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## Who Pays for Financial Crises? Price and Quantity Rationing of Different Borrowers by Domestic and Foreign Banks

by Allen N. Berger, Tanakorn Makaew, and Rima Turk-Ariss

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I N T E R N A T I O N A L M O N E T A R Y F U N D

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Who Pays for Financial Crises?  
Price and Quantity Rationing of Different Borrowers  
by Domestic and Foreign Banks

**Prepared by Allen N. Berger, Tanakorn Makaew, and Rima Turk-Ariss**

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**Abstract**

Financial crises result in price and quantity rationing of otherwise creditworthy business borrowers, but little is known about the relative severity of these two types of rationing, which borrowers are rationed most, and the roles of foreign and domestic banks. Using a dataset from 50 countries containing over 18,000 business loans with information on the lender, the borrower, and contract terms, we find that publicly-listed borrowers are rationed more by prices or interest rates, whereas privately-held borrowers are rationed more by the number of loans. Also, the global financial crisis appears to have changed how banks price borrower risk. Further, there are important differences between foreign and domestic banks and between U.S. and non-U.S. loans.

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## 1. Introduction

Financial crises have many adverse consequences, including the rationing of bank loans to otherwise creditworthy business borrowers. In this paper, we address which of these borrowers – publicly-listed versus privately-held – suffer from for financial crises in terms of both price and quantity credit rationing, and the roles of both domestic and foreign banks in this rationing. We also distinguish between U.S. banks and borrowers and those in the rest of the world. Our dataset contains over 18,000 business loans with bank, borrower, loan, and relationship information from 50 developed and developing countries over 2004-2011, with the last 4 years 2008-2011 identified as the crisis period. The data are gathered from four major data sources: DealScan for loans, BankScope for banks, Orbis for borrower fundamentals, and Osiris for borrower listing status.<sup>1</sup> As discussed further below, this dataset has distinct advantages over others used in the literature that allows us to address a number of previously unanswered questions.

Some of our key findings are as follows: First, banks treated public and private borrowers quite differently since the beginning of the global financial crisis. Surprisingly, publicly-listed borrowers experienced slight increases rather than declines in lending quantities, but suffered large increases in interest rate spreads. Privately-held borrowers experienced substantial quantity rationing, but minimal increases in loan prices. This finding suggests that interest rate was a more informative measure of credit market conditions for publicly-listed firms whereas lending quantity was more informative for privately-held firms. Second, the crisis changed how loans are priced – interest rate spreads became more sensitive to borrower leverage and credit rating during the crisis. Third, foreign and domestic banks react differently to the crisis. In particular, foreign banks decrease lending quantities more and, among private borrowers, increase spread less than domestic banks. Finally, U.S. banks appear to engage in more quantity rationing than banks from other nations.

Despite the large literature on bank lending during financial crises<sup>2</sup>, our unique dataset allows us to depart from literature in a number of respects: First, other studies often use aggregate- or portfolio-level information, rather than studying individual loans, which sacrifices a

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<sup>1</sup> Our data collection, matching, and processing consumed three economists and five research assistants who jointly speak over 10 languages, and it took several years to complete. Given that Orbis covers both public and private firms, there are over 10 million firms in the database. There is no common identifier to match DealScan borrowers with firms in Orbis so a combination of computerized and manual matching was done using company names.

<sup>2</sup> The papers that study the effect of financial crises on bank lending include Bae, Kang, and Lim (2002); Ongena, Smith, and Michalsen (2003); Gan (2007); Ivashina and Scharfstein (2010); Santos (2011); Puri, Rocholl, and Steffen (2011); Carbó-Valverde, Rodríguez-Fernández, and Udell (2016); Popov and Udell (2012); De Haas and Van Horen (2013); Presbitero, Udell, and Zazzaro (2014); and Claessens and Van Horen (2015).

significant amount of relevant information. Our use of loan-level information with borrower characteristics allows us to control for individual borrower demand for credit and to better disentangle loan demand and supply effects.<sup>3</sup> Second, while most prior papers focus on quantity of loans, we study both price and quantity. Our results confirm that the analysis of loan pricing is crucial. We find that banks use different mechanisms to respond to the financial crisis: public borrowers are rationed more by price, whereas private borrowers are rationed more by quantities. Third, in contrast with most papers that consider characteristics of publicly-listed borrowers only, our dataset covers both public and private borrowers. Including private borrowers is important for a study of bank lending because bank credit is key to private firms without access to public equity financing. Fourth, some recent papers use borrower fixed effects to control for firm heterogeneity (e.g., De Haas and Van Horen, 2012, 2013). In contrast, we study firm heterogeneity directly. We find borrower composition and sensitivities of loan spreads to borrower characteristics to change during the financial crisis. As noted below, this also allows us to use more of the data and avoid some sample selection issues. Fifth, many studies include data from the U.S. or a small set of countries.<sup>4</sup> Our paper employs a data from a large number of countries, allowing us to draw general conclusions in a broader international context and to compare U.S. and non-U.S. crisis responses.

This paper is also related to the literature on foreign banks.<sup>5</sup> Although geographic diversification of portfolios is generally beneficial, foreign banks are often alleged to exacerbate the economic consequences of crises by significantly cutting back credit in host countries in response to adverse balance sheet conditions at home.<sup>6</sup> They are also purported to decrease business credit in host countries more than domestic banks during financial crises

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<sup>3</sup> A number of the papers on foreign banks rely on cross-country aggregate data. For example, Detragiache, Gupta, and Tressel (2008) use country-level data to show that credit to the private sector is lower in countries with more foreign banks. Bruno and Hauswald (2014) use country-level data on foreign bank entry to show that external-finance-dependent industries grow faster in countries with more foreign banks. Feyen, Letelier, Love, Maimbo, and Rocha (2014) use country-level data to show that credit growth is highly sensitive to cross-border funding shocks.

<sup>4</sup> There are papers that examine different types of borrowers by using micro data albeit in the context of a single country (e.g., Detragiache and Gupta, 2006; Mian, 2006; Khwaja and Mian, 2008; Gormley 2010; Puri, Rocholl, and Steffen, 2011; Schnabl, 2012; and Weinstein and Amity, 2018). Ongena, Peydro, and Van Horen (2015) study loans from Eastern European countries.

<sup>5</sup> For papers discussing the benefits and costs of foreign banks, see Levine (1996); Berger, DeYoung, Genay, and Udell (2000); Claessens, Demirguc-Kunt, and Huizinga (2001); Beck, Demirguc-Kunt, and Maksimovic (2004); and Giannetti and Ongena (2008).

<sup>6</sup> For papers discussing the balance sheet channel, see Peek and Rosengren (2000); Schnabl (2012); Popov and Udell (2012); De Haas and Van Horen (2012); Cetorelli and Goldberg (2011, 2012); Aiyar (2012); De Haas and Lelyveld, (2014); Aiyar, Calomiris, Hooley, Korniyenko, and Wieladek (2014). The balance sheet channel is also recently extended to include bank losses in some foreign markets (e.g., such as from exposure to the European debt crisis (Popov and Van Horen, 2015) affecting lending in other foreign markets.

because they suffer from more serious informational opacity problems or because they are less willing to take significant risks in host nations (flight to quality). Foreign banks are also argued to have home bias, which increases significantly if the lender's country of origin experiences a crisis (flight home). We argue that the issue of foreign banks reducing credit to firms during financial crises is complex and requires the use of a more comprehensive dataset than has been employed in the literature. How foreign and domestic banks react differently to crises depends on borrower type. For example, we find that during the last crisis, foreign banks increased spreads less than domestic banks for private borrowers, but not for public borrowers.

Starting with Stiglitz and Weiss (1981), numerous papers document the importance of asymmetric information in bank lending. The theoretical model of credit rationing with heterogeneous firms by Calomiris and Hubbard (1990) predicts that credit markets can be segmented when borrowers have differing degrees of asymmetric information and internal net worth. A credit collapse, in which no loan is offered to certain types of borrowers is possible. Our paper provides evidence in favor of the multiple-contract equilibrium in Calomiris and Hubbard (1990), where the loan markets for public borrowers continue to use price rationing during the crisis but the loan markets for private borrowers largely shut down.

Recent papers use the financial crisis as a quasi-natural experiment and loan-level data to test credit rationing theories (e.g., Giannetti and Laeven, 2012; De Haas and Van Horen, 2012). They typically include borrower fixed effects in lieu of borrower characteristics to study the effects of the financial crisis across lenders. However, borrower fixed effect specifications, by construction, cannot capture how borrower heterogeneity affects crisis outcomes.<sup>7</sup> They may also lead to sample selection bias because borrowers with single loans are excluded (Khwaja and Mian, 2008; Jiménez, Ongena, Peydró, and Saurina, 2012). Because we have detailed information on borrower characteristics, we are not restricted to looking only at borrowers with multiple loan borrowers and we are also able to examine the effects of individual borrower characteristics, which turn out to be crucial to our results.

Finally, there is a recent interest in the corporate finance literature on differences between public and private firms (e.g., Gao, Li, and Harford, 2013; Maksimovic, Phillips, and Yang, 2013; Michaely and Roberts, 2012). Our paper contributes to this literature by studying credit availability to these two types of firms using a dataset that includes both borrower and lender characteristics.

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<sup>7</sup> The advantage of the borrower fixed effect approach is that it accounts for any omitted borrower characteristics that are constant over time and hence partially obviates the need to collect borrower information. In comparison, our approach allows to compare the impacts of the crisis across borrowers. For example, we can study how the composition of borrowers' changes between normal times and the recent crisis. We can show that the crisis changes interest rate sensitivity to certain characteristics of the borrowers. Our findings cannot be captured by fixed effect specifications which draw inference exclusively from the comparison of loans with the same borrower.

The rest of the paper is organized as follows. Section 2 outlines the conceptual framework. Section 3 discusses data sources and sample construction and gives descriptive statistics. Sections 4 and 5 analyze loan quantities of foreign and domestic banks to public and private borrowers during normal times and the financial crisis, respectively, while Section 6 compares the loan spreads of foreign and domestic banks to public and private borrowers during these time periods. Section 7 examines differences between U.S. and non-U.S. banks and borrowers, and Section 8 presents additional tests, including comparisons between relationship and non-relationship borrowers. Section 9 concludes.

## 2. Research Questions

Our paper is structured to answer the following four questions:

- (1) How do loan quantities change between normal times and the recent crisis for foreign and domestic banks and for public and private firms?

We examine the percentage change in total loans, loans by foreign and domestic banks, and loans to public and private borrowers in normal times and the crisis. We also investigate how the quantities of loans with different Standard and Poor's (S&P) credit rating categories change between the two-time periods. Changes in loan quantities give a first indication as to which borrowers suffer most from quantity rationing during the financial crisis.

- (2) How do loan spreads differ between foreign and domestic banks and for public and private firms, and how do they change between normal times and the recent crisis?

We investigate loan pricing across subsamples (lending by foreign and domestic banks and for public and private firms) during normal times and the crisis. This analysis shows how banks adjust interest rate during the crisis and how price adjustment relates to quantity adjustment. In the spread regression, we do not impose the restriction that the coefficient estimates must be similar across all subsamples. This investigation allows us to examine whether the crisis affects how borrower characteristics are priced.

