

Running for the Exit: International Banks and Crisis Transmission

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This version: September 2010

Abstract

The global financial crisis has reignited the debate about the risks of financial globalization, in particular the international transmission of financial shocks. We use data on individual loans of the 118 largest international banks to examine whether banks' access to borrower information affects the transmission of a financial shock across borders. Cross-sectional and difference-in-differences regression techniques show that during a crisis banks remain more committed to lend to countries in which they have a subsidiary, that are geographically close, and where they have built up relationships with local banks over time. These results are particularly strong for bank lending to emerging markets and to firms outside the financial sector.

JEL codes: F36, F42, F52, G15, G21, G28

Keywords: Financial contagion, cross-border lending, information, loan syndication

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1. Introduction

In the wake of the 2007/2009 global crisis the virtues and vices of financial globalization are being re-evaluated (cf. IMF, 2009a). Financial linkages between countries, in particular in the form of bank lending, have been singled out as a key channel of international crisis transmission (IMF, 2009b). Indeed, after the collapse of Lehman Brothers in September 2008, syndicated cross-border lending declined by 53 percent compared to pre-crisis levels. However, as Figure 1 illustrates, there exist considerable differences – both across banks and recipient countries – in the severity of this ‘sudden stop’.

A pertinent question that is high on the academic and policy agenda is why bank lending to some countries is relatively stable whereas it is more volatile in other cases. The recent crisis, which originated in the U.S. sub-prime market and spilled over to much of the developed and developing world, provides for an ideal testing ground to answer this question. In this paper we use detailed data on lending by a large number of individual banks to borrowers in a large number of countries to demonstrate that banks’ access to borrower information – and their ability to process this information – is a key determinant of lending stability in times of crisis.

[INSERT FIGURE 1 HERE]

Banks screen new borrowers and monitor existing ones to reduce information asymmetries and the agency problems associated with debt (Allen, 1990). When screening and monitoring is difficult, the scope for adverse selection and moral hazard remains high and banks resort to credit rationing (Stiglitz and Weiss, 1981). Banks’ ability to screen and monitor varies across borrowers: agency problems are especially pronounced for opaque companies, such as small firms. Banks need to exercise considerable effort to extract ‘soft’ information from such borrowers, for instance by building up a relationship over time (Rajan, 1992; Ongena, 1999). Because opaque borrowers are difficult to screen and monitor they experience more credit rationing (Berger and Udell, 2002).

Banks’ screening and monitoring intensity also varies over time. An adverse economic shock increases the marginal benefits of screening and monitoring as the proportion of firms with a

high probability of default increases (Ruckes, 2004).¹ During a recession or crisis the net worth of firms drops and this exacerbates adverse selection and moral hazard. Banks consequently need to step up their screening and monitoring during a negative economic shock (Rajan, 1994; Berger and Udell, 2004; De Haas and Van Horen, 2010). However, banks tend to be less successful in containing increased agency problems in the case of opaque borrowers. In response to an adverse shock banks therefore resort to credit rationing of such intransparent borrowers in particular (‘flight to quality’, cf. Bernanke et al., 1996).

In line with the above, we expect that during the recent crisis cross-border lending was reduced most to countries where banks were unable to limit the increase in uncertainty through generating additional information about borrowers and had to resort to credit rationing instead. Economic theory suggests a number of factors that influence whether a bank is able to limit agency problems in specific countries. In this paper we use unique data on international bank lending to put these theoretical priors to the test.

First, we consider the geographical distance between the bank and its borrowers (Petersen and Rajan, 1994; 2002). Distant borrowers are more difficult to screen and monitor and banks therefore lend less to far-away borrowers (Jaffee and Modigliani, 1971; Hauswald and Marquez, 2006). In line with geographical credit rationing, Portes et al. (2001), Buch (2005), and Giannetti and Yafeh (2008) document a negative relationship between distance and international asset holdings – including bank loans – whereas Carling and Lundberg (2005) do not find such evidence. Similarly, and in line with an international flight to quality, we expect that distant firms became disproportionately more difficult to monitor during the crisis and therefore were rationed more by international banks.

A potentially important mechanism for banks to overcome distance constraints in cross-border lending is setting up a local subsidiary (Mian, 2006; Giannetti and Yafeh, 2008). A presence on the ground reduces information asymmetries as local loan officers are better placed to extract soft information from borrowers. Developing closer ties with borrowers may allow the bank to continue to lend to borrowers during periods of high uncertainty because screening and monitoring can be stepped up quite easily. Local staff on the ground may also make it easier for a bank to generate new cross-border deals.

¹ Conversely, during boom periods default probabilities are low and the advantages of screening and monitoring – such as reduced shirking by firm management – mostly benefit shareholders rather than creditors.

However, while a local subsidiary reduces the physical distance between the firm and the loan officer, it also creates ‘functional distance’ within the bank. Banks may experience difficulties in efficiently sending (soft) information from the subsidiary to headquarters (Aghion and Tirole, 1997; Stein, 2002). In addition, if the incentives of subsidiary managers are not aligned with those of the parent bank, internal agency costs (Scharfstein and Stein, 2000) may hamper cross-border lending. Such costs increase with distance if parent banks find it more difficult to supervise management in far-away places (Rajan et al., 2000).² Whether a subsidiary in a country makes a bank’s lending to that country more stable or not therefore depends on whether the positive effect of the shorter distance between loan officer and borrower is offset by the negative effect of a longer within-bank functional distance.

Finally, another way for banks to overcome distance constraints in cross-border lending is to co-operate with domestic banks. Domestic banks possess a comparative advantage in reducing information asymmetries vis-à-vis local firms (Mian, 2006; Carey and Nini, 2007; Houston et al., 2007) as they share the same language and culture and have a more intimate knowledge of local legal, accounting, and other institutions and their impact on firms. By (repeatedly) co-lending with domestic banks, foreign banks may gradually increase their own knowledge of local firms and reduce information asymmetries.³

To empirically examine the influence of banks’ ability to process borrower information on the stability of cross-border lending, one needs detailed bank-level data. Such an analysis should ideally be based on loan flows from individual banks to individual countries over a prolonged period of time. Data should preferably contain lending flows to various countries from individual banks (to exploit within-bank variation) as well as lending flows from various banks to individual countries (to control for credit demand at the country level). And finally, such a dataset should ideally contain the individual deals that underlie bank lending flows, so that micro information on borrowers and on inter-bank co-operation can be exploited. We use data on cross-border syndicated bank lending that fulfil all of these requirements.

² Alessandrini et al. (2009) show for Italy that a greater functional distance between loan officers and bank headquarters adversely affects the availability of credit to local firms.

³ Local bank participation leads to larger, longer, and cheaper syndicated loans (Carey and Nini, 2007). Borrowers may still value the presence of foreign banks if these are part of international bank networks that provide firms with a deeper and more liquid loan base, further reducing borrowing costs (Houston et al., 2007).

Loan syndications – groups of financial institutions that jointly provide a loan to a corporate borrower – have become one of the main channels of cross-border debt finance to both developed and emerging markets.⁴ In 2007, international syndicated loans made up over 40 percent of all cross-border funding to U.S. borrowers and more than two-thirds of cross-border flows to emerging markets.⁵ We concentrate on the 118 largest banks active in the market for cross-border syndicated loans, which together account for over 90 percent of this market. We use data on individual cross-border syndicated bank deals to construct for each of these banks a monthly snap-shot of their credit flows to firms in individual countries. This allows us to compare post-crisis and pre-crisis lending by each bank to each country.

We use cross-section and difference-in-differences regression techniques to explain this lending behaviour on the basis of variables that measure the ability of banks to screen and monitor borrowers in specific countries. We control for credit demand by using host country fixed effects – in effect analyzing how different banks change their lending to the same country differently. We find that during a crisis banks remain more committed to countries in which they have a subsidiary, that are geographically close, and where they have built up relationships with local banks over time. These results are particularly strong for bank lending to emerging markets and to firms outside the financial sector. Our analysis shows that information asymmetries between banks and their foreign customers are an important determinant of the resilience of cross-border lending during a crisis.

