the country in which at least one of the banks in our sample was active. *Number of cross-border loan portions* measures the total number of individual loan portions provided by the banks in our sample to the country (e.g., one loan with five lenders of which three foreign lenders implies three loan portions). *Number of active banks* measures the number of different banks that were at least three times as active as cross-border lenders in the country in the pre-crisis period.

Table A3
Variable definitions and sources

Variable name	Measurement period	Unit	Description	Source
Sudden stop	Jul 06–Sept 09	0/1	Dummy that is 1 if bank *i* stopped lending to country *j* in the post-Lehman Brothers period.	Loan Analytics
Volume	Jul 06–Sept 09	Log change	Log change in the amount of cross-border lending by bank *i* to country *j* post-Lehman Brothers compared to pre-crisis period.	Loan Analytics
Number	Jul 06–Sept 09	Log change	Log change in the number of cross-border loans by bank *i* to country *j* post-Lehman Brothers compared to pre-crisis period.	Loan Analytics
Exit	Jul 06–Sept 09	0/1	Dummy that is 1 if bank *i* stopped lending to firm *k* in the post-Lehman Brothers period.	Loan Analytics
Distance	-	Log km	Distance in km between bank *i* and country *j* according to the great circle distance formula (in log).	CIA World Factbook 2005
Experience	Jan 00–Jul 06	Log no.	Number of loans provided by bank *i* to country *j* (or firm *k*) since 2000 that had matured by July 2006.	Loan Analytics
Subsidiary	End 07	0/1	Dummy variable that is 1 if bank *i* majority owns a bank subsidiary in country *j*.	BankScope
Domestic banks	Jan 00–Jul 07	Log no.	Number of different domestic lenders (banks, insurance companies, etc.) in country *j* with whom bank *i* has cooperated in a syndicate between 2000 and July 2007.	Loan Analytics

(*continued*)

Table A3
Continued

Variable name	Measurement period	Unit	Description	Source
Exposure	Sept 08	%	Outstanding number of loans by bank i to country j as a percentage of the total number of loans by bank i at the time of the Lehman Brothers collapse.	Loan Analytics
Arranger	Jan 00–Jul 07	0/1	Dummy variable that is 1 if bank i acted at least once as a mandated lead arranger in country j (or for firm k in the firm-level regressions).	Loan Analytics
Change trade	Jul 06–Sept 09	Log change	Log change in (1+ export plus import between the home country of bank i and country j).	UN Comtrade
Change bank FDI	Jul 06–Sept 09	Log change	Log change in the number of banks from the home country of bank i that own a subsidiary in country j.	Claessens and Van Horen (2011)
Common language	2006	0/1	Dummy variable that is 1 if the home country of bank$i$ and country j share the same language.	CIA World Factbook 2005
Creditor protection	2006	0/1	Dummy variable that is 1 if the degree to which collateral and bankruptcy laws facilitate lending in destination country j is below the median level of all destination countries. The underlying index includes three aspects related to legal rights in bankruptcy and seven aspects found in collateral law.	Doing Business
Credit information	2006	0/1	Dummy variable that is 1 if the credit information index in destination country j is below the median level of all destination countries. The credit information index captures rules affecting scope, access, and quality of credit information.	La Porta et al. (1998)
Dif creditor protection	2006	points	Difference between the legal rights index in the home country of bank i and the index in destination country j. A positive difference indicates that collateral and bankruptcy laws are more conducive to lending in the home than in the destination country.	Doing Business
Dif credit information	2006	points	Difference between the credit information index in the home country of bank i and the index in destination country j. A positive difference indicates that public credit information is more widely available in the home than in the destination country.	La Porta et al. (1998)

(*continued*)

Table A3
Continued

Variable name	Measurement period	Unit	Description	Source
First-time borrower	Jan 00–Jul 07	0/1	Dummy variable that is 1 (0) for lending by bank i to borrowers in destination country j that never before (at least once before) borrowed from bank i	Loan Analytics
Bank	Jan 00–Jul 07	0/1	Dummy variable that is 1 (0) for lending by bank i to banks (non-banks) in destination country j.	Loan Analytics

This table presents definitions and sources of all variables used in the paper. Pre-crisis refers to July 2006–June 2007 and post–Lehman Brothers to October 2008–September 2009. Loan Analytics is Dealogic's Loan Analytics database on syndicated loans. BankScope is Bureau van Dijk's database of bank balance sheet and income statement data. IFS are the International Financial Statistics provided by the International Monetary Fund. Doing Business is the World Bank Doing Business Survey (2008).