- (3) How do the effects of the financial crisis on loan quantities and spreads differ between U.S. and non-U.S. banks and between U.S. and non-U.S. borrowers?

To study the differential impacts of the financial crisis on loan quantities, we divide our observations into U.S. and non-U.S. subsamples and examine the changes in loan quantities. For loan spreads, we regress these spreads on Foreign Bank dummy, U.S. dummy, and their interaction. Given that the nature of information problems and capital pressure facing banks in the U.S. might differ from the rest of the world, it is useful to study the subsamples of U.S. banks and borrowers separately.

- (4) How do the effects of the financial crisis on loan quantities and spreads differ between relationship and non-relationship borrowers?

We divide our sample into borrowers with and without prior lending relationships with their lenders. We then examine spreads of foreign and domestic banks during normal times and the crisis, controlling for borrower listing status. Given that past relationship may produce borrower-specific durable and reusable information, the nature of asymmetric information problems might be different. Thus, it is helpful to distinguish between relationship and non-relationship borrowers.

### **3. Data and Sample Construction**

#### **Bank Data**

We construct a 2004-2011 annual dataset of all the banks available in 50 countries (25 developed and 25 developing).<sup>8</sup> Our sources for bank ownership data are Bureau van Dijk's BankScope and Claessens and Van Horen (2014). When there is a discrepancy between the two data sources, we use the classification in Claessens and Van Horen (2014), which is considered to be more accurate. The Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise (borrower data are discussed below). We base a bank's country on the nationality of its owner. For example, Citibank Thailand is classified as a U.S. bank, not a Thai bank. Data on other bank characteristics measuring bank size, profitability, liquidity, and non-performing loans (NPLs/ Gross Total Assets<sup>9</sup>) are also retrieved from BankScope.

#### **Loan and Relationship Data**

Our main source for loan data is Thomson's Loan Pricing Corporation's DealScan, which contains information on over \$2 trillion of corporate and middle market commercial loans. Our main dependent variables are loan quantities and spreads, the latter defined as total fees and interest paid over LIBOR per dollar drawn down. We also collect other loan contract terms from DealScan: Loan Size, the natural log of deal amount in constant 2005 U.S. Dollars; Maturity measured in months; and Collateral, a dummy indicating whether collateral is pledged. We also use four dummies to describe loan purposes: Acquisition and Recapitalization; Capital Expenditure; Refinancing; and Back-Up Line.

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<sup>8</sup> Developed countries are defined as those classified as high-income economies by the World Bank's Atlas Method. Developed countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States. Developing countries include Argentina, Brazil, Chile, China, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, New Zealand, Peru, Philippines, Poland, Russia, Slovakia, South Africa, Thailand, Turkey, and Venezuela.

<sup>9</sup> Gross total assets (GTA) equals total assets plus the reserve for impaired loans. We add the reserves back to measure the full value of the assets financed.

DealScan is also used to measure lending relationships. The relationship variable is a dummy for whether the lead bank on the deal was also a lead bank in another deal with the same borrower during the past five years (from  $t-5$  to  $t-1$ ).

Table 1 reports the basic characteristics of loans in our sample, as well as borrower information.

### **Borrower Data**

Our main source for borrower data is Bureau Van Dijk's Orbis, which contains financial statement information on over 10 million public and private firms around the world. We construct variables for four key borrower characteristics, size (natural log of total assets), profitability (return on assets), leverage (total liabilities divided by total assets), and asset tangibility (dummy variable taking the value of one if Orbis reports the value of tangible assets). To reduce the possibility that our results may be driven by outliers or any mistakes in the original dataset, we winsorize all variables at 1%.

We also construct a dummy for whether the firm is public versus private because of differences in asymmetric information problems, risk, and access to alternative sources of external finance between the two borrower types. A concern is that listing information from Orbis only reflects the most recent status of the firm and firms may change status. We mitigate this concern by obtaining IPO and delisting dates from Bureau van Dijk's Osiris, which contains detailed information on approximately 80,000 publicly-listed companies around the world, and use listing status at the time the loan was extended.

Additional borrower dummy variables are taken from DealScan for sector and debt rating. Corporation, Government, Financial Industry, Manufacturing, and High-Tech<sup>10</sup> describe the sectors, and S&P's senior debt rating categories, A, B, C, and D, describe the rating, with the omitted category being unrated.

### **Merging Data from Different Sources**

A major challenge is merging information in BankScope, DealScan, and Orbis/Osiris, as there is no common identifier across the various databases. We manually match banks in BankScope with lead arrangers in DealScan by bank names and nationalities. For loans with multiple lead arrangers, we assign the largest lead arranger as the lender. We match firms in Orbis/Osiris with borrowers in DealScan by firm name and nationality. There are over 10 million firms in Orbis, so manual matching is not feasible. Since names in the three datasets might be spelled differently, we use an approximate matching algorithm (fuzzy matching). First, we standardize the names in each database by Anglicizing the words and

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<sup>10</sup> Manufacturing Industry dummy is equal to one if the borrower's SIC code is between 2000 and 3999. High-Tech dummy is equal to one if the borrower is in the high-tech industry according to the American Electronics Association (comprising 47 four-digit SIC codes in the two-digit industries 28, 35, 36, 38, 48, and 73).



eliminating common suffixes (such as corporation, incorporated, and limited liability) in different languages. Second, we compute an edit distance which measures the similarity between names in different databases. Third, we retain all the perfect matches based on the distance and discard all observations that do not appear to match at all. Finally, we match the borderline observations (similarity scores between 90% and 100%) manually. This algorithm resulted in over 33,000 observations with bank and loan information, and over 18,000 observations that additionally have borrower information.

While these matching procedures may create selection biases in favor of certain types of lenders or borrowers, we argue that this potential bias is unlikely to affect our main conclusions. We focus on the changes between normal times and the crisis period, so as long as the selection bias across lenders and borrowers persists over time, the biases should generally be differenced away.

#### **4. Changes in Bank Lending Quantities between Normal Times and the Financial Crisis**

Table 2 provides key statistics on how the aggregate quantities of loans changed between normal times and crisis years. Normal times are defined as 2004 to 2007, while the crisis is defined as 2008 to 2011. We choose 2008-2011 as the crisis period because it covers both the subprime crisis in the U.S. that spilled over to other countries and the European debt crisis. Since the two main time periods have the same number of years, we can compare the aggregate quantities of loans during these periods directly.

##### **Bank Nationality and Borrower Listing Status**

In Panel A of Table 2, we report the percentage change in total loans, loans by foreign and domestic banks, and loans to public and private borrowers. We find that the number of loans dropped by 18% between normal times and the crisis. Both foreign and domestic banks cut back on their lending, but foreign banks contracted their lending much more (37% versus 12%). Between public and private borrowers, contractions only occurred among private borrowers. The number of loans to private borrowers dropped by 38% whereas the number of loans to public borrowers actually increased by 9%. The decline among private borrowers is intuitive because banks have less information about private borrowers, though it suggests that less transparency may exacerbate a crisis. In addition, these borrowers are generally riskier and were pushed closer to default during the crisis, perhaps resulting in more credit rationing of these firms. Within the subsample of loans to private borrowers, foreign banks contracted their lending much more than domestic banks (50% versus 34%). Lending to public borrowers had minor changes. Public borrowers received less credit during the crisis from foreign banks (-9%), but more credit from domestic banks (+12%). The increase in loans to public firms from domestic banks is potentially due to flight to quality during the crisis, as banks shift their portfolios from riskier and more opaque to safer and more transparent borrowers.

These findings are consistent with credit rationing theories. Prior research has shown that foreign banks are more likely to suffer from asymmetric information than domestic banks (Berger, Klapper, and Udell, 2001; Haselmann and Wachtel, 2011). The distinction between public and private borrowers in our dataset introduces a new layer of information asymmetry. Since private borrowers are likely to be more opaque than public borrowers, the effects of financial crisis which exacerbates information problems should fall primarily on foreign banks and private borrowers. An alternative explanation is that domestic banks are more likely to have strong relationships with borrowers in their own countries, and provide these borrowers with liquidity insurance. Relationship lenders may be able to lend short-term at a loss during times of adverse conditions and recoup these losses in the long term through earnings on future loans or elsewhere from the relationship (e.g., Petersen and Rajan, 1994; Gatev and Strahan, 2006; Berger, Bouwman, and Kim, 2017).<sup>11</sup>

### **Borrower Credit Rating**

In Table 2 Panel B, we investigate lending changes for firms with different Standard and Poor's credit rating categories. The number of loans to A, B, and C rated borrowers dropped by 28%, 48%, and 51%, respectively. We find more contraction among worse-rated borrowers potentially because the recent financial crisis exacerbated the risk of these borrowers more than those of better-rated borrowers. The aforementioned flight to quality may also help explain this observation. The number of loans to D rated borrowers went up from 21 to 26 loans. This exception may be due to the small number of D rated loans, or because some of the higher-rated borrowers slipped into the D rating during the crisis.

In Table 2 Panel C, we examine the distribution of borrower risks during normal and crisis times. Within each category of banks (foreign and domestic) and borrowers (public and private), we divide loans based on borrower credit ratings. We find that foreign banks tend to lend to safer borrowers than domestic banks during normal times. For example, during normal times, 40% of foreign loans are granted to A and B rated borrowers while only 30% of domestic loans are granted to these borrowers. These figures drop to 36% and 19%, respectively, during the crisis, indicating that the decrease in the fraction of safer borrowers is smaller for foreign banks. In other words, foreign banks' aversion to risky borrowers (relative to domestic banks) increases during the crisis.

Not surprisingly, public borrowers tend to have better credit ratings than private borrowers during normal times. During such times, 43% of loans to public borrowers are A and B rated, while only 23% of loans to private borrowers have such ratings. The data also show that the decline in borrower quality during the crisis is more severe among public borrowers. During the crisis, the fraction of A and B rated loans drops to 28% for public borrowers and

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<sup>11</sup> We also compare relationship and non-relationship borrowers (firms that have and have not borrowed from the lender in the past five years). As discussed, relationships may be associated with liquidity insurance. We indeed find more contraction among non-relationship borrowers during the financial crisis. The number of loans to relationship and non-relationship borrowers dropped by 9% and 23%, respectively.

14% for private borrowers. This finding supports the notion that the riskiest private borrowers are quantity-rationed during the crisis.

### **Banks and Borrowers in the United States**

We next examine in Table 2 Panel D how the aggregate quantities of loans changed between normal times and crisis years across four subsamples—U.S. versus Non-U.S. banks—and in Table 2 panel E we show U.S. versus Non-U.S. borrowers.

U.S. banks appear to engage in more quantity rationing than banks from other nations. We find that the declines in loan quantities are larger for U.S. banks than non-U.S. banks and for U.S. borrowers than non-U.S. borrowers. This result is consistent with the crisis hurting U.S. banks more than others, having originated in the U.S. Additional tests in Section 8 show that U.S. banks suffered greater capital losses, more profit decreases, more non-performing loans, and more loan loss provisions than other during the recent financial crisis, supporting this interpretation.