This paper contributes to several strands of the literature. First, we add to the literature on banking sector globalization. A first branch of this literature analyzes the impact of *multinational* banking: the creation of banks with subsidiaries and branches in various countries. Earlier evidence suggests that foreign bank entry can lead to greater efficiency of the domestic banking sector in developing countries (Claessens et al., 2001), to more accessible and cheaper credit (Crystal et al., 2000), and to faster GDP growth (Berger et al., 2004). A number of papers also demonstrate how home-country shocks can force affiliates of multinational banks to reduce their lending abroad. Peek and Rosengren (1997, 2000) show how the drop in Japanese stock prices in 1990 led Japanese bank branches in the U.S. to reduce credit. De Haas and Van Lelyveld (2010) demonstrate that lending by multinational

⁴ 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 as emerging markets.

⁵ Cross-border 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, 14^a, and 14^b).

bank subsidiaries depends on the financial strength of the parent bank. Cull and Martinez Peria (2010) summarize the empirical evidence and conclude that multinational banking has a positive impact on bank efficiency without leading to increased banking system instability. The impact on lending to small firms or on the overall credit supply is less clear-cut.

A second branch of the literature on the globalization of banks deals with *international* banking: the cross-border provision of loans from a bank's headquarters to a foreign company. *On aggregate* such cross-border lending tends to be less stable during crisis periods than lending through subsidiaries on the ground (Peek and Rosengren, 2000 and García Herrero and Martinez Peria, 2007). We contribute to and connect both of these branches of the banking literature by analyzing cross-border lending flows by banks with and without foreign subsidiary networks. We also distinguish – within one banking group – between countries of operation with and without a subsidiary. This allows us to analyze in more detail under what conditions cross-border bank lending is particularly volatile during a crisis.

Our paper is also related to the literature on financial contagion through international bank lending. Van Rijckeghem and Weder (2001, 2003) find that international banks that are exposed to a financial shock – either in their home or in a third country – reduce their bank lending to other countries. Jeanneau and Micu (2002) show that cross-border lending is determined by macroeconomic factors, such as the business cycle and monetary policy stance, in both the home and the host country. Buch et al. (2010) analyze the cross-border transmission of shocks through international bank lending and find that interest rate differentials and also energy prices determine the amount of international bank lending. An important methodological contribution of this paper is the use of detailed information on individual loans to create bank-specific data on cross-border lending flows. This allows us to go beyond assessing the impact of macroeconomic factors on international bank lending and instead test a number of hypotheses on mechanisms that banks use to mitigate information costs that hitherto have not been analyzed in an international context.

Finally, we add to the emerging literature on the latest global financial crisis. A number of recent papers use *aggregate* data from the Bank for International Settlements (BIS) to study the 2008/2009 contraction in international bank lending.⁶ They find that international banks

⁶ BIS data on 'cross-border' lending either include lending by banks' foreign affiliates (consolidated statistics) or intra-bank funding from parent banks to subsidiaries (locational statistics). Even consolidated statistics on international claims include local claims in foreign currency and thus only proxy for cross-border flows. Our data instead provides a clean measure of cross-border lending between banks and foreign borrowers.

contributed to the spreading of the crisis and that this impact was most severe in the case of banking *sectors* that were particularly vulnerable to USD funding shocks (Cetorelli and Goldberg, 2010), that displayed a low *average* level of profitability or high *average* expected default frequency (McGuire and Tarashev, 2008), or that had a poor *average* stock-market performance (Herrmann and Mihaljek, 2010). Takáts (2010) shows that supply factors – proxied by the volatility of the S&P 500 financial index – were a more important driver of the reduction in bank lending to emerging markets than local demand. While these papers provide useful insights into the factors that influence aggregate bank lending, they do not tell us much about what type of banks transmitted the crisis to what type of countries. Our data has the advantage that it contains information not only about the destination of flows but also about their bank-level origin. As such it is particularly well-suited to understand how lending flows are affected not only by borrower country characteristics but also by the characteristics of the lenders themselves.

The paper is structured as follows. Section 2 explains our data and econometric methodology in more detail, after which Section 3 describes our empirical findings. Section 4 concludes.

2. Data and econometric methodology

2.1. Data

Our main data source is the Dealogic Loan Analytics database, which provides comprehensive market information on virtually all global syndicated loans issued since the 1980s. We use this database to download all syndicated loans to private borrowers worldwide during the period 2005-2009 and then break each syndicated loan down into the various loan portions that were provided by individual banks. Unfortunately, Loan Analytics only provides detailed information on this loan distribution for about 25 per cent of all loans. This sub-sample of loans nevertheless gives a good idea of how a typical loan is distributed: on average 50 per cent of each loan is allocated to participants (junior banks) whereas the other half is retained by the loan arrangers (senior banks). We use this rule of thumb to allocate half of each loan to the arrangers and half to the participants and then further subdivide these loan portions within the arranger and participant groups on an equal basis.

We then use these loan portions to reconstruct the volume and country distribution of individual banks' monthly lending over the sample period. We focus on cross-border lending

flows, which we define as loans where the nationality of the (parent) bank is different from the nationality of the borrower.⁷ We then identify all banks that at the group level provided at least 0.01 per cent of global syndicated cross-border lending in 2006 and that participated in at least twenty cross-border loans in that year.⁸ This leaves us with a sample of 118 banks from 36 countries, both advanced (75 banks) and emerging markets (43 banks). Together these banks lent to borrowers in 60 different advanced and emerging countries and accounted for over 90 per cent of all cross-border syndicated lending in 2006.

Annex 1 lists all 118 banks by country of incorporation as well as their absolute and relative position in the global market for cross-border lending. Although most banks have a pre-crisis market share of less than 1 per cent, there are a number of big players which each make up more than 3 per cent of the market: RBS/ABN Amro (8.3 percent), Deutsche Bank (5.4), BNP Paribas (5.1), Citigroup (4.9), Barclays (4.7), Credit Suisse (3.6), Mitsubishi UFJ (3.4), JPMorgan (3.2), and Commerzbank (3.1).⁹

For each of these banks we calculate the percentage change in their average monthly cross-border lending volume – overall and by individual destination country – after the Lehman collapse (October 2008-October 2009) compared to the pre-crisis period (January 2005-July 2007). These are the bank-specific dependent variables we use in our regression analysis. Table 1 shows that on average banks reduced their lending by 39 per cent to advanced countries and by 58 per cent to emerging markets during the crisis.

[INSERT TABLE 1 HERE]

Next, we create a number of variables that measure for individual banks and individual bank-country combinations the ability of banks to mitigate the increase in information costs during

⁷ This means we also include syndicated lending by subsidiaries of a foreign bank in the country of the borrower (Citibank Poland participating in a syndicated loan to a Polish firm). However, the vast majority (94 per cent) of our cross-border lending is truly cross-border (Citibank lending from the U.S. directly to a Polish firm).

⁸ We only include commercial banks, savings banks, cooperative banks, and investment banks.

⁹ During our sample period RBS acquired part of ABN Amro; Bank of America acquired Merrill Lynch; and Wells Fargo acquired Wachovia. We consider these merged banks as a single entity over our whole sample period. We add the number of loans their respective parts provided during the pre-merger period and calculate other bank-specific variables as weighted averages, using total assets of the pre-merger entities as weights.

the crisis ('Information variables' in Table 1). We start with using the great circle distance formula to calculate the geographical distance between each 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 4,454 km but there is considerable variation (the standard deviation is 2,237 km).