Table A4
Correlation matrix of closeness variables

	Distance	Experience	Subsidiary	Domestic banks	Exposure
Distance	1.00				
Experience	−0.027 (0.237)	1.00			
Subsidiary	−0.104 (0.000)	0.349 (0.000)	1.00		
Domestic banks	0.057 (0.013)	0.518 (0.000)	0.186 (0.000)	1.00	
Exposure	−0.062 (0.007)	0.357 (0.000)	0.168 (0.000)	0.428 (0.000)	1.00

This table provides a matrix of the pairwise correlation coefficients between our closeness variables. P-values are in parentheses.

References

Acharya, V. V., P. Schnabl, and G. Suarez. Forthcoming. Securitization without risk transfer. *Journal of Financial Economics*.

Agarwal, S., and R. Hauswald. 2010. Distance and private information in lending. *Review of Financial Studies* 23:2757–88.

Aghion, P., and J. Tirole. 1997. Formal and real authority in organisations. *Journal of Political Economy* 105:1–29.

Aiyar, S. 2012. From financial crisis to great recession: The role of globalized banks. *American Economic Review: Papers & Proceedings* 102:225–30.

Alessandrini, P., A. F. Presbitero, and A. Zazzaro. 2009. Banks, distances, and firms' financing constraints. *Review of Finance* 13:261–307.

Almazan, A. 2002. A model of competition in banking: Bank capital versus expertise. *Journal of Financial Intermediation* 11:87–121.

Boot, A. W. A. 2000. Relationship banking: What do we know? *Journal of Financial Intermediation* 9: 7–25.

Boot, A. W. A., and A. V. Thakor. 2000. Can relationship banking survive competition? *Journal of Finance* 55: 679–713.

Brainard, S. 1997. An empirical assessment of the proximity concentration trade-off between multinationals sales and trade. *American Economic Review* 8:520–44.

Buch, C. M. 2005. Distance and international banking. *Review of International Economics* 13:787–804.

Calvo, G. A. 1998. Capital flows and capital-market crises: The simple economics of sudden stops. *Journal of Applied Economics* 1:35–54.

Calvo, G. A., and E. G. Mendoza. 2000. Rational contagion and the globalization of securities markets. *Journal of International Economics* 51:79–113.

Carey, M., and G. Nini. 2007. Is the corporate loan market globally integrated? A pricing puzzle. *Journal of Finance* 62:2969–3007.

Cetorelli, N., and L. S. Goldberg. 2011. Global banks and international shock transmission: Evidence from the crisis. *IMF Economic Review* 59:41–76.

———. Forthcoming. Liquidity management of U.S. global banks: Internal capital markets in the great recession. *Journal of International Economics*.

Chava, S., and A. Purnanandam. 2011. The effect of banking crisis on bank-dependent borrowers. *Journal of Financial Economics* 99:116–35.

Claessens, S., M. P. Dooley, and A. Warner. 1995. Portfolio capital flows: Hot or cold? *World Bank Economic Review* 9:153–74.

Claessens, S., and N. Van Horen. 2011. Trends in foreign banking: A database on foreign bank ownership. DNB Working Paper No. 330 and IMF Working Paper No. 12/10.

Cowan, K., and C. Raddatz. 2011. Sudden stops and financial frictions. Evidence from industry level data. World Bank Policy Research Paper No. 5605. Washington, DC: World Bank.

Degryse, H., and S. Ongena. 2005. Distance, lending relationships, and competition. *Journal of Finance* 60: 231–66.

Dell'Ariccia, G. 2001. Asymmetric information and the structure of the banking industry. *European Economic Review* 45:1957–80.

De Haas, R., and N. Van Horen. 2010. The crisis as a wake-up call: Do banks tighten screening and monitoring standards during a financial crisis? Working Paper No. 117. London: European Bank for Reconstruction and Development.

———. 2012. International shock transmission after the Lehman Brothers collapse: Evidence from syndicated lending. *American Economic Review: Papers & Proceedings* 102:231–37.