As discussed above, the number of loans dropped more for foreign banks than domestic banks during the crisis in the full sample. We show that these effects are generally stronger for non-U.S. banks and non-U.S. borrowers. Among U.S. banks, the percentage change in number of loans during the crisis is -63% for foreign banks (U.S. banks lending overseas) and -44% for domestic banks (U.S. banks lending at home). Among non-U.S. banks, the corresponding percentage change in number of loans during the crisis is -33% for foreign banks (non-U.S. banks lending in the U.S. and anywhere else other than their home countries) and +25% for domestic banks (non-U.S. banks lending at home). Among non-U.S. borrowers, the percentage change in number of loans during the crisis is -39% for foreign banks and +25% for domestic banks. The result that the difference between foreign and domestic banks is smaller in the U.S. supports the notion that information problems are less severe in the U.S. than in other countries.<sup>12</sup>

In the full sample, the number of loans dropped much more for private than public borrowers. This effect is stronger for non-U.S. banks and non-U.S. borrowers. Among U.S. banks, the percentage change in number of loans during the crisis is -36.05% for public borrowers and -55% for private borrowers. Among non-U.S. banks, the percentage change in number of loans during the crisis is +63% for public borrowers and -28% for private borrowers. Among U.S.

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<sup>12</sup> The only exception to the notion that the number of loans dropped more for foreign banks than domestic banks during the crisis is the subsample involving U.S. borrowers. Among these borrowers, the percentage change in number of loans during the crisis is -33% for foreign banks and -44% for domestic banks. In other words, U.S. banks lending domestically cut back more than foreign banks operating in the U.S. U.S. banks cut back their lending more, regardless whether they lent inside or outside the U.S. – U.S. banks lending overseas decrease the number of loans by 63% whereas domestic banks outside the U.S. *increase* the number of loans by 25%. There are two potential explanations for this finding: U.S. banks may suffer greater capital losses at the beginning of the crisis; the U.S. may have had stricter enforcement of capital requirements (e.g., stress tests were generally more stringent in the U.S. than in the EU).

borrowers, the percentage change in number of loans during the crisis is -34% for public borrowers and -52% for private borrowers. Among non-U.S. borrowers, the percentage change in number of loans during the crisis is +77% for public borrowers and -29% for private borrowers. The finding that the difference between public and private borrowers is smaller in the U.S. again supports the notion that information problems are less severe in the U.S.

## 5. Multivariate Analysis of Lending Quantities

We now analyze lending quantities in a multivariate probit framework by estimating the probability that a pre-crisis lender continues to grant loans to its pre-crisis borrowers during the crisis. Our specification is as follows:

$$\begin{aligned} \text{Prob}(\text{Loan during Crisis} | \text{Loan before Crisis})_i = & f(\alpha_0 + \alpha_1 \text{Foreign Bank}_i + \alpha_2 \text{Public} \\ & \text{Borrower}_i + \\ & \alpha_3 \text{U.S. Bank}_i + \alpha_4 \text{U.S. Borrower}_i + \alpha_5 \text{Relationship}_i + A_6 \text{Other Borrower} \\ & \text{Characteristics}_i + \\ & \alpha_7 \text{Loan Size}_i + \alpha_8 \text{Maturity}_i + \alpha_9 \text{Collateral}_i + \alpha_{10} \text{Acquisition}_i + \alpha_{11} \text{Capital} \\ & \text{Expenditure}_i + \\ & \alpha_{12} \text{Refinancing}_i + \alpha_{13} \text{Backup Line}_i + \varepsilon_{\alpha i}) \end{aligned} \quad (1)$$

The dependent variable,  $\text{Prob}(\text{Loan during Crisis} | \text{Loan before Crisis})_i$ , is the probability that for each pre-crisis loan  $i$ , there is at least one loan with the same bank-borrower pair during the crisis. The key explanatory variables are Foreign Bank, Public Borrower, U.S. Bank, U.S. Borrower, and Relationship. Included as controls are Other Borrower Characteristics, consisting of (1) basic characteristics of Size, Profitability, Leverage, and Asset Tangibility, (2) indicators of whether the borrowers are corporations or government-owned entities, (3) indicators of whether the borrowers are in financial, manufacturing, or high-tech industries, and (4) dummies (A, B, C, and D) for S&P's senior debt rating. The capitalized  $A_6$  on Other Borrower Characteristics reflects that it is a vector of coefficients. Borrower and bank characteristics are measured at the end of the year before loan  $i$  is granted. We also include controls for loan contract terms (Loan Size, Maturity, and Collateral) and loan purposes (Acquisition, Capital Expenditure, Refinancing, and Backup Line).

The results are reported in Table 3. The columns successively add more of the explanatory variables. We find that foreign banks that lend during normal times are less likely to continue to lend during the crisis compared to domestic banks. Public borrowers are more likely to continue to receive loans during the crisis. U.S. banks are less likely than banks in other countries to continue to lend. Borrowers that have relationships with banks are more

likely to continue to receive loans during the crisis.<sup>13</sup> In the full specification, the estimated coefficients on Foreign Bank, Public Borrower, U.S. Bank, and Relationship dummies are all statistically significant at the 1% level. The coefficient on U.S. Borrower is not statistically significant after we control for borrower rating. Our multivariate analysis supports the univariate findings in Table 2.

The coefficients on other borrower characteristics are consistent with expectations. Larger borrowers with higher profitability and lower leverage are more likely to continue to receive loans during the crisis. The coefficients on Size, Profitability, and Leverage are all statistically significant at the 1% level. The coefficients on rating dummies are not statistically significant, perhaps due to lack of variation in the sample. For example, we only have a few pre-crisis loans with C or D ratings in this specification. Across industries, borrowers in high-tech industries are less likely than those in other industries to receive loans during the crisis. We also find that borrowers that receive larger loans with longer maturities during normal times are less likely to borrow again during the crisis. In contrast, borrowers with pre-crisis refinancing loans are more likely to borrow again. The coefficients on other controls are not statistically significant. Overall, our estimated coefficients on the control variables suggest that riskier borrowers are more likely to be quantity rationed during the crisis.<sup>14</sup>

## 6. Loan Spreads during Normal Times and the Financial Crisis

In this section, we examine how loan spreads change between normal times and the crisis and how they differ between foreign and domestic banks. Thus, we estimate the following specification:

$$\text{Spread}_i = \beta_0 + \beta_1 \text{Foreign Bank}_i + \beta_2 \text{Other Borrower Characteristics}_i + \beta_3 \text{Loan Size}_i + \beta_4 \text{Maturity}_i + \beta_5 \text{Collateral}_i + \beta_6 \text{Acquisition}_i + \beta_7 \text{Capital Expenditure}_i + \beta_8 \text{Refinancing}_i + \beta_9 \text{Backup Line}_i + \varepsilon_{\beta i} \quad (2)$$

The dependent variable is the all-in spread defined above and the explanatory variables are as defined previously. Compared with equation (1), some explanatory variables are dropped because we use them to partition our sample. We estimate equation (2) separately for the

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<sup>13</sup> We note that the effects of lending relationships on credit availability are not mechanical since we measure relationships for each loan during the *pre-crisis years* using the information *five years prior* to the origination of the loan whereas the dependent variable is an indicator whether there exists another loan from the same bank-borrower pair *during the crisis*.

<sup>14</sup> Public and private firms clearly differ along many dimensions besides risk. Our goal is to document what happens to private borrowers, a category that is not considered in other cross-country studies, rather than trying to pin down a single underlying characteristic that drives the difference between public and private firms.

normal times and crisis subsamples, and within these subsamples, we also separate out public and private borrowers.

For illustrative purposes, we estimate the specification where we only include Foreign Bank dummy as the explanatory variable. Table 4 Panel A reports the baseline results, indicating that foreign banks charge higher spreads to public borrowers relative to domestic banks and that this sensitivity increases during the crisis. In contrast, foreign bank spreads to private borrowers are lower than domestic banks' during the crisis.

Figure 1 describes the change in spread between normal and crisis times across categories of banks and borrowers. The spread basis point changes are calculated from the coefficient estimates in Table 4 Panel A. To put spread changes in perspective, we also present the changes in loan quantity in the same figure. The percentage changes in aggregate number of loans are from the bottom part of the last column in Table 2 Panel A.

Consider the effects of the crisis on both number of loans and spreads in Figure 1. The number of foreign bank loans to public borrowers decreases by 9% and average spread increases by 100 basis points. It is likely that the decline in the number of loans reflects rationing of relatively risky public borrowers. However, the increase in risk due to the crisis more than offset the decrease in quantity, resulting in the spread increase.

The number of domestic bank loans to public borrowers increases by 12% and average spread increases by 89 basis points. The increase in number of loans likely comes from flight to quality and liquidity insurance for relationship borrowers by domestic banks. Public firms are generally safer and more transparent than private firms. However, the risk is still higher during the crisis.

The number of foreign (domestic) bank loans to private borrowers decreases by 50% (34%) and average spread increases by 21 (66) basis points. Private borrowers experience the largest decline in number of loans and most modest increase in spread. This finding is consistent with very significant quantity rationing of the riskiest private borrowers. Among private borrowers, the rationing effects are stronger for foreign banks which suffer more from information problems.

Table 4 Panel B reports results from the full specification in which Foreign Bank dummy, borrower characteristics, the other three loan contract terms (Deal Size, Maturity, and Collateral)<sup>15</sup>, and loan purposes are included in the regressions. The direction of the effects of Foreign Bank dummy on spread (the sign of coefficient  $\beta_1$ ) is generally similar to the ones

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<sup>15</sup> The reason for the inclusion is that these other contract terms and loan purposes may affect the spreads. While one may argue all loan contract terms are endogenous, if the spreads are determined after other loan contract terms, it might be appropriate to control for these contract terms when assessing the effects of foreign banks. Including other loan contract terms in spread regressions is a common practice in the literature (e.g., Berger and Udell (1995); Berger, Frame, and Ioannidou (2011); Santos (2011)).

in Panel A, but the magnitudes are different.<sup>16</sup> The coefficient on Foreign Bank dummy is estimated at 16.56 for public firms and 8.16 for private firms during normal times. The estimated coefficient on Foreign Bank dummy is 31.85 for public firms and -35.01 for private firms during the crisis period. These estimates confirm that the increase in lending rates to private borrowers was much smaller for foreign banks.

Next, we focus on the coefficients on borrower characteristics. During normal times, larger, more profitable, and less leveraged borrowers with more tangible assets have lower spreads, consistent with expectations that loans to these firms are generally less risky. Among different borrower types, loans to banks have lower spreads than loans to governments and corporate borrowers. Loans to borrowers in manufacturing industries have lower spreads and loans to borrowers in high-tech industries have higher spreads. This finding is in line with the notion that manufacturing industries are less risky while high-tech industries are riskier. Those with better credit ratings generally have lower spreads, consistent with expectations.

Comparing the effects of borrower characteristics on loan spread during normal times and the financial crisis, almost all coefficients have similar sign but the magnitudes of coefficients on leverage and low ratings change dramatically. The spreads go up more for riskier borrowers, reflecting that risk is increased more during the financial crisis for firms closer to default. In addition, changes in coefficient estimates confirm the appropriateness of running the regressions separately for each period. In Panel C, we test whether the normal times and the crisis coefficients are statistically different. The tests verify that the coefficients on borrower risk (leverage and credit ratings) change significantly between normal times and the financial crisis period, again emphasizing the importance of including borrower characteristics.