In line with the theoretical priors set out in the introduction, we also create variables that proxy for the extent to which a bank can overcome distance-related agency problems through using loan officers based in the destination country itself. To do this we first link each of our banks to Bureau van Dijk's BankScope database, which not only contains information on banks' balance sheets and income statements, but also on ownership structure (both of the banks themselves and their minority and majority equity participations). For each bank we identify all majority-owned foreign bank subsidiaries, add up their respective assets and calculate a variable *Size subsidiaries* that measures the size of the foreign subsidiary network in percent of the balance sheet of the unconsolidated group. On average the international banks in our sample have built up a subsidiary network that equals almost 20 percent of the group's balance sheet. The network in advanced countries is on average twice as large as that in emerging markets and a typical bank owns a subsidiary in seven foreign countries. We also create a dummy that is 1 if a bank's foreign subsidiary network makes up at least 10 percent of the group balance sheet and a bank-country specific dummy that is 1 for each specific destination country in which a bank owns a subsidiary.

Next, we create a number of variables that measure a bank's prior experience in syndicated bank lending (in general or to a specific country). Banks that build up a lending track-record will gradually reduce information asymmetries over time and become more closely integrated into a stable network of co-lenders. We measure *Experience* as the number of loans (in logs) that a bank was involved in – either as an arranger or as a participant – since 2000 and that had already matured when Lehman Brothers collapsed.¹⁰ We weigh loans by the number of years since loan signing (older loans have a higher weight) to take into account that experience gradually built up over time will be more valuable than experience that was amassed over a recent period only. On average, a bank in our sample had been part of 4,515

¹⁰ We exclude loans that were on banks' balance sheets at the time of the Lehman collapse since these are part of our *Exposure* variable. We want to distinguish between experience built up through previous relationships (expected positive impact on lending stability) and the current exposure (which may have a negative impact on lending stability to the extent that banks reduce relatively high exposures more during a crisis).

previous syndicated loans, with banks having more than 2.5 times more experience in advanced than in emerging markets.¹¹ In each particular country a bank had on average been involved in 179 previous deals.

Finally, we count for each bank and for each of its countries of operation the number of different domestic banks (in logs) it has previously cooperated with in a lending syndicate since 2000. A better embedding in a network of local banks may allow a bank to become less of an ‘outsider’ and to free-ride on the ability of local banks to generate information about local borrowers. On average a bank has worked with 15 different domestic banks in a given country, though bank strategies differ considerably: the number of domestic co-lenders ranges between 1 and 186.

2.2. *Econometric methodology*

To examine whether increased information costs and banks’ ability to mitigate such costs impact the cross-border transmission of a financial shock, we use the bankruptcy of Lehman Brothers as an exogenous event that triggered a sudden stop in cross-border bank lending. By examining changes in average monthly lending volumes after the Lehman collapse compared to before the start of the crisis, we control directly for all time-invariant characteristics of recipient countries that influence the general level of cross-border lending (such as the institutional environment and the level of economic development). This allows us to focus on testing for heterogeneous bank behaviour as a result of differences in the way banks deal with information asymmetries vis-à-vis foreign borrowers. We use two econometric approaches: cross-sectional regressions where we focus on differences *across* banks and difference-in-differences (DID) regressions where we focus on differences *within* banks *across* countries.

In the cross-sectional regressions our dependent variable is the percentage change in aggregate monthly cross-border lending by a bank to *all* of its countries of operation. As main explanatory variables we use *Network* (the size of the subsidiary network as a percentage of the group balance); *Distance* (the weighted average distance (in logs) between the bank and its countries of operation, where we weigh with the share of each country in the pre-crisis loan portfolio); and *Experience* (the number of loans (in logs) the bank was involved in since 2000 and that had matured at the time of the Lehman collapse, weighed by the number of years since loan signing).

¹¹ This number is weighted by the number of years since signing. The unweighted average equals 693 loans.

The cross-sectional model looks as follows:

$$\Delta L_i = \alpha + \beta' \cdot I_i + \gamma' \cdot X_i + \varepsilon_i \quad (1)$$

where subscript i denotes individual banks, α is a constant term, β' and γ' are coefficient vectors, I_i is a matrix of information variables, X_i is a matrix of control variables, and ε_i is the error term. ΔL_i captures the percentage change in total monthly cross-border lending by bank i to all of its countries of operation.

As bank-specific control variables we use a number of pre-crisis (2007) variables (taken from BankScope) that control for the financial strength and balance sheet health of each bank (see Table 1). These are *Capital* (equity/total assets), *Liquidity* (Liquid assets/deposits and other short-term funding), and *Profitability* (return on assets). Controlling for banks' pre-crisis financial health is important as banks with weak balance sheets can be expected to reduce foreign exposures the most (McGuire and Tarashev, 2008; De Haas and Van Lelyveld, 2010).

We also include a variable *Demand* that controls for the change in credit demand that each bank experiences in the post-Lehman period. To construct this variable we calculate average GDP growth (quarter-on-quarter) in the four quarters after the Lehman collapse of all countries where the bank provided cross-border loans at the onset of the crisis. We weigh with the pre-crisis portfolio shares of each country. We expect that cross-border lending contracted more for banks that were exposed to countries with severe economic contractions.

To control for a bank's exposure to cross-border lending at the time of the Lehman collapse we include *Exposure*, the share of all cross-border loans as a percentage of total syndicated lending (on average 64 percent, see Table 1). We expect that banks with higher pre-crisis cross-border exposures adjusted their international lending the most in order to bring their portfolio more in line with the average market exposure.

Finally, we include a dummy variable *State support* as a control variable that indicates whether a bank received government support during the crisis. To create this dummy, we develop a database of all financial support measures – capital injections, loan guarantees, and removals of toxic assets – since the onset of the crisis. Thirty percent of the banks in our sample received some form of official government support. State support can be seen as an indicator of a bank's financial fragility during the crisis and thus as a proxy for the bank's

need to deleverage – including through reducing cross-border lending. In addition, Kamil and Rai (2010) suggest that public rescue programs may also have *caused* banks to ‘accelerate the curtailment of cross-border bank flows’. Anecdotal evidence indeed suggests that rescue packages came with strings attached in the sense that banks were asked to refocus on domestic lending. For instance, when the UK government decided to guarantee a substantial part of Royal Bank of Scotland’s assets, the bank “promised to lend GBP 50 billion more in the next two years, expanding its *domestic* loan book by a fifth (The Economist, February 28th 2009, p. 37, Italics added). Likewise, French banks that received state support had to pledge to increase domestic lending by 3-4 per cent annually, while Dutch bank ING announced that it would lend USD 32 billion to Dutch borrowers in return for government assistance (World Bank, 2009, p. 70).

After running these cross-sectional regressions, we proceed by using a DID model to explain the difference in the change in lending supply by different banks to the same country. We follow Khwaja and Mian (2008) and Schnabl (2010) who control for credit demand at the firm level by using firm fixed effects in regressions on a dataset of firms that borrow from multiple banks. Since in our dataset we have information on multiple banks lending to the same country we can use country fixed effects to rigorously control for credit demand at the host country level (cf. Cetorelli and Goldberg, 2010). This is important because the crisis hit the real economy of countries to a different extent and with a different lag. Firms’ demand for external funds to finance working capital and investments will consequently have been affected to varying degrees. Our DID model specification looks as follows:

$$\Delta L_{ij} = \beta' \cdot I_{ij} + \gamma' \cdot X_i + \varphi_j + \eta_{ij} \quad (2)$$

where subscripts i and j denote individual banks and destination countries, respectively, β' and γ' are coefficient vectors, I_{ij} is a matrix of information variables for individual bank-destination country pairs, X_i is a matrix of bank-specific control variables, φ is a vector of country fixed effect coefficients, and η is the error term. ΔL_{ij} captures the percentage change in monthly cross-border lending by bank i to country j .