De Haas, R., and I. Van Lelyveld. 2010. Internal capital markets and lending by multinational bank subsidiaries. *Journal of Financial Intermediation* 19:1–25.

Diamond, D. W. 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies* 51: 393–414.

———. 1991. Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy* 99:689–721.

Esty, B. 2004. When do foreign banks finance domestic projects? New evidence on the importance of legal and financial systems. Working Paper, Harvard Business School.

Forbes, K., and F. Warnock. Forthcoming. Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*.

Gabriele, A., K. Boratav, and A. Parikh. 2000. Instability and volatility of capital flows to developing countries. *World Economy* 23:1031–56.

Giannetti, M., and L. Laeven. 2012a. Flight home, flight abroad, and international credit cycles. *American Economic Review: Papers & Proceedings* 102:219–24.

———. 2012b. The flight home effect: Evidence from the syndicated loan market during financial crises. *Journal of Financial Economics* 104:23–43.

Giannetti, M., and Y. Yafeh. 2012. Do cultural differences between contracting parties matter? Evidence from syndicated bank loans. *Management Science* 58:365–83.

Gorton, G., and G. Pennachi. 1995. Banks and loan sales: Marketing non-marketable assets. *Journal of Monetary Economics* 35:389–411.

Greenbaum, S. I., and A. V. Thakor. 1995. *Contemporary Financial Intermediation.* New York: Dryden Press.

Hauswald, R., and R. Marquez. 2006. Competition and strategic information acquisition in credit markets. *Review of Financial Studies* 19:967–1000.

Herrmann, S., and D. Mihaljek. 2010. The determinants of cross-border bank flows to emerging markets: New empirical evidence on the spread of financial crises. Deutsche Bunderbank and BIS, Working Paper.

Houston, J., J. Itzkowitz, and A. Naranjo. 2007. Borrowing beyond borders: The geography and pricing of syndicated bank loans. University of Florida and Seton Hall University, Working Paper.

Hutchison, M., and I. Noy. 2006. Sudden stops and the mexican wave: Currency crises, capital flow reversals, and output loss in emerging markets. *Journal of Development Economics* 79:225–48.

Imai, M., and S. Takarabe. 2011. Bank integration and transmission of financial shocks: Evidence from Japan. *American Economic Journal: Macroeconomics* 3:155–83.

International Monetary Fund. 2010. *The Fund's Role Regarding Cross-Border Capital Flows.* Report prepared by the Strategy, Policy, and Review Department and the Legal Department.

Ivashina, V., and D. S. Scharfstein. 2010. Bank lending during the financial crisis of 2008. *Journal of Financial Economics* 97:319–38.

Iyer, R., S. Lopes, J.-L. Peydró, and A. Schoar. 2010. The inter-bank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis. MIT and European Central Bank, Working Paper.

Jaffee, D. M., and F. Modigliani. 1971. A theory and test of credit rationing. *American Economic Review* 59: 850–72.

Jappelli, T., M. Pagano, and M. Bianco. 2005. Courts and banks: Effects of judicial enforcement on credit markets. *Journal of Money, Credit, and Banking* 37:223–44.

Kaufmann, D., A. Kraay, and M. Mastruzzi. 2007. Governance matters VI: Aggregate and individual governance indicators, 1996–2006. Policy Research Working Paper Series No. 4280. Washington, DC: World Bank.

Khwaja, A. I., and A. R. Mian. 2008. Tracing the impact of bank liquidity shocks. *American Economic Review* 98:1413–42.

Kose, M. A., E. S. Prasad, and M. E. Terrones. 2003. How does globalization affect the synchronization of business cycles? *American Economic Review* 93:57–62.

La Porta, R., F. López-de-Silanes, A. Shleifer, and R. W. Vishny. 1998. Law and finance. *Journal of Political Economy* 106:1113–55.

Lederer, P., and A. P. Hurter. 1986. Competition of firms: Discriminatory pricing and location. *Econometrica* 54:623–40.

Levchenko, A., and P. Mauro. 2007. Do some forms of financial flows help protect from sudden stops? *World Bank Economic Review* 21:389–411.

Liberti, J. M., and A. R. Mian. 2009. Estimating the effect of hierarchies on information use. *Review of Financial Studies* 22:4057–90.