The coefficients on other loan contract terms are also consistent with expectations. Larger loans are safer. Loans with longer maturity are riskier and/or there is a term premium. Loans that required collateral are riskier consistent with most prior collateral literature, although the results sometimes go the other way (e.g., Berger, Frame, and Ioannidou, 2016). Among different loan purposes, loans for acquisitions have higher spreads than loans for capital expenditure, refinancing, and back up lines, suggesting that acquisitions are deemed riskier activities.

In sum, our evidence sheds new light on credit rationing theories. There is a stark contrast between public and private borrowers. During the crisis, aggregate number of loans went up for public borrowers, consistent with a flight to quality, and the spreads for these borrowers

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<sup>16</sup>To highlight the importance of borrower information in our analysis, we estimate the specification where we include all control variables, except borrower characteristics in unreported regressions. We find that spreads depend in important ways on borrower information. Without them, the R-Squared's go down substantially from the range of 0.13-0.27 in Panel B to 0.07-0.18. The exclusion of borrower characteristics also alters the effects of financial crisis on foreign bank coefficients. Given the significant shifts in our key coefficients, information on borrower characteristics from Orbis is crucial.

went up more dramatically than for private borrowers who were likely more often quantity rationed. On the other hand, number of loans went down significantly for private borrowers and the increase in spread for private borrowers was minimal. These effects are stronger for foreign banks, suggesting information asymmetry has a strong influence on how the quantity and price of loans are determined.<sup>17</sup>

## 7. Spread of Loans Involving Banks and Borrowers from the United States

A large fraction of our observations is from the U.S. (approximately 40%). In this section, we examine special cases of U.S. banks and borrowers. On one hand, the crisis originated in the U.S. and U.S. banks faced stronger capital pressure. On the other hand, the U.S. financial markets are the largest and most developed in the world. Financial institutions in the U.S. are also known for their innovative activities and operational efficiency, even when operating in foreign nations (e.g., Berger, DeYoung, Genay, and Udell, 2000). Further, the pool of U.S. borrowers might be more transparent than those in other countries due to the better enforcement of strict regulations and the quality of certified-audit financial statements, particularly for public firms. It is therefore likely that the nature of information problems involving banks and borrowers in the United States is different from the rest of the world, making it useful to study the subsamples of U.S. banks and U.S. borrowers separately.

We examine whether spreads of banks and borrowers from the U.S. differ from the rest of the world. Similar to Section 6, we divide our sample into normal times and crisis periods as well as public and private borrower subsamples. Thus, we estimate the following baseline specifications using each subsample:

$$\begin{aligned} \text{Spread}_i = & \gamma_0 + \gamma_1 \text{Foreign Bank}_i + \gamma_2 \text{U.S. Bank}_i + \gamma_3 \text{Foreign Bank}_i \times \text{U.S. Bank}_i + \\ & \gamma_4 \text{Public Borrower}_i + \gamma_5 \text{Other Borrower Characteristics}_i + \gamma_6 \text{Loan Size}_i + \gamma_7 \\ & \text{Maturity}_i + \gamma_8 \text{Collateral}_i + \gamma_9 \text{Acquisition}_i + \gamma_{10} \text{Capital Expenditure}_i + \gamma_{11} \\ & \text{Refinancing}_i + \\ & \gamma_{12} \text{Backup Line}_i + \varepsilon_i \end{aligned} \quad (3)$$

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<sup>17</sup> We also examine the determinants of other loan contract terms, deal size, maturity, and collateral. During normal times, foreign banks grant larger loans with longer maturities relative to domestic banks, perhaps reflecting the rationing of borrowers with more significant information problems. However, foreign banks require collateral more often, indicating that they try to use collateral to overcome the information problems. During the financial crisis, the average loan size goes up more for foreign banks, likely reflecting quantity rationing of lower quality borrowers that tend to have smaller deal size. Foreign banks also adjust maturity and collateral requirement more during the crisis: the maturity of loans granted by foreign banks dropped more while the use of collateral went up more than domestic banks. Comparing between public and private borrowers, the increase in loan size and the contraction of maturity by foreign banks are stronger among private borrowers. Overall, our evidence on loan contract terms is consistent with credit rationing theories. Banks select loan contract terms that accommodate information problems of their borrowers.



$$\begin{aligned}
\text{Spread}_i = & \delta_0 + \delta_1 \text{ Foreign Bank}_i + \delta_2 \text{ U.S. Borrower}_i + \delta_3 \text{ Foreign Bank}_i \times \text{U.S. Borrower}_i \\
+ & \\
& \delta_4 \text{ Public Borrower}_i + \Gamma_5 \text{ Other Borrower Characteristics}_i + \delta_6 \text{ Loan Size}_i + \\
& \delta_7 \text{ Maturity}_i + \delta_8 \text{ Collateral}_i + \delta_9 \text{ Acquisition}_i + \delta_{10} \text{ Capital Expenditure}_i + \\
& \delta_{11} \text{ Refinancing}_i + \delta_{12} \text{ Backup Line}_i + \varepsilon_{\delta i} \tag{4}
\end{aligned}$$

Equation (3) allows us to examine whether U.S. banks are different and Equation (4) allows us to examine whether U.S. borrowers are different. The key explanatory variables are Foreign Bank dummy in both regressions, U.S. Bank dummy in Equation (3), U.S. Borrower dummy in Equation (4), and their interactions. We first estimate Equations (3) and (4) with the key explanatory variables and without the control variables. Panels A of Tables 5 and 6 report the results from Equations (3) and (4), respectively. We interpret the parameter estimates of Tables 5 and 6 (Panel A) using Figure 2.

Theoretical predictions about the change in spreads are unclear. On one hand, we expect the subsamples that suffer greater contraction in the number of loans to have smaller increase in spreads. This is because the riskier borrowers are generally more quantity-rationed. On the other hand, banks that reduce credit supply the most may raise interest rates and quantity ration simultaneously, meaning that the subsamples with greater contraction in the number of loans will suffer from larger increase in spreads as well. Furthermore, the subsamples that suffer greater contraction in the number of loans may experience higher increase in spreads as greater contraction in number of loans indicates a weaker set of lender-borrower relationships (e.g., Berlin and Mester, 1999; Bolton et al., 2016).

For the non-U.S. banks or non-U.S. borrowers, a common pattern emerges: between foreign and domestic banks, spreads generally increase more for domestic banks. Between public and private borrowers, spreads generally increase more for public borrowers. For the subsamples involving U.S. banks or U.S. borrowers, the results are mixed. The notable pattern is that for U.S. borrowers, the increase in spreads is smaller among domestic banks and public borrowers. This result suggests that interest-rate insurance is particularly relevant for domestic lending in the U.S. That is, U.S. public firms form relationships with domestic banks and receive lower spreads than would otherwise be predicted during the crisis. This effect may be more pronounced among U.S. public firms because lending relationships to larger/higher-quality firms are more valuable to the banks.

We then add the control variables from Section 6 and estimate the full Equations (3) and (4) to see if the relations continue to hold. The results are reported in Panel B of Tables 5 and 6. Most of the key coefficients are of the same sign. However, the significance is often diminished due to the inclusion of the additional variables. The coefficients on the control variables are similar to the ones from the specifications in Panel B of Table 4.

## 8. Additional Tests

### Loan Spreads of Relationship versus Non-Relationship Borrowers

We next divide our sample into borrowers with and without prior relationships with their lenders. If a bank has past relationship with a borrower which produced borrower-specific durable and reusable information, the nature of asymmetric information problems might be different between relationship and non-relationship borrowers.

We estimate Equation (2) from Section 6 in Table 8 Panels A and B, using the subsamples of relationship and non-relationship borrowers during normal times and the crisis period. In Panel B, we also control for borrower listing status to ensure that the effects of relationship are not confounded with the public dummy.

We use the estimated coefficient on Foreign Bank dummy and the constant term from Panel A to compute the average spreads for each subsample. We find that the loan spreads are much lower for relationship than non-relationship borrowers. Moreover, relationships with foreign banks appear to have less value to borrowers than those with domestic banks. This finding holds both during normal times and the crisis period. Prior lending relationship lowers the spread by 58.19 (27.30) basis points for foreign banks and 65.81 (40.16) basis points for domestic banks during normal times (the crisis period).

Comparing normal times and crisis periods, loan spreads increase substantially during the crisis. Foreign bank lending to non-relationship borrowers suffers the smallest increase in spread. This result (together with the previous finding that foreign banks and non-relationship borrowers experience largest decline in number of loans) is consistent with very significant quantity rationing of the non-relationship borrowers which are likely to be the riskiest.

In Table 7 Panel B, we further control for Public dummy, other borrower characteristics, loan contract terms, and loan purposes. We still find that relationships with foreign banks are less valuable than relationships with domestic banks. Compared to the numbers in Panel A, the effects of financial crisis on foreign bank coefficients among relationship borrowers are greatly accentuated when we control for borrower characteristics.

### Bank Characteristics

In Table 8, we control for bank characteristics other than foreign bank dummy to rule out the possibility that our results are driven by characteristics of foreign banks other than their foreignness. We use five bank characteristics: Size (natural log of Gross Total Assets), Equity (Total Equity / Gross Total Assets), Profitability (Pre-Tax Profits / Gross Total Assets), Liquidity (Liquid Assets / Gross Total Assets), and Non-Performing Loans (NPLs / Gross Total Assets). Non-Performing Loans refer to loans that past due for more than 90 days. We use pre-tax profits instead of net profits to eliminate the effects of taxation which

may differ from country to country. We do not include these bank characteristics in the main specifications because doing so reduces the sample size substantially.

We still find that during normal times foreign banks have higher spreads than domestic banks. The increases in spreads during the crisis are smaller for foreign banks and this effect is stronger among private borrowers. Coefficients on bank characteristics are consistent with expectations. We find that larger and better-capitalized banks tend to grant loans with lower spreads. During normal times, more profitable banks have higher-spread loans, but during the crisis more profitable banks have lower-spread loans. This supports the notion that lending to risky borrowers becomes less profitable during the crisis.

### **Developed versus Developing Countries**

In Table 9, we examine the breakdown of loans in developed and developing countries as an alternative to U.S. versus Non-U.S. breakdown. Panel A illustrates how the aggregate quantities of loans changed between normal times and crisis years and between developed and developing countries. Similar to Table 2 Panel A, we find that the number of loans dropped more for foreign banks and private borrowers during the crisis. This effect is generally stronger in developing countries. This finding supports the notion that information problems are less severe in the developed countries.

Next, we examine whether spreads of loans in developed and developing countries differ. We divide our sample into normal times and crisis periods as well as public and private borrower subsamples and estimate the specification with Developed Country dummy and its interaction with Foreign Bank dummy as the key explanatory variables using each subsample. (Developed Country dummy takes the value of one if the borrower is from a developed country.) The results are reported in Table 9 Panel B. The coefficient estimates can be interpreted in the same fashion as Section 7. We find that among private borrowers, spreads generally increase more for domestic banks than foreign banks. This finding holds in both developed and developing country subsamples.