Similar to the cross-sectional regressions, we include a number of variables that measure banks’ ability to overcome agency problems during the crisis. In the DID regressions, these

variables relate to individual bank-destination country pairs: *Subsidiary* is a dummy variable that is 1 if bank *i* has a subsidiary in country *j*; *Experience* measures the number of loans by bank *i* to country *j* since 2000 that had matured at the time of the Lehman collapse (weighted by the number of years since loan signing); *Distance* measures the distance (in log km) between the home country of bank *i* and destination country *j*; and *Domestic lenders* measures the number of different domestic lenders (in log) that bank *i* has co-lent with in country *j* since 2000.

Also in line with our cross-section model, we continue to use bank-level controls in the DID regressions even though – since banks are active in multiple countries – we could in principle also use bank fixed effects. Because bank-level control variables tell some interesting stories we decided to include the following variables: *Exposure* (share of loans to country *j* in the portfolio of bank *i* at the time of the Lehman collapse); *Exposure-All* (share of cross-border loans in the portfolio of bank *i* at the time of the Lehman collapse), *Experience-All* (the number of loans that the bank was involved in since 2000 and that had matured at the time of the Lehman collapse, weighted by the number of years since signing); *State support*; *Capital*; *Liquidity*; and *Profitability*. When we use bank fixed effects we find very similar results.

We estimate all our cross-section and DID models using OLS with robust standard errors (which in the DID regressions are clustered by bank).

3. Empirical results

3.1. Cross-section regression results

Table 2 presents the results from our cross-sectional analysis. The first three columns contain regression estimates for cross-border lending to all countries, the next three columns for lending to advanced countries, and the last three columns for lending to emerging markets.

[INSERT TABLE 2 HERE]

In line with our theoretical priors, it becomes clear that banks with a foreign subsidiary network displayed a significantly lower decline in cross-border bank lending during the crisis than banks that could not rely on the information generating capacities of such a network.

However, a local presence only seems to matter in emerging markets, where – at least for Western banks – (increases in) information asymmetries can be expected to have been particularly pronounced. Compared to a bank without subsidiaries, banks with at least one subsidiary abroad ($D > 0$) reduced their cross-border lending by 30 per cent less (compared to the mean decrease in lending). For emerging markets, the results become even somewhat stronger – in terms of both economic and statistical significance – when we only take large subsidiary networks into account (representing more than ten per cent of the group assets).

We find that previous experience with cross-border lending is also important for lending stability. A bank with average experience reduces its cross-border lending by 28 percent less compared to a bank with no experience. Banks that built up a track-record of syndicated lending over time turn out to be less fickle during a crisis. Again, however, this effect only holds for lending to (relatively opaque) borrowers in emerging markets.

Interestingly, we find no evidence that the average distance to foreign borrowers has an impact on lending stability. In the DID regressions we will look in more detail whether this also holds at the individual country level. We also find no cross-sectional evidence that state support has been correlated with sharper credit contractions or that banks with weaker balance sheets retracted more. The exception is that, again for lending to emerging markets only, we find that more liquid banks reduced their cross-border lending the most. This most likely reflects that banks with significant liquidity buffers are more risk averse.

3.2. Difference-in-differences regression results

Table 3 presents the results of our DID regressions in which we explain lending by individual banks to individual countries. A key advantage of this approach is that it allows us to neatly control for changes in credit demand at the country level. Overall we explain close to 20 per cent in the variation in banks' post-Lehman retrenchment from specific countries.

[INSERT TABLE 3 HERE]

A first interesting result is that we confirm our earlier finding about the importance of local subsidiaries. Cross-border lending to individual countries in which a bank owns a subsidiary is more stable. Banks on average reduced their lending to a country in which they have a

subsidiary by 26 per cent less compared to a country where they do not own a subsidiary. Again, this result only holds for lending to emerging markets. In contrast to our cross-section results, we find strong evidence for the impact of distance: banks continue to lend more during a crisis to borrowers that are relatively close. Interestingly, this result is driven by lending to advanced countries. Finally, we find that connections to a network of domestic banks is an important determinant of lending stability. For both cross-border lending to developed and emerging markets we find that the better a bank is connected to domestic banks, the more stable its lending is to that country during a crisis.

In the fourth column of each sub-set of regressions we simultaneously include all our information variables to identify the strongest determinants of lending stability. This ‘horse race’ indicates that distance and connections with domestic lenders are both key determinants of cross-border lending stability, while the presence of a local subsidiary is of lesser importance. Distance remains the most important determinant in advanced countries, whereas local connections are of greater importance in emerging markets.

Our control variables tell some interesting stories as well. As expected, banks with a high cross-border exposure *to a particular country* were those that had to rein in lending the most during the crisis in order to rebalance portfolios in the light of stricter country limits. We also confirm our cross-sectional result that lending experience is important but only when lending to (relatively opaque) borrowers in emerging markets.

Interestingly, once we adequately control for changes in credit demand in the host country, we also find very strong evidence for a negative correlation between state support and cross-border lending during the crisis. This holds for both lending to advanced and developing countries, in line with an increased focus on domestic lending by supported banks. The result holds even when we include a battery of bank-specific control variables, like balance sheet strength and the pre-crisis orientation on cross-border lending. While this seems to confirm the anecdotal evidence with regard to a negative causal impact of financial protectionism on cross-border lending, it may also partly reflect selection bias. Weaker banks, with the most binding balance sheet constraints and the biggest need to deleverage, were also those most in need of government support.

Finally, we run similar DID regressions where we split the sample into cross-border lending to banks and to non-bank borrowers (Table 4). 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 deals with assessing the bank's risk and operational systems as well as the quality of a sample of the loan book. 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 and information asymmetries in lending between banks also had repercussions for longer term lending between banks. While after the collapse of Lehman Brothers cross-border lending declined by 52.7 percent on average – compared to pre-crisis levels – this figure was 68.3 percent for cross-border lending to banks.

Indeed, the results in Table 4 indicate that none of the mechanisms that banks successfully used to limit information costs during the crisis – a local subsidiary, country-specific experience, and relationships with domestic co-lenders – helped to contain the crunch in inter-bank cross-border syndicated bank lending. Agency problems and mistrust in the inter-bank market were simply too large for banks to mitigate them in any meaningful way.

[INSERT TABLE 4 HERE]

4. Conclusions

We use a large and detailed dataset on cross-border bank lending to analyze to what extent mechanisms to mitigate information costs have enabled banks to limit their decrease in cross-border lending during the crisis. We use both cross-sectional and difference-in-differences (DID) techniques and find that the main advantage of DID, namely to carefully control for changes in credit demand, makes for crucial differences. The DID regressions show that distance and access to local knowledge of domestic banks are key determinants of the stability of cross-border credit supply during a financial crisis. We also find that previous lending experience is important, but only for the stability of lending to (relatively opaque) borrowers in emerging markets.

Our results have important implications for the policy debate surrounding financial globalization and in particular whether countries should integrate their banking systems integrate with global financial markets or not. One of the main features of cross-border lending – if not the only – that both the academic and policy debate has focused on is its

in stable character (for instance compared to lending by domestic banks or foreign bank subsidiaries). While the recent crisis has certainly further underlined this truism, our results allow the debate to go one step further and give some first answers to the question when lending is particularly volatile and when it is not.

In particular, we read our results as indicating that information asymmetries between borrowers and lenders matter not only for the amount but also for the stability of bank lending. If banks that are 'close' to borrowers turn out to be more stable sources of credit, countries may need to think about ways to benefit from local knowledge without losing out on the advantages of foreign funding. More specifically, the fact that repeat co-operation between domestic banks and foreign banks leads to more stable cross-border credit flows shows that it is possible to combine the benefits of local banks (better ability to gather and process local information) with the benefits of access to foreign capital (higher liquidity). Indeed, such co-operation may be better than relying on domestic or foreign funding only. While pure cross-border funding may be volatile due to foreign banks' inability to mitigate agency costs during a crisis ('liquidity without brains') domestic bank lending may be just as volatile due to a limited funding pool ('brains without liquidity').