McGuire, P., and N. Tarashev. 2008. Bank health and lending to emerging markets. *BIS Quarterly Review* December:67–80.

Melitz, M. J. 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica* 71:1695–1725.

Mian, A. R. 2006. Distance constraints: The limits of foreign lending in poor economies. *Journal of Finance* 61:1465–1505.

Milesi-Ferretti, G. M., and C. Tille. 2011. The great retrenchment: International capital flows during the global financial crisis. *Economic Policy* 66:285–342.

Morgan, D. 2002. Ratings banks: Risk and uncertainty in an opaque industry. *American Economic Review* 92:874–88.

Nini, G. 2004. The role of local banks in promoting external finance: A study of syndicated lending to emerging market borrowers. Federal Reserve Board, Working Paper.

Pagano, M., and T. Jappelli. 1993. Information sharing in credit markets. *Journal of Finance* 43:1693–1781.

Paravisini, D., V. Rappoport, P. Schnabl, and D. Wolfenzon. 2012. Dissecting the effect of credit supply on trade: Evidence from matched credit-export data. NBER Working Paper No. 16975.

Peek, J., and E. Rosengren. 1997. The international transmission of financial shocks: The case of Japan. *American Economic Review* 87:495–505.

———. 2000. Collateral damage: Effects of the Japanese bank crisis on the United States. *American Economic Review* 90:30–45.

Petersen, M. A., and R. G. Rajan. 2002. Does distance still matter? The information revolution in small business lending. *Journal of Finance* 57:2533–70.

Pongsaparn, R., and O. Unteroberdoerster. 2011. Financial integration and rebalancing in Asia. IMF Working Paper No. 243. Washington, DC: International Monetary Fund.

Popov, A., and G. Udell. 2012. Cross-border banking, credit access, and the financial crisis. *Journal of International Economics* 87:147–61.

Portes, R., H. Rey, and Y. Oh. 2001. Information and capital flows: The determinants of transactions in financial assets. *European Economic Review* 45:783–96.

Qian, J., and P. E. Strahan. 2007. How laws and institutions shape financial contracts: The case of bank loans. *Journal of Finance* 62:2803–34.

Rajan, R. G. 1992. Insiders and outsiders: The choice between informed and arm's-length debt. *Journal of Finance* 47:1367–1400.

Rajan, R. G., H. Servaes, and L. Zingales. 2000. The cost of diversity: The diversification discount and inefficient investments. *Journal of Finance* 55:35–80.

Reinhart, C. M., and K. S. Rogoff. 2009. *This Time Is Different. Eight Centuries of Financial Folly.* Princeton, NJ: Princeton University Press.

Rose, A. K., and T. Wieladek. 2011. Financial protectionism: The first tests. External MPV Unit Discussion Paper No. 32. London: Bank of England.

Ruckes, M. 2004. Bank competition and credit standards. *Review of Financial Studies* 17:1073–1102.

Sarno, L., and M. P. Taylor. 1999. Hot money, accounting labels, and the permanence of capital flows to developing countries: An empirical investigation. *Journal of Development Economics* 59:337–64.

Scharfstein, D. S., and J. C. Stein. 2000. The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *Journal of Finance* 55:2537–64.

Schnabl, P. 2012. Financial globalization and the transmission of bank liquidity shocks: Evidence from an emerging market. *Journal of Finance* 67:897–932.

Sharpe, S. 1990. Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. *Journal of Finance* 45:1069–87.

Stein, J. C. 2002. Information production and capital allocation: Decentralized versus hierarchical firms. *Journal of Finance* 57:1891–1921.

Sufi, A. 2007. Information asymmetry and financing arrangements: Evidence from syndicated loans. *Journal of Finance* 62:629–68.

Sussman, O., and J. Zeira. 1995. Banking and development. CEPR Discussion Paper No. 1127, London.

Tinbergen, J. 1962. *Shaping the World Economy.* New York: The Twentieth-Century Fund.

Van Rijckeghem, C., and B. Weder. 2001. Sources of contagion: Finance or trade? *Journal of International Economics* 54:293–308.

———. 2003. Spillovers through banking centres: A panel data analysis of bank flows. *Journal of International Money and Finance* 22:483–509.