### **Fixed Effect Specifications**

We control for omitted cross-country cross-industry differences by including the full set of country and industry fixed effects in Table 10 Panel A. We do not include the full set of industry fixed effects in the main specification because we prefer to focus on three industry indicators (Financial, High-Tech, and Manufacturing dummies) that are more informative about borrower riskiness. Country fixed effects are based on borrower countries. Industry fixed effects are defined by borrower industry using Fama-French 49-industry classification. The results are generally similar to the ones in Table 4. We still find that foreign banks have higher spreads than domestic banks. Among private borrowers, the increases in spreads during the crisis are generally smaller for foreign banks. In unreported regressions, we also replace Foreign Bank dummy with bank fixed effects. The results on the remaining variables are qualitatively similar.

In the main specification, we use borrower characteristics to control for loan demand. In Table 10 Panel B, we further include Country x Year fixed effects to capture any components of loan demand driven by country-level time-varying economic conditions. The results are similar to the ones in Table 4. The increases in spreads during the crisis are generally smaller for foreign banks and this effect comes from loans to private borrowers.

### **Alternative Crisis Definition**

A concern is that our definition of the crisis period (2008-2011) may be too long, resulting in underestimation of the crisis effects. Therefore, in Table 11, we alternatively define the crisis period to be 2008-2009 which are arguably the most intense years. Similar to the prior results, we find that the increases in spreads during the crisis are generally smaller for foreign banks and this effect comes from loans to private borrowers. The magnitude of the coefficients on Foreign Bank dummy during the crisis period is larger under this alternative definition. The coefficients on Foreign Bank dummy during the crisis period are estimated at 33.01 for public firms and -43.56 for private firms. The magnitudes of these estimates are larger than those in Table 4 Panel B (31.85 for public firms and -35.01 for private firms).<sup>18</sup>

### **Capitalization of U.S. and Non-U.S. Banks**

Earlier, we find that the declines in quantity of loans during the recent financial crisis are concentrated among U.S. banks operating inside and outside the U.S. Here, we compare capitalization of U.S. and non-U.S. banks to see whether greater capital pressure on U.S. banks may be responsible for this result.

We plot annual average of Bank Equity/Gross Total Assets of U.S. and non-U.S. banks from 2004 to 2011 in Figure 3. We find that U.S. banks had lower capital ratios and they fell more during the crisis. Bank Equity/ Gross Total Assets in the U.S. is at the lowest in 2009, picks up in 2010 and 2011, but it is still lower than the 2007 level.

In unreported regressions, we also regress bank characteristics on the Crisis dummy. We find that Bank Loans/ Gross Total Assets and ROA are lower during the crisis. Bank NPL/Gross Total Assets and Reserve/Gross Loans are higher during the crisis. We then divide the sample in to U.S. and non-U.S. banks. The effects of the crisis on all these variables are stronger in the U.S.

### **Other Robustness Checks (not tabulated for brevity)**

We split our sample based on lender capitalization (Bank Equity/Gross Total Assets) and re-estimate the spread regressions using each subsample. Our finding that the increases in spreads during the crisis are smaller for foreign banks' lending to private borrowers is

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<sup>18</sup> In unreported regressions, we also shorten the normal times window to 2006-2007 so that the number of years during normal times is equal to the number of years during the crisis period. Our main results still hold.

stronger among well-capitalized banks. The data suggest that undercapitalized foreign banks are more likely to use both quantity and interest rate rationing to limit their exposure to private borrowers during the crisis.

Inferences in this paper are based on t statistics computed from robust standard errors. It is possible that shocks to loan spreads are correlated within a country or within an industry. Therefore, we cluster standard errors at the country and industry levels as a robustness check. We find that our main coefficients remain statistically significant.

## **9. Conclusions**

We use a unique dataset that combines hand- and computer-matched information on banks, loans, and borrowers from 50 countries over the period 2004 to 2011. We use these data to analyze questions about the effects of financial crises on lending by foreign and domestic banks to public and private firms, with special attention paid to U.S. versus non-U.S. banks and borrowers. The analysis yields a number of interesting findings.

First, banks treat public and private borrowers differently during a financial crisis. Public borrowers experience slight increases in lending quantities, but suffer large increases in interest rate spreads. Private borrowers experience substantial decreases in lending quantities, but minimal increases in interest rate spreads. In other words, public borrowers are rationed more by price, whereas private borrowers are rationed more by quantities.

Second, we estimate the effects of financial crises on the pricing of borrower risk. Our result indicates that interest rate spreads become significantly more sensitive to borrower leverage and credit rating during the crisis.

Third, foreign and domestic banks reacted differently to the crisis. Their behavior also depends on borrower types. In particular, foreign banks decreased lending quantities more and, among private borrowers, increase spread less than domestic banks.

Fourth, the declines in loan quantities were larger for U.S. banks than non-U.S. banks, consistent with the crisis hurting U.S. banks more than others. Additional data shows that U.S. banks suffered greater capital losses, more profit decreases, more non-performing loans, and more loan loss provisions than other during the recent financial crisis, supporting this interpretation.

Our findings strongly suggest that it is important to include borrower characteristics in this type of study. First, public and private firms received very different treatment from their banks, which would not be observable without the information on borrower listing status. Second, borrower characteristics have significant explanatory power in loan spread regressions, allowing for more accurate estimates of all the coefficients. Third, the sensitivities of loan spreads to borrower characteristics change between normal times and

financial crisis periods. Using firm fixed effects to control for borrower characteristics as in other recent papers does not capture these findings.

Our findings have several potential policy implications. First, given that foreign bank lending to private firms reacts more strongly to the financial crisis, a robust domestic banking sector may be important for protecting private borrowers from the ravages of such crises. This policy implication can be particularly relevant as the banking sector in many countries is dominated by foreign banks. In that respect, several countries have implemented a number of measures to ensure the viability of foreign banks, whether within the European banking union or more broadly through cross border cooperation between the G20 countries. Second, a robust capital market with significant opportunities for firms to go public may be particularly important for protecting firms from credit rationing by banks during financial crises. One other option is to improve the transparency of private borrowers, as it may reduce the information gap relative to public borrowers. Finally, significant capital pressure on the banking sector during financial crises may result in substantially more credit rationing of borrowers. This might be especially harmful to the economy, since the effects tend to fall on private firms that are thought to be engines of innovation and economic growth. These findings lend support to countercyclical capital requirements to protect the economy from financial crises.

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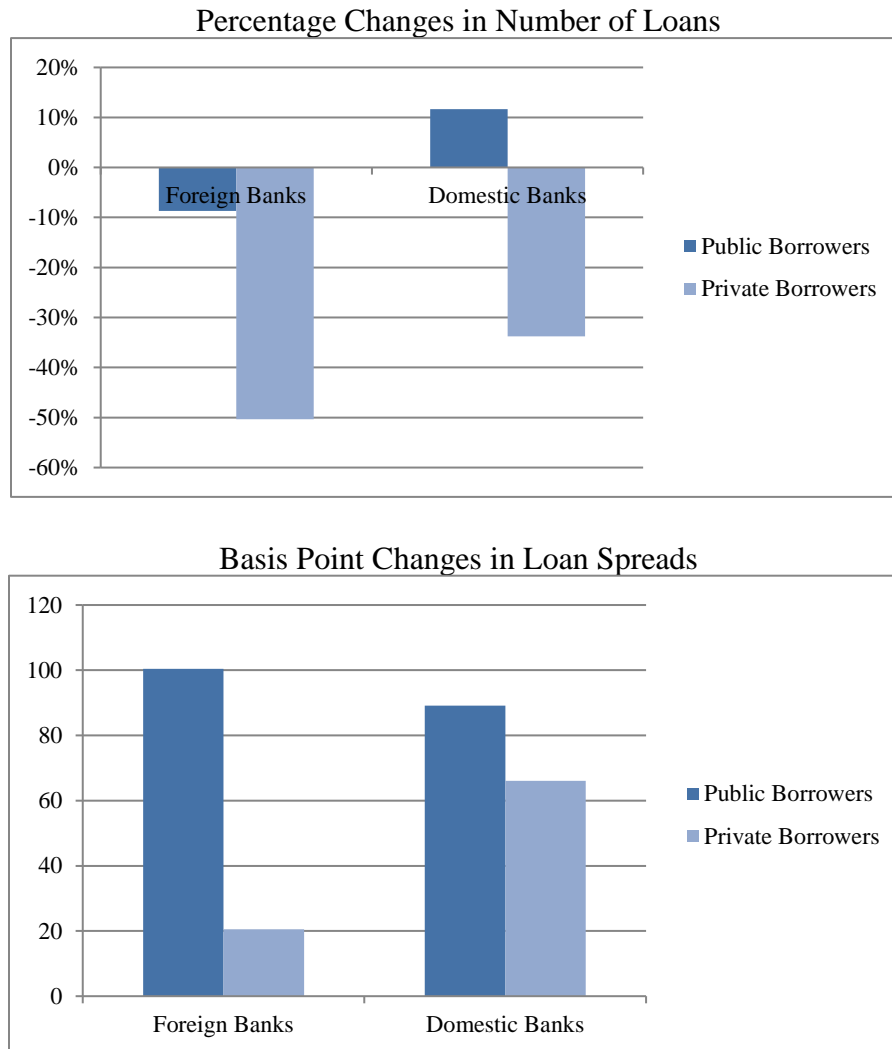
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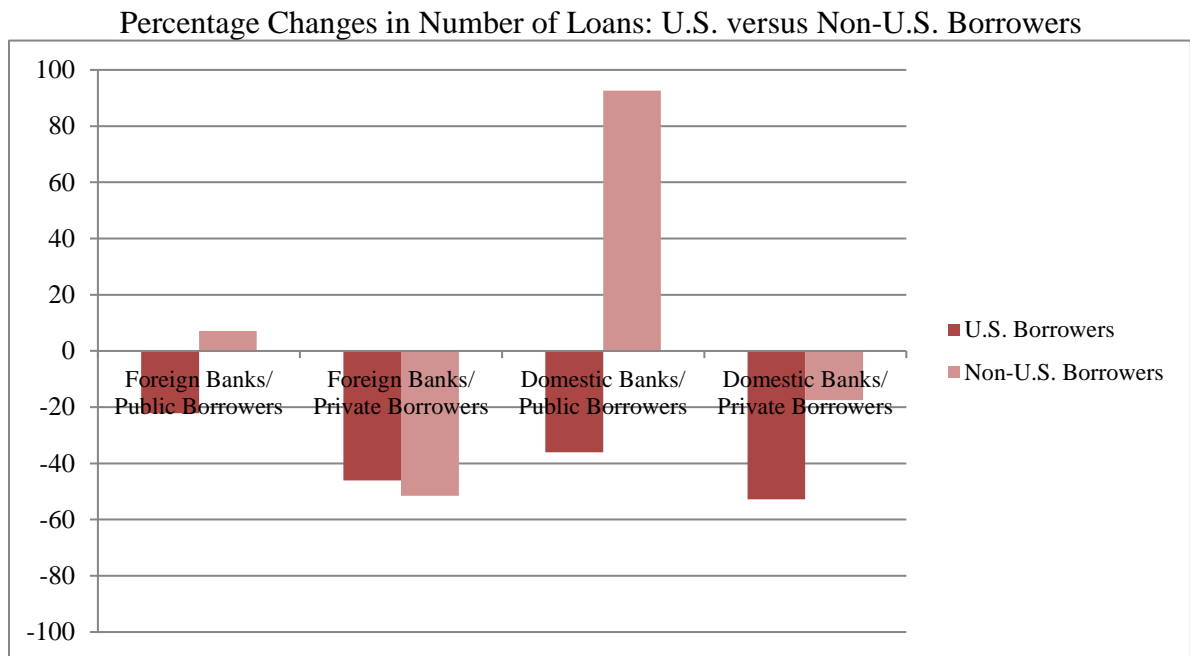
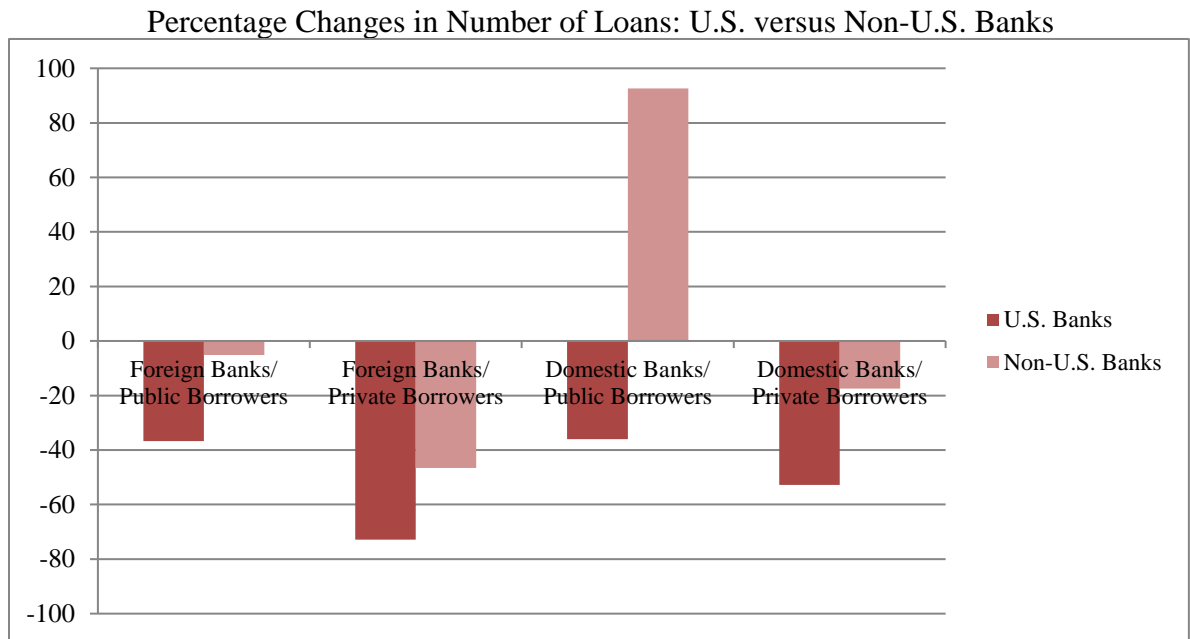
**Figure 1: The Effects of the Financial Crisis**