And finally, and perhaps more controversially, our results indicate that banks that are further away from their customers are less reliable sources of funding, in particular when they have no local presence on the ground in the form of a subsidiary. For (potential) recipient countries that may want to open up their banking systems this may first of all imply that stimulating banks to 'set up shop' will not only provide a source of relatively stable funding through these subsidiaries themselves but will also stabilize the cross-border component of foreign bank lending. In addition, our results indicate that cross-border lenders from the same geographical region may be more committed during crisis period compared to geographically (and culturally) distant lenders. This suggests that policy makers not only need to make a decision on whether to open up their financial system but also to whom.

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Figure 1

Distribution of the change in cross-border lending after the Lehman collapse

This figure shows the distribution of the change in cross-border syndicated lending across banks (top) and borrower countries (bottom). Lending change is the percentage change in average monthly lending in the pre-crisis compared to the post-Lehman period. The pre-crisis period is defined as January 2005 to August 2007 and the post-Lehman period as October 2008 to October 2009.

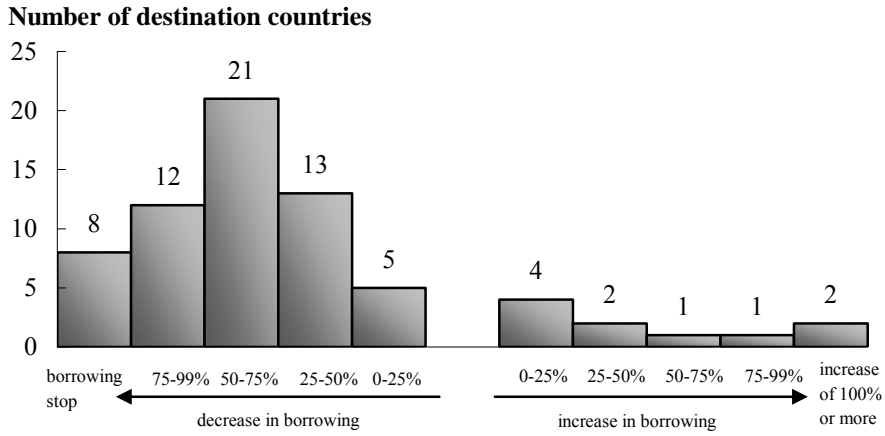
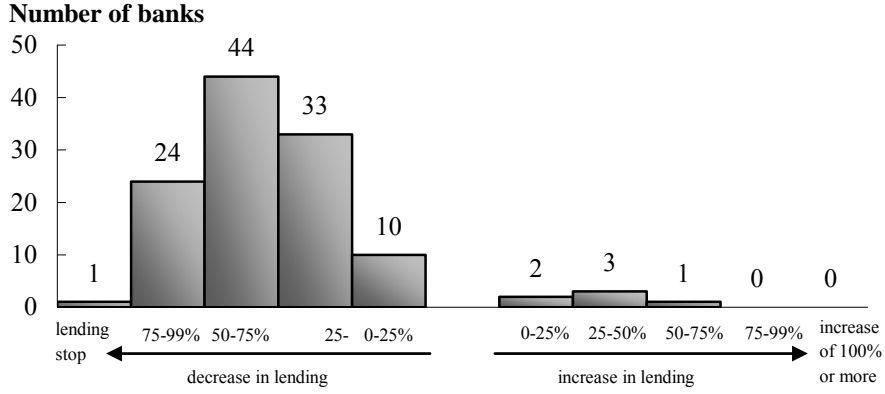


Table 1
Summary Statistics

The table shows summary statistics for the variables that we use in our model.

	Obs	Mean	Median	St Dev	Min	Max
<i>Dependent variable</i>						
Change in cross-border lending to all countries	118	-54%	-59%	31%	-100%	55%
Change in cross-border lending to advanced countries	117	-39%	-57%	65%	-100%	333%
Change in cross-border lending to emerging markets	117	-58%	-73%	58%	-100%	301%
Average change in cross-border lending to a country	118	-48%	-56%	44%	-100%	122%
<i>Information variables</i>						
Average distance between lender and borrower country (km)	118	4454	4072	2237	659	9795
Average number domestic lenders bank has cooperated with	118	15	12	19	1	186
Size subsidiaries (% balance total)	117	0.18	0.08	0.21	0	0.83
Size subsidiaries in advanced countries (% balance total)	117	0.12	0.03	0.19	0	0.82
Size subsidiaries in emerging markets (% balance total)	117	0.06	0.01	0.10	0	0.45
Number of countries in which bank owns a subsidiary	118	6.73	3.50	9.50	0	57
Experience in all countries	118	4515	1472	6321	117	27494
Experience in advanced countries	118	3257	839	5093	0	23096
Experience in emerging markets	118	1257	542	1607	0	7340
Average experience in a country a bank is active in	118	179	118	168	10	745
<i>Control variables</i>						
Exposure to all countries at time of Lehman collapse	118	0.64	0.66	0.25	0.05	1
Exposure to advanced countries at time of Lehman collapse	118	0.41	0.41	0.28	0	1
Exposure to emerging markets at time of Lehman collapse	118	0.23	0.14	0.24	0	0.98
Supported bank	118	0.30	0.00	0.46	0	1
Demand in world	118	-0.02	-0.03	0.02	-0.06	0.05
Demand in advanced countries	117	-0.03	-0.03	0.01	-0.06	0.01
Demand in emerging markets	117	-0.01	-0.01	0.03	-0.07	0.05
Size of the bank (million \$))	118	551	245	780	3	5,317
Capital of the bank	117	6%	6%	4%	-14%	18%
Liquidity of the bank	118	40%	31%	40%	3%	312%
Profitability of the bank	118	1%	1%	1%	-3%	4%

Table 2
Information and crisis transmission - cross-section results

Dependent variable is the bank-specific percentage change in average monthly cross-border lending between the period after the collapse of Lehman Brothers (Oct 2008-Oct 2009) and the pre-crisis period (Jan 2005-July 2007). In the first three regressions we look at cross-border lending to all countries in our sample, in the second group of regressions only at cross-border lending to advanced countries (high-income OECD), and in the last group at cross-border lending to emerging markets. In the last two groups only banks are included with at least 20 loans to the group of countries under consideration in the pre-crisis period. *Network* equals the share of the subsidiaries' assets in total assets of the parent bank. *Network (D:>0)* is a dummy which is one if the bank has at least one subsidiary and *Network (D:>10%)* is a dummy which is one if the sum of assets of the subsidiaries capture at least ten percent of the assets of the parent bank. In the advanced country and emerging market regressions only subsidiaries in these countries are taken into account. *Distance* is the weighted average of the distance between the country of the bank and the borrower country. The weights equal the share of the country in the pre-crisis portfolio of the bank. *Experience* is the number of loans (in logs) that the lender was involved in since 2000 and that had already matured at the time of the Lehman collapse. Loans are weighted by year with loans signed in 2000 having a weight of nine and loans signed at (the beginning of) 2008 a weight of one. For advanced countries and emerging market regressions only loans to those countries are taken into account. *Exposure* equals the share of cross-border loans to all countries, to advanced countries, and to emerging markets, respectively, in the bank' portfolio at the time of the Lehman collapse. *State support* is a dummy which is one if the bank received government support during the financial crisis. *Demand* equals the weighted GDP growth in the four quarters after the collapse of Lehman for each country in which the bank had a pre-crisis exposure. The weight of each country is equal to its weight in the portfolio of the lender. *Capital* equals the equity to asset ratio of the bank (2007), *Liquidity* captures liquid assets to deposits and other short-term funding (2007), and *Profitability* equals return on assets (2007). The model is estimated using OLS. Standard errors are heteroskedasticity robust and clustered by bank. Robust p-values appear in brackets and ***, **, * correspond to one, five and ten percent level of significance, respectively.

	All countries			Advanced countries			Emerging markets		
Network	0.123 [0.361]			0.008 [0.960]			0.564* [0.100]		
Network (D:>0)	0.180** [0.046]			0.021 [0.842]			0.150** [0.020]		
Network (D:>10%)	0.121* [0.081]			-0.045 [0.584]			0.236*** [0.005]		
Distance	0.051 [0.230]	0.048 [0.270]	0.045 [0.303]	0.054 [0.166]	0.054 [0.174]	0.059 [0.140]	-0.012 [0.844]	-0.012 [0.834]	0.006 [0.919]
Experience	0.046* [0.058]	0.037 [0.115]	0.042* [0.071]	0.015 [0.522]	0.012 [0.634]	0.02 [0.410]	0.075** [0.012]	0.064* [0.051]	0.063** [0.016]
Exposure	-0.051 [0.742]	-0.057 [0.712]	-0.11 [0.490]	-0.278 [0.261]	-0.274 [0.247]	-0.253 [0.319]	-0.172 [0.343]	-0.099 [0.587]	-0.162 [0.347]
State support	-0.069 [0.226]	-0.051 [0.354]	-0.079 [0.162]	-0.1 [0.156]	-0.1 [0.155]	-0.1 [0.154]	-0.011 [0.872]	0.005 [0.945]	-0.008 [0.898]
Demand	1.241 [0.566]	1.172 [0.567]	1.218 [0.558]	2.145 [0.581]	2.24 [0.584]	2.011 [0.606]	2.357 [0.118]	1.742 [0.247]	2.092 [0.143]
Capital	-0.671 [0.605]	-0.462 [0.640]	-0.666 [0.600]	-2.253 [0.230]	-2.139 [0.228]	-2.35 [0.197]	-0.518 [0.573]	-0.346 [0.634]	-0.678 [0.449]
Liquidity	-0.146* [0.098]	-0.148* [0.086]	-0.136 [0.143]	-0.089 [0.363]	-0.091 [0.367]	-0.088 [0.368]	-0.164* [0.058]	-0.191** [0.027]	-0.172** [0.045]
Profitability	-2.953 [0.550]	-2.02 [0.683]	-2.479 [0.629]	3.383 [0.735]	2.974 [0.762]	3.377 [0.733]	0.182 [0.950]	0.41 [0.881]	0.175 [0.949]
Constant	-1.106*** [0.004]	-1.164*** [0.002]	-1.035*** [0.008]	-0.623 [0.135]	-0.616 [0.152]	-0.687 [0.116]	-0.939* [0.052]	-0.966** [0.044]	-1.007** [0.031]
Observations	116	116	116	90	90	90	102	102	102
R-squared	0.10	0.14	0.13	0.13	0.13	0.13	0.14	0.15	0.20

Table 3
Information and crisis transmission - Difference in differences results

Dependent variable is the percentage change in average monthly cross-border lending of bank *i* to country *j* in the period after the collapse of Lehman (Oct 2008-Oct 2009) compared to the pre-crisis period (Jan 2005-July 2007). The first group of regressions includes all countries, the second only advanced countries (high-income OECD) and the third one only emerging markets. *Subsidiary* is a dummy which is one if the bank has a subsidiary in the country. *Experience* is the number of loans (in logs) to country *i* that the lender was involved in since 2000 that had already matured when Lehman Brothers collapsed. Loans are weighted by year with loans signed in 2000 having a weight of nine and loans signed in (the beginning of) 2008 a weight of one. *Distance* is the log of the distance (in kilometres) between the home country of the bank and the borrower country. *Domestic loans* is the number of loans to country *j* that bank *i* was involved in between 2000 and the collapse of Lehman Brothers and where at least one domestic bank was among the syndicate members divided by the total number of loans bank *i* was involved in in country *j* over the same period. *Domestic lenders* equals the number of different domestic lenders (in logs) with whom the bank has been active in a syndicate between 2000 and the collapse of Lehman Brothers. *Exposure* equals the number of loans to country *j* as a percentage of total loans in the portfolio of the bank at the moment of the Lehman Brothers collapse. For a description of the other control variables see Table 1. The model is estimated using OLS and includes country fixed effects. Standard errors are heteroskedasticity robust and clustered by bank. Robust p-values appear in brackets and ***, **, * correspond to one, five and ten percent level of significance, respectively.

	All countries					Advanced countries					Emerging markets				
Subsidiary	0.125**				0.087	0.095				0.062	0.183**				0.141
	[0.033]				[0.127]	[0.247]				[0.443]	[0.045]				[0.121]
Experience		0.020			-0.020		0.023			-0.029		0.032			-0.001
		[0.203]			[0.323]		[0.306]			[0.313]		[0.255]			[0.986]
Distance			-0.069***		-0.058**			-0.092***		-0.083***			-0.052		-0.030
			[0.002]		[0.018]			[0.001]		[0.007]			[0.175]		[0.438]
Domestic lenders				0.114***	0.103**				0.150*	0.140				0.108***	0.083*
				[0.003]	[0.034]				[0.070]	[0.173]				[0.010]	[0.073]
Exposure	-0.631**	-0.640**	-0.668***	-0.840***	-0.900***	-0.457	-0.508*	-0.479*	-0.768**	-0.721**	-0.868	-0.829	-0.808	-0.924	-1.121*
	[0.013]	[0.014]	[0.009]	[0.003]	[0.002]	[0.125]	[0.092]	[0.098]	[0.029]	[0.043]	[0.178]	[0.184]	[0.178]	[0.152]	[0.088]
State support	-0.136***	-0.137***	-0.150***	-0.144***	-0.156***	-0.116**	-0.123**	-0.147***	-0.133**	-0.150***	-0.125**	-0.120*	-0.124*	-0.125**	-0.133**
	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.028]	[0.023]	[0.009]	[0.015]	[0.006]	[0.042]	[0.054]	[0.051]	[0.038]	[0.031]
Experience - all	0.067***	0.061***	0.088***	0.054***	0.076***	0.039	0.028	0.058**	0.022	0.053	0.076***	0.063*	0.092***	0.058**	0.063*
	[0.000]	[0.003]	[0.000]	[0.005]	[0.001]	[0.165]	[0.403]	[0.029]	[0.514]	[0.123]	[0.006]	[0.061]	[0.001]	[0.042]	[0.061]
Exposure - all	-0.071	-0.063	-0.165	-0.078	-0.163	-0.410**	-0.383**	-0.561***	-0.399**	-0.569***	0.022	0.000	-0.065	-0.023	-0.044
	[0.526]	[0.581]	[0.169]	[0.484]	[0.198]	[0.021]	[0.038]	[0.002]	[0.022]	[0.003]	[0.903]	[0.999]	[0.755]	[0.898]	[0.831]
Capital	0.733	0.563	0.814	0.500	0.790	-1.868	-1.837	-1.316	-1.944	-1.461	0.602	0.310	0.557	0.445	0.601
	[0.547]	[0.641]	[0.495]	[0.684]	[0.508]	[0.421]	[0.434]	[0.564]	[0.413]	[0.525]	[0.687]	[0.836]	[0.706]	[0.768]	[0.689]
Liquidity	0.062	0.065	0.071	0.064	0.067	0.052	0.056	0.071	0.058	0.068	0.058	0.058	0.062	0.054	0.061
	[0.199]	[0.178]	[0.120]	[0.178]	[0.136]	[0.374]	[0.336]	[0.186]	[0.318]	[0.196]	[0.523]	[0.528]	[0.494]	[0.552]	[0.493]
ROAA	4.569	4.986	4.948	4.660	4.416	14.979**	14.649**	16.791**	15.381**	17.462**	1.230	2.195	1.656	1.366	0.805
	[0.196]	[0.159]	[0.163]	[0.187]	[0.208]	[0.046]	[0.050]	[0.025]	[0.040]	[0.019]	[0.739]	[0.553]	[0.653]	[0.711]	[0.830]
Observations	2128	2128	2128	2128	2128	968	968	968	968	968	1160	1160	1160	1160	1160
R-squared	0.18	0.18	0.18	0.18	0.18	0.14	0.14	0.15	0.14	0.15	0.21	0.20	0.20	0.21	0.21