Figure 1 illustrates the change in quantity and spread between normal times and financial crisis across categories of banks and borrowers. The percentage changes in aggregate number of loans are taken from the bottom part of the last column in Table 2 Panel A. The basis point changes are calculated from Table 3 Panel A.



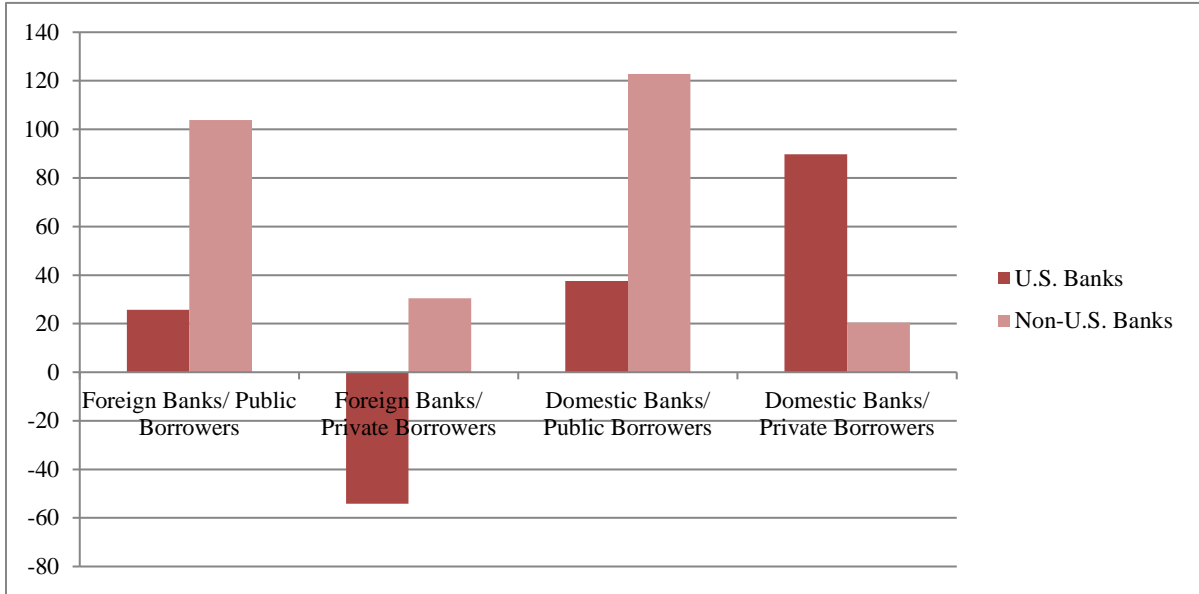
**Figure 2:** The Effects of Financial Crisis on U.S. vs. Non-U.S. Banks and Borrowers

Figure 2 describes the change in quantity and spread between normal times and financial crisis across categories of U.S. and non-U.S. banks and borrowers. The percentage changes in aggregate number of loans are taken from the bottom part of Table 4. The basis point changes are from Panel B of Tables 5 and 6.

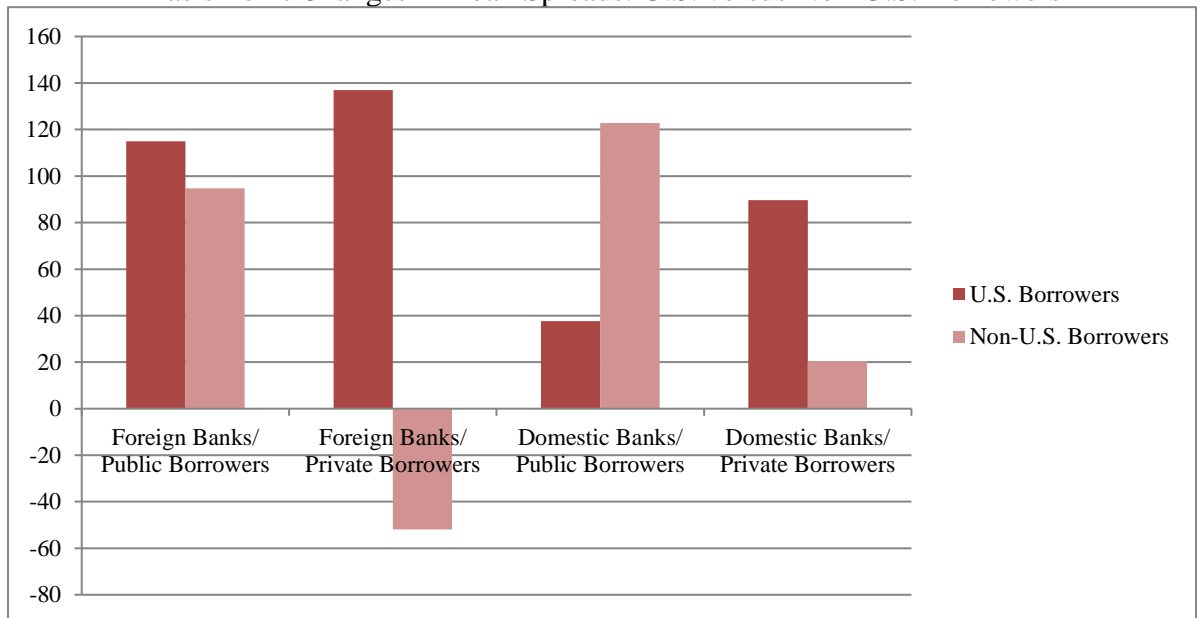


**Figure 2: The Effects of Financial Crisis on U.S. vs. Non-U.S. Banks and Borrowers**  
(concluded)

Basis Point Changes in Loan Spreads: U.S. versus Non-U.S. Banks

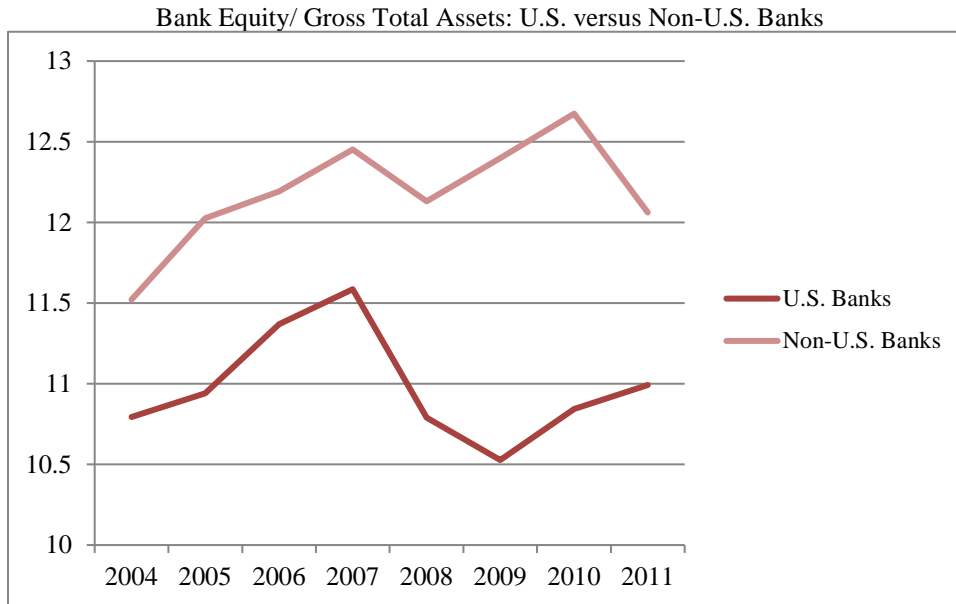


Basis Point Changes in Loan Spreads: U.S. versus Non-U.S. Borrowers



**Figure 3:** Capitalization of U.S. and Non-U.S. Banks

Figure 3 shows annual average of Bank Equity/Gross Total Assets of U.S. and non-U.S. banks. Our sample includes all banks in 50 developed and developing countries from BankScope.