Table 4
Information and crisis transmission - Banks vs non-bank borrowers

Dependent variable is the percentage change in average monthly cross-border lending of bank *i* to country *j* in the period after the collapse of Lehman (Oct 2008-Oct 2009) compared to the pre-crisis period (Jan 2005-July 2007). The first group of regressions includes lending to banks, the second to all non-bank borrowers. *Experience* is the number of loans (in logs) to country *i* that the lender was involved in since 2000 that had already matured when Lehman Brothers collapsed. Loans are weighted by year with loans signed in 2000 having a weight of nine and loans signed in (the beginning of) 2008 a weight of one. *Distance* is the log of the distance (in kilometres) between the home country of the bank and the borrower country. *Domestic lenders* equals the number of different domestic lenders (in logs) with whom the bank has been active in a syndicate between 2000 and the collapse of Lehman Brothers. *Exposure* equals the number of loans to country *j* as a percentage of total loans in the portfolio of the bank at the moment of the Lehman Brothers collapse. For a description of the other control variables see Table 1. The model is estimated using OLS and includes country fixed effects. Standard errors are heteroskedasticity robust and clustered by bank. Robust p-values appear in brackets and ***, **, * correspond to one, five and ten percent level of significance, respectively.

Subsidiary	Banks					Non banks				
	0.011				0.010	0.172**				0.141*
	[0.747]				[0.760]	[0.020]				[0.061]
Experience		0.003			0.002		0.026			-0.009
		[0.692]			[0.814]		[0.184]			[0.756]
Distance			0.005		0.008			-0.070**		-0.057*
			[0.670]		[0.485]			[0.017]		[0.072]
Domestic lenders				0.010	0.010				0.092*	0.058
				[0.656]	[0.679]				[0.068]	[0.384]
Exposure	0.103	0.095	0.125	0.081	0.077	-0.861***	-0.862***	-0.851***	-0.951***	-1.072***
	[0.328]	[0.426]	[0.227]	[0.512]	[0.563]	[0.003]	[0.004]	[0.003]	[0.002]	[0.001]
State support	0.028	0.027	0.030	0.027	0.029	-0.190***	-0.192***	-0.204***	-0.197***	-0.206***
	[0.267]	[0.288]	[0.252]	[0.281]	[0.265]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Experience - all	0.028***	0.027**	0.027**	0.026**	0.023*	0.061**	0.053*	0.085***	0.054**	0.070**
	[0.007]	[0.010]	[0.014]	[0.023]	[0.060]	[0.015]	[0.054]	[0.001]	[0.039]	[0.020]
Exposure - all	-0.068	-0.069	-0.060	-0.069	-0.056	-0.102	-0.090	-0.196	-0.103	-0.180
	[0.205]	[0.205]	[0.310]	[0.201]	[0.354]	[0.441]	[0.502]	[0.146]	[0.436]	[0.213]
Capital	0.283	0.255	0.266	0.257	0.250	0.020	-0.237	0.047	-0.219	0.085
	[0.527]	[0.564]	[0.554]	[0.561]	[0.578]	[0.989]	[0.880]	[0.976]	[0.889]	[0.956]
Liquidity	-0.021	-0.021	-0.020	-0.022	-0.021	0.067	0.071	0.079	0.072	0.075
	[0.428]	[0.441]	[0.445]	[0.425]	[0.445]	[0.288]	[0.264]	[0.189]	[0.262]	[0.212]
ROAA	1.718	1.753	1.783	1.713	1.713	7.410	8.035	7.989	7.693	7.444
	[0.264]	[0.258]	[0.249]	[0.268]	[0.265]	[0.166]	[0.133]	[0.130]	[0.150]	[0.165]
Observations	1241	1241	1241	1241	1241	1946	1946	1946	1946	1946
R-squared	0.17	0.17	0.17	0.17	0.17	0.19	0.18	0.19	0.18	0.19

Appendix Table 1
List of international lenders

This table lists all 118 banks in our sample, ordered by country of incorporation. *Pre-crisis* refers to the period Jan 2005-July 2007 and *post-Lehman* to the period Oct 2008-Oct 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 USD 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 total global market for cross-border syndicated lending (in percentage points).

	Name	Share of cross-border in total lending		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
		Pre-crisis	Crisis: post-Lehman	Pre-crisis	Crisis: post-Lehman	Pre-crisis	Crisis: post-Lehman	Pre-crisis
Australia	National Australia Bank	55	31	21,082	2,507	266	51	0.44
Australia	ANZ	36	43	15,114	5,388	231	80	0.26
Australia	Commonwealth Bank of Australia	33	23	10,507	2,437	141	32	0.25
Australia	Westpac	30	17	10,323	1,729	125	35	0.23
Austria	RZB	94	97	18,504	4,196	783	55	0.38
Austria	Erste Group Bank AG	96	96	9,754	927	482	21	0.26
Austria	Hypo Alpe-Adria-Bank	99	100	1,089	133	48	2	0.05
Austria	Oesterreichische Volksbanken AG	93	90	1,861	198	64	6	0.03
Austria	BAWAGPSK	88	100	1,190	187	89	3	0.03
Bahrain	Gulf International Bank BSC	97	100	5,924	75	111	1	0.14
Bahrain	Arab Banking Corp - BSC	94	100	4,787	302	100	8	0.09
Belgium	Fortis	85	80	77,901	8,732	1,269	149	1.53
Belgium	KBC	87	85	31,153	3,786	646	62	0.62
Belgium	Dexia	91	93	18,830	4,042	180	53	0.57
Canada	Scotia Capital	72	68	65,979	17,694	805	200	1.26
Canada	BMO Capital Markets	65	51	33,341	7,926	718	152	0.74
Canada	RBC Capital Markets	63	55	38,825	9,260	376	110	0.67
Canada	TD Securities Inc	51	56	18,785	8,225	312	138	0.36
Canada	CIBC World Markets	44	9	13,538	615	166	19	0.25
China	Bank of China Ltd	87	73	21,422	8,630	505	68	0.48
China	Industrial & Commercial Bank of China - ICBC	89	52	6,197	2,201	225	42	0.15
China	Bank of Communications Co Ltd	88	32	3,329	512	102	18	0.09
China	China Construction Bank Corp - CCB	72	33	3,577	723	159	20	0.08
China	China Merchants Securities Co Ltd	90	33	3,646	431	59	16	0.06
China	Agricultural Bank of China	71	9	1,574	137	69	6	0.03
China	CITIC Group	68	52	1,187	578	78	14	0.02
Denmark	Danske Bank	86	78	25,299	5,072	406	39	0.65
Egypt	National Bank of Egypt	75	100	1,306	174	126	2	0.04
France	BNP Paribas	78	85	213,787	45,450	2,359	474	5.10
France	Calyon	69	76	136,839	28,928	1,681	358	2.86
France	SG Corporate & Investment Banking	73	82	112,182	25,394	1,341	293	2.62
France	Natixis	55	70	50,563	10,147	960	168	1.22
France	Banque Federative du Credit Mutuel - BFCM	46	68	18,209	5,637	269	52	0.38
France	CASDEN Banque Populaire	40	16	2,415	94	64	4	0.12
Germany	Deutsche Bank	91	91	252,748	36,460	1,464	290	5.44
Germany	Commerzbank Group	71	72	125,951	16,476	1,792	152	3.13
Germany	DZ Bank	79	59	21,911	4,762	478	59	0.50
Germany	NordLB	74	67	9,852	2,028	301	32	0.17
Germany	WGZ	60	7	1,333	20	146	2	0.03
Greece	Alpha Bank	62	100	2,405	23	185	1	0.07
Greece	National Bank of Greece	64	96	1,919	496	178	21	0.03
Hong Kong	Bank of East Asia	64	73	2,104	614	131	22	0.05
Hong Kong	Iyo Finance (Hong Kong) Ltd	100	100	1,044	513	197	55	0.03
India	SBI Capital Markets Ltd	60	11	3,016	1,475	190	27	0.06
India	ICICI Bank	69	67	1,954	562	91	7	0.04
Ireland	Bank of Ireland	91	94	25,197	3,848	486	62	0.54
Ireland	Allied Irish Banks plc	92	95	25,778	2,454	561	51	0.53
Israel	Bank Hapoalim BM	100	100	3,490	48	149	2	0.09
Israel	Bank Leumi Le-Israel BM	100	100	2,191	329	63	13	0.06