**Table 1: Descriptive Statistics**

This table reports the number of observations and means of loan contract terms, borrower characteristics, and loan purposes. Our sample includes loans in developed and developing countries from DealScan with lender information from BankScope and borrower information from Orbis/Osiris. The sample period is 2004-2011. Normal times are 2004-2007. Crisis years are 2008-2011. Bank ownership data are from Claessens and Van Horen (2014) and BankScope. Borrower listing status is from Orbis/Osiris. A-D Rated categories are constructed from S&P's Senior Debt Ratings. Manufacturing Industry dummy is equal to one if the borrower's SIC code is between 2000 and 3999. High-Tech dummy is equal to one if the borrower is in the high-tech industry according to the American Electronics Association.

Subsample =	Number of Observations	All	Normal Times	Crisis	Foreign Banks	Domestic Banks	Public Borrowers	Private Borrowers
<u>Loan Contract Terms</u>								
Spread	9,868	227.770	204.55	268.79	235.71	225.34	199.70	257.65
Deal Size	18,708	14.242	14.362	14.097	14.885	14.087	14.441	14.041
Maturity	18,127	51.307	55.86	45.829	60.877	49.096	44.09	58.793
Collateral	18,736	0.278	0.32	0.227	0.351	0.26	0.261	0.295
<u>Borrower Characteristics</u>								
Size	18,736	12.811	12.664	12.99	13.468	12.653	14.125	11.48
Profitability	18,736	0.240	0.126	0.378	0.110	0.271	0.237	0.242
Leverage	18,736	0.345	0.262	0.445	0.377	0.337	0.367	0.322
Asset Tangibility	18,736	0.120	0.073	0.177	0.184	0.104	0.177	0.062
A Rated	18,736	0.076	0.080	0.070	0.147	0.058	0.086	0.065
B Rated	18,736	0.198	0.238	0.150	0.235	0.189	0.268	0.128
C Rated	18,736	0.009	0.011	0.007	0.013	0.008	0.010	0.008
D Rated	18,736	0.003	0.002	0.003	0.004	0.002	0.004	0.001
Corporate Borrower	18,736	0.821	0.812	0.832	0.774	0.832	0.854	0.788
Government Borrower	18,736	0.010	0.011	0.009	0.040	0.003	0.005	0.015
Financial Industry	18,736	0.029	0.039	0.016	0.100	0.012	0.008	0.050
Manufacturing Industry	18,736	0.229	0.253	0.199	0.297	0.212	0.229	0.228
High-Tech Industry	18,736	0.072	0.079	0.064	0.085	0.069	0.087	0.056
<u>Loan Purposes</u>								
Acquisition	18,736	0.123	0.165	0.072	0.212	0.101	0.074	0.173
Capital Expenditure	18,736	0.023	0.018	0.029	0.021	0.023	0.022	0.023
Refinancing	18,736	0.098	0.070	0.132	0.092	0.100	0.116	0.081
Backup Line	18,736	0.006	0.008	0.004	0.004	0.007	0.008	0.004

**Table 2:** The Effects of the Financial Crisis on the Number of Loans

This table reports the composition of borrower credit rating during normal times and the financial crisis within each category of banks (foreign and domestic) and borrowers (public and private). The numbers reported in each column are percentages of loans that are granted to A, B, C, and D rated borrowers and unrated borrowers.

Panel A: Number of Loans by Bank and Borrower Types

Number of Loans	Normal Times	Crisis Years	Percent Changes
All Loans	10,275	8,461	-17.65
Foreign Banks	2,242	1,406	-37.29
Domestic Banks	8,033	7,055	-12.17
Public Borrowers	4,523	4,908	8.51
Private Borrowers	5,752	3,553	-38.23
Foreign Banks/Public Borrowers	703	642	-8.68
Foreign Banks/Private Borrowers	1,539	764	-50.36
Domestic Banks/Public Borrowers	3,820	4,266	11.68
Domestic Banks/Private Borrowers	4,213	2,789	-33.8

Panel B: Number of Loans by Bank and Borrower Credit Ratings

Number of Loans	Normal Times	Crisis Years	Percent Changes
A Rated	824	591	-28.28
B Rated	2,443	1,273	-47.89
C Rated	114	56	-50.88
D Rated	21	26	23.81



## Panel C: Distributions of Borrower Credit Ratings across Subsamples

	Normal Times			Crisis			Crisis- Normal Times		
	All	Foreign	Domestic	All	Foreign	Domestic	All	Foreign	Domestic
A Rated	8.02%	16.09%	5.76%	6.98%	12.59%	5.87%	-1.03%	-3.51%	0.10%
B Rated	23.78%	23.90%	23.75%	15.05%	22.97%	13.47%	-8.74%	-0.92%	-10.29%
C Rated	1.11%	1.16%	1.10%	0.66%	1.64%	0.47%	-0.45%	0.48%	-0.63%
D Rated	0.20%	0.45%	0.14%	0.31%	0.36%	0.30%	0.10%	-0.09%	0.16%
Unrated	66.88%	58.40%	69.25%	77.00%	62.45%	79.90%	10.12%	4.04%	10.65%

	Normal Times			Crisis			Crisis- Normal Times		
	All	Public	Private	All	Public	Private	All	Public	Private
A Rated	8.02%	8.95%	7.28%	6.98%	8.27%	5.21%	-1.03%	-0.68%	-2.08%
B Rated	23.78%	34.53%	15.33%	15.05%	19.62%	8.73%	-8.74%	-14.91%	-6.61%
C Rated	1.11%	1.26%	0.99%	0.66%	0.82%	0.45%	-0.45%	-0.44%	-0.54%
D Rated	0.20%	0.42%	0.03%	0.31%	0.31%	0.31%	0.10%	-0.11%	0.27%
Unrated	66.88%	54.84%	76.36%	77.00%	70.99%	85.31%	10.12%	16.15%	8.95%

## Panel D: Number of Loans of U.S. vs. Non-U.S. Banks

Number of Loans	U.S. Banks			Non-U.S. Banks		
	Normal Times	Crisis Years	Percentage Change	Normal Times	Crisis Years	Percentage Changes
All Loans	4,653	2,568	-44.81	5,622	5,893	4.82
Foreign Banks	300	110	-63.33	1,942	1,296	-33.26
Domestic Banks	4,353	2,458	-43.53	3,680	4,597	24.92
Public Borrowers	2,483	1,588	-36.05	2,040	3,320	62.75
Private Borrowers	2,170	980	-54.84	3,582	2,573	-28.17
Foreign Banks/Public Borrowers	79	50	-36.71	624	592	-5.13
Foreign Banks/Private Borrowers	221	60	-72.85	1,318	704	-46.59
Domestic Banks/Public Borrowers	2,404	1,538	-36.02	1,416	2,728	92.66
Domestic Banks/Private Borrowers	1,949	920	-52.8	2,264	1,869	-17.45

## Panel E: Number of Loans of U.S. vs. Non-U.S. Borrowers

Number of Loans	U.S. Borrowers			Non-U.S. Borrowers		
	Normal Times	Crisis Years	Percentage Change	Normal Times	Crisis Years	Percentage Changes
All Loans	5,067	2,934	-42.1	5,208	5,527	6.13
Foreign Banks	714	476	-33.33	1,528	930	-39.14
Domestic Banks	4,353	2,458	-43.53	3,680	4,597	24.92
Public Borrowers	2,784	1,834	-34.12	1,739	3,074	76.77
Private Borrowers	2,283	1,100	-51.82	3,469	2,453	-29.29
Foreign Banks/Public Borrowers	380	296	-22.11	323	346	7.12
Foreign Banks/Private Borrowers	334	180	-46.11	1,205	584	-51.54
Domestic Banks/Public Borrowers	2,404	1,538	-36.02	1,416	2,728	92.66
Domestic Banks/Private Borrowers	1,949	920	-52.8	2,264	1,869	-17.45

**Table 3:** Conditional Probability of Loan Availability during the Crisis Period

This table reports the coefficient estimates from the loan availability probit regressions. The sample contains all loans during normal times (2004-2007). The dependent variable in this regression is the probability that, for each pre-crisis loan, there will be at least one loan with the same bank-borrower pair during the crisis period. (The Loan during Crisis dummy takes the value of one if the lender of loan  $i$  also decides to lend to the borrower of loan  $i$  during the crisis period (2008-2011) and zero otherwise.) The explanatory variables are Foreign Bank dummy, Public dummy, U.S. Bank dummy, U.S. Borrower dummy, Relationship dummy as well as other borrower characteristics, loan purposes, and other loan contract terms. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. Public Borrower dummy takes the value of one if the borrower is public. U.S. Bank dummy takes the value of one if the bank is from the U.S. and zero otherwise. U.S. Borrower dummy takes the value of one if the borrower is from the U.S. and zero otherwise. The Relationship dummy takes the value of one if the lead bank on the deal was also a lead bank in another deal during the past five years (from  $t-5$  to  $t-1$ ). Size, Profitability, Leverage, and Asset Tangibility are from Orbis. Manufacturing Industry dummy is equal to one if the borrower's SIC code is between 2000 and 3999. High-Tech dummy is equal to one if the borrower is in the high-tech industry according to the American Electronics Association. A-D Rated dummies are constructed from S&P's Senior Debt Ratings. All other variables are obtained directly from DealScan. Numbers in the parentheses are the z statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.



**Table 4:** The Effects of the Financial Crisis on the Loan Spreads

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). In Panel A, the explanatory variable is Foreign Bank dummy. In Panel B, the explanatory variables are Foreign Bank dummy, borrower characteristics, other loan contract terms, and loan purposes. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Numbers in the parentheses are the z statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively. Panel C tests whether the estimated coefficients in Panel B significantly change between normal times and the financial crisis period. Difference Column is defined as the coefficients estimated from the crisis subsample minus the coefficients estimated from the normal times subsample. Numbers in the parentheses are the t statistics. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

## Panel A: Loan Spreads

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	15.808 (2.27)**	-0.263 (0.03)	27.1 (3.21)***	-45.805 (3.50)***
Constant	157.753 (53.45)***	242.341 (46.67)***	246.884 (67.83)***	308.417 (43.92)***
R-squared	<0.01	<0.01	<0.01	0.01
N	2,910	3,391	2,178	1,389