Appendix Table 1- cont'd

	Name	Share of cross-border in total lending		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
		Pre-crisis	Crisis: post-Leh man	Pre-crisis	Crisis: post-Leh man	Pre-crisis	Crisis: post-Leh man	Pre-crisis
Israel	Israel Discount Bank Ltd	100	100	1,338	403	69	13	0.04
Italy	UniCredit Group	83	87	86,313	11,476	1,582	143	1.78
Italy	Intesa Sanpaolo	66	74	41,266	10,448	763	102	0.93
Italy	Monte dei Paschi	70	15	8,112	419	208	13	0.11
Italy	Gruppo Banco Popolare di Verona e Novara Scarl	51	1	3,180	16	117	1	0.05
Japan	Mitsubishi UFJ Financial Group	67	38	174,833	39,457	2,243	544	3.44
Japan	Mizuho	52	21	100,243	14,541	1,557	167	2.33
Japan	Sumitomo Mitsui Financial Group, Inc	45	19	78,368	15,660	1,364	211	1.54
Japan	Nomura	100	53	24,087	272	113	6	0.58
Japan	Norinchukin Bank Ltd	22	5	3,012	389	64	10	0.05
Jordan	Arab Bank Group	100	100	7,361	731	150	11	0.16
Luxembourg	BCEE	86	17	1,750	25	86	1	0.03
Macao	Tai Fung Bank Ltd	100	100	2,694	175	48	3	0.08
Malaysia	Maybank Investment Bank Bhd	93	83	3,070	536	156	17	0.08
Malaysia	CIMB Group	45	62	1,024	266	89	6	0.02
Netherlands	ING	86	84	98,876	15,820	1,418	204	1.99
Netherlands	Rabobank	78	75	33,342	6,723	659	132	0.73
Netherlands	NIBC Bank	63	43	3,693	481	83	12	0.09
Norway	DnB NOR Bank ASA	63	57	24,295	2,666	308	41	0.56
Oman	Bank Muscat SAOG	64	100	958	11	76	1	0.02
Portugal	Caixa Geral de Depositos SA - CGD	95	57	7,667	1,928	185	25	0.21
Portugal	Banco Espirito Santo de Investimento	94	57	5,686	1,352	117	29	0.17
Portugal	Banco BPI	93	22	2,347	253	60	5	0.11
Qatar	Qatar National Bank	56	15	1,904	45	56	3	0.04
Qatar	Commercial Bank of Qatar QSC	47	0	661	0	51	0	0.02
Qatar	Doha Bank QSC	65	19	568	36	55	3	0.01
Singapore	DBS	85	68	14,064	3,195	398	93	0.29
Singapore	UOB	86	48	9,678	1,137	282	33	0.24
Singapore	Oversea-Chinese Banking Corp Ltd	69	46	4,189	1,106	182	32	0.15
South Africa	Standard Bank	88	100	4,993	1,205	227	21	0.11
Spain	BBVA	79	77	55,402	18,017	781	217	1.50
Spain	Banco Santander SA	64	66	46,243	16,121	660	163	0.98
Spain	Caja Madrid	55	48	14,825	3,503	114	19	0.34
Sweden	Nordea Bank AB	84	88	40,912	7,206	451	75	1.09
Sweden	SEB	67	79	20,001	4,510	248	41	0.46
Sweden	Svenska Handelsbanken AB	76	91	17,383	3,389	163	33	0.39
Sweden	Swedbank Markets	51	53	3,722	626	105	8	0.10
Switzerland	Credit Suisse	97	93	167,344	23,598	1,083	155	3.59
Switzerland	UBS	97	87	106,681	18,008	854	160	2.31
Taiwan	First Commercial Bank Co Ltd	72	63	4,731	1,363	183	24	0.13
Taiwan	Chang Hwa Commercial Bank Ltd	72	42	4,544	954	190	33	0.13
Taiwan	Mega International Commercial Bank Co Ltd	59	53	5,564	966	276	34	0.11
Taiwan	Bank of Taiwan	52	51	3,000	690	170	20	0.08
Taiwan	Hua Nan Commercial Bank Ltd	53	26	2,351	301	144	13	0.05
Taiwan	Cathay United Bank Co Ltd	28	14	1,051	116	83	10	0.04
Taiwan	Fubon Financial Holding Co Ltd	27	25	1,158	364	70	14	0.03
Taiwan	Taiwan Cooperative Bank	30	15	1,085	178	62	11	0.03
Taiwan	Shanghai Commercial & Savings Bank Ltd	47	3	1,184	11	81	2	0.02
Taiwan	Chinatrust Commercial Bank	23	47	1,098	661	65	24	0.01
Thailand	Bangkok Bank Ltd	86	31	1,024	68	94	8	0.03

Appendix Table 1- cont'd

	Name	Share of cross-border in total lending		Volume of cross-border lending (USD m)		Number of cross-border loans		Market share (ppts.)
		Pre-crisis	Crisis: post-Leh man	Pre-crisis	Crisis: post-Leh man	Pre-crisis	Crisis: post-Leh man	Pre-crisis
Turkey	Turkiye Garanti Bankasi AS	100	100	1,123	29	103	2	0.02
UAE	Mashreqbank PSC	73	44	2,853	113	147	3	0.04
UAE	Emirates NBD PJSC	42	20	2,042	112	155	2	0.04
UK	RBS / ABN AMRO	77	79	360,862	44,010	2,930	445	8.33
UK	Barclays Capital	78	81	247,708	33,772	1,604	254	4.69
UK	HSBC	78	86	144,716	34,130	1,978	422	2.76
UK	Lloyds Banking Group	51	60	61,802	11,597	871	122	1.43
UK	Standard Chartered Bank	92	89	40,274	8,967	977	170	1.00
UK	NM Rothschild	88	100	2,188	7	60	1	0.03
US	Citi	48	36	234,311	30,775	1,646	195	4.85
US	JPMorgan	27	18	145,908	17,519	788	118	3.18
US	Goldman Sachs	52	24	76,400	6,302	204	21	1.47
US	Bank of America - Merrill Lynch	15	11	78,935	9,297	692	119	1.41
US	Morgan Stanley	49	22	58,251	4,113	210	35	1.12
US	GE Capital Markets Inc	24	28	18,074	3,043	275	30	0.47
US	Wells - Wachovia Securities	7	5	18,339	2,051	371	40	0.34
US	Bank of New York Mellon Corp	6	7	5,035	749	171	17	0.11
US	Comerica Bank	13	8	3,664	456	67	14	0.08
US	PNC Bank NA	37	22	25,992	3,763	764	120	0.05