Panel B: Loan Spreads with Borrower Characteristics and Other Controls

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	16.56 (2.68)***	8.161 (0.81)	31.85 (4.14)***	-35.014 (2.57)**
<u>Borrower Characteristics</u>				
Size	-17.366 (9.35)***	-4.166 (3.01)***	-6.139 (2.65)***	-3.021 (1.60)
Profitability	-85.751 (4.82)***	-10.48 (0.89)	-61.714 (7.28)***	-18.404 (1.75)*
Leverage	23.903 (3.89)***	-11.078 (1.06)	70.244 (7.56)***	26.435 (2.12)**
Asset Tangibility	-35.81 (4.16)***	-36.762 (1.30)	-14.26 (1.85)*	-23.49 (0.98)
A Rated	-54.829 (5.62)***	-125.41 (5.59)***	-76.827 (5.93)***	-86.233 (3.12)***
B Rated	-3.582 (0.63)	-22.356 (1.98)**	24.715 (3.40)***	54.466 (3.35)***
C Rated	101.469 (5.48)***	96.983 (2.65)***	162.4 (6.85)***	382.775 (6.55)***
D Rated	173.002 (6.03)***	45.897 (0.27)	255.781 (6.95)***	228.879 (3.25)***
Corporate Borrower	-7.129 (0.86)	-18.152 (1.34)	-6.572 (0.67)	-12.893 (0.75)
Government Borrower	-43.195 (1.21)	-14.963 (0.39)	9.795 (0.27)	26.157 (0.38)
Financial Industry	-10.345 (0.40)	-55.311 (1.99)**	-68.42 (2.01)**	-75.842 (1.98)**
Manufacturing Industry	-11.178 (2.28)**	-6.888 (0.73)	-4.12 (0.63)	26.976 (2.05)**
High-Tech Industry	14.51 (2.15)**	5.634 (0.37)	22.955 (2.63)***	63.647 (2.95)***
<u>Other Loan Contract Terms</u>				
Deal Size	-3.698 (1.58)	-6.335 (1.77)*	-9.35 (3.19)***	-13.177 (2.95)***
Maturity	0.489 (4.56)***	0.965 (7.32)***	0.12 (0.85)	0.247 (1.53)
Collateral	51.169 (10.03)***	71.644 (7.55)***	57.263 (8.99)***	24.989 (1.97)**
<u>Loan Purposes</u>				
Acquisition	38.328 (5.40)***	49.295 (4.65)***	42.336 (3.82)***	89.616 (5.47)***
Capital Expenditure	12.185 (0.68)	-93.243 (1.90)*	-17.156 (0.66)	-29.074 (0.49)
Refinancing	10.285 (0.96)	-49.851 (2.44)**	-4.001 (0.37)	-72.054 (2.38)**
Backup Line	8.805 (0.44)	-19.639 (0.38)	-84.64 (2.15)**	-97.485 (1.02)
Constant	419.267 (14.69)***	308.085 (6.15)***	407.843 (11.38)***	485.936 (8.02)***
R-squared	0.27	0.13	0.25	0.15
N	2,859	3,268	2,160	1,360

Panel C: Difference in Coefficient Estimates between Crisis and Normal Times

	Public		Private	
	Difference	t-statistic	Difference	t-statistic
Foreign Bank	15.290	(1.39)	-43.175	(2.29)**
<u>Borrower Characteristics</u>				
Public Borrower				
Size	11.227	(3.49)***	1.145	(0.49)
Profitability	24.037	(0.91)	-7.924	(0.64)
Leverage	46.341	(3.66)***	37.513	(1.99)**
Asset Tangibility	21.550	(2.18)**	13.272	(0.46)
A Rated	-21.998	(1.78)*	39.177	(1.84)*
B Rated	28.297	(2.88)***	76.822	(4.4)***
C Rated	60.931	(1.52)	285.792	(2.98)***
D Rated	82.779	(0.98)	182.982	(2.5)**
Corporate Borrower	0.557	(0)	5.259	(0.26)
Government Borrower	52.990	(1.47)	41.120	(1.22)
Bank Borrower	-58.075	(2.21)**	-20.531	(0.68)
Manufacturing Industry	7.058	(0.87)	33.864	(2.19)**
High-Tech Industry	8.445	(0.77)	58.013	(1.32)
<u>Other Loan Contract Terms</u>				
Deal Size	-5.652	(0.32)	-6.842	(1.68)*
Maturity	-0.369	(0.91)	-0.718	(1.68)*
Collateral	6.094	(0.87)	-46.655	(0.93)
<u>Loan Purposes</u>				
Acquisition	4.008	(5.76)***	40.321	(2.72)***
Capital Expenditure	-29.341	(1.46)	64.169	(1.22)
Refinancing	-14.286	(1.81)*	-22.203	(1.66)*
Backup Line	-93.445	(0.71)	-77.846	(3.02)***

**Table 5:** Spreads: U.S. Banks vs. Non-U.S. Banks

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). In Panel A, the explanatory variables are Foreign Bank dummy, U.S. Bank dummy, and their interaction. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. U.S. Bank dummy takes the value of one if the bank is from the U.S. and zero otherwise. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively. Panel B further controls for borrower characteristics, loan purposes, and other loan contract terms. Size, Profitability, Leverage, and Asset Tangibility are from Orbis. Manufacturing Industry dummy is equal to one if the borrower's SIC code is between 2000 and 3999. High-Tech Dummy is equal to one if the borrower is in the high-tech industry according to the American Electronics Association. A-D Rated dummies are constructed from S&P's Senior Debt Ratings. All other variables are obtained directly from DealScan.

Panel A: Loan Spreads of U.S. vs. Non-U.S. Banks

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	40.736 (3.21)***	-52.739 (4.19)***	85.873 (7.92)***	-45.836 (2.64)***
U.S. Bank	21.054 (1.87)*	-66.109 (5.99)***	64.215 (7.45)***	-3.146 (0.2)
Foreign Bank x U.S. Bank	-80.395 (3.28)***	120.393 (4.71)***	-201.614 (6.35)***	-27.182 (0.6)
Constant	138.26 (12.78)***	287.045 (31.64)***	196.911 (25.90)***	310.648 (23.86)***
R-squared	0.01	0.01	0.04	0.01
N	2,910	3,391	2,178	1,389

Panel B: Loan Spreads of U.S. vs. Non-U.S. Banks with Borrower Characteristics and Other Controls

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	-2.039 (0.18)	-5.606 (0.44)	40.871 (3.74)***	-38.356 (2.13)**
U.S. Bank	-20.948 (1.98)**	-10.31 (0.80)	6.637 (0.66)	-10.291 (0.57)
Foreign Bank x U.S. Bank	25.527 (1.15)	72.11 (2.67)***	-77.852 (2.54)**	-38.096 (0.84)
<u>Borrower Characteristics</u>				
Size	-17.452 (9.40)***	-4.374 (3.15)***	-6.249 (2.70)***	-3.017 (1.60)
Profitability	-89.932 (5.02)***	-9.894 (0.84)	-58.601 (6.71)***	-19.139 (1.79)*
Leverage	23.159 (3.76)***	-10.895 (1.05)	69.401 (7.47)***	24.733 (1.93)*
Asset Tangibility	-40.529 (4.51)***	-52.316 (1.82)*	-10.122 (1.17)	-25.65 (1.04)
A Rated	-52.52 (5.34)***	-120.51 (5.34)***	-75.071 (5.79)***	-86.853 (3.14)***
B Rated	-1.561 (0.27)	-16.678 (1.40)	24.825 (3.39)***	56.155 (3.35)***
C Rated	103.402 (5.58)***	99.299 (2.70)***	160.909 (6.80)***	383.471 (6.56)***
D Rated	173.51 (6.04)***	52.154 (0.31)	254.962 (6.94)***	230.47 (3.27)***
Corporate Borrower	-7.055 (0.85)	-19.328 (1.43)	-6.621 (0.67)	-14.361 (0.83)
Government Borrower	-46.243 (1.29)	-16.766 (0.43)	15.644 (0.42)	26.473 (0.39)
Financial Industry	-10.658 (0.41)	-56.719 (2.03)**	-70.302 (2.06)**	-77.816 (2.03)**
Manufacturing Industry	-11.446 (2.33)**	-8.673 (0.92)	-4.175 (0.64)	28.713 (2.16)**
High-Tech Industry	15.21 (2.25)**	5.634 (0.36)	21.595 (2.46)**	65.133 (3.01)***
<u>Other Loan Contract Terms</u>				
Deal Size	-3.852 (1.65)*	-7.786 (2.13)**	-8.949 (3.04)***	-13.369 (2.91)***
Maturity	0.483 (4.49)***	0.944 (6.98)***	0.102 (0.72)	0.218 (1.31)
Collateral	52.652 (10.22)***	71.394 (7.51)***	57.007 (8.94)***	23.498 (1.84)*
<u>Loan Purposes</u>				
Acquisition	37.192 (5.23)***	47.411 (4.29)***	42.806 (3.86)***	90.311 (5.47)***
Capital Expenditure	9.122 (0.51)	-95.856 (1.95)*	-17.261 (0.66)	-23.933 (0.40)
Refinancing	6.458 (0.59)	-51.862 (2.51)**	-1.886 (0.17)	-75.276 (2.46)**
Backup Line	9.272 (0.46)	-17.421 (0.34)	-87.853 (2.24)**	-94.468 (0.99)
Constant	441.67 (14.39)***	340.768 (6.23)***	398.527 (10.68)***	499.176 (7.26)***
R-squared	0.27	0.13	0.25	0.15
N	2,859	3,268	2,160	1,360



**Table 6:** Spreads: U.S. Borrowers vs. Non-U.S. Borrowers

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). In Panel A, the explanatory variables are Foreign Bank dummy, U.S. Borrower dummy, and their interaction. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. U.S. Borrower dummy takes the value of one if the borrower is from the U.S. and zero otherwise. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively. Panel B further controls for borrower characteristics, loan purposes, and other loan contract terms. Size, Profitability, Leverage, and Asset Tangibility are from Orbis. Manufacturing Industry dummy is equal to one if the borrower's SIC code is between 2000 and 3999. High-Tech dummy is equal to one if the borrower is in the high-tech industry according to the American Electronics Association. A-D Rated dummies are constructed from S&P's Senior Debt Ratings. All other variables are obtained directly from DealScan.

Panel A: Loan Spreads of U.S. vs. Non-U.S. Borrowers

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	-25.679 (1.71)*	-49.738 (3.78)***	10.449 (0.76)	-125.238 (6.76)***
U.S. Borrower	21.054 (1.89)*	-66.109 (5.99)***	64.215 (7.52)***	-3.146 (0.21)
Foreign Bank x U.S. Borrower	72.926 (4.24)***	83.134 (3.94)***	49.919 (2.89)***	209.02 (7.81)***
Constant	138.26 (12.88)***	287.045 (31.62)***	196.911 (26.12)***	310.648 (24.59)***
R-squared	0.02	0.01	0.05	0.07
N	2,910	3,391	2,178	1,389

Panel B: Loan Spreads of U.S. vs. Non-U.S. Borrowers with Borrower Characteristics and Other Controls

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	-14.71 (1.13)	5.209 (0.39)	13.595 (1.04)	-110.585 (5.76)***
U.S. Borrower	-16.306 (1.51)	-9.531 (0.73)	12.236 (1.17)	22.186 (1.24)
Foreign Bank x U.S. Borrower	40.916 (2.75)***	2.662 (0.12)	31.807 (1.96)**	174.142 (6.55)***
<u>Borrower Characteristics</u>				
Size	-17.124 (9.19)***	-4.261 (3.04)***	-5.195 (2.22)**	-1.727 (0.93)
Profitability	-84.569 (4.68)***	-10.413 (0.88)	-56.486 (6.41)***	-15.55 (1.49)
Leverage	23.353 (3.80)***	-11.13 (1.07)	69.366 (7.47)***	35.472 (2.83)***
Asset Tangibility	-33.434 (3.50)***	-40.701 (1.41)	-4.421 (0.49)	16.82 (0.68)
A Rated	-54.176 (5.49)***	-123.18 (5.43)***	-78.653 (6.07)***	-82.694 (3.06)***
B Rated	-3.416 (0.59)	-18.607 (1.50)	20.837 (2.81)***	22.965 (1.36)
C Rated	101.824 (5.49)***	100.346 (2.72)***	154.956 (6.51)***	342.376 (5.97)***
D Rated	169.51 (5.90)***	49.186 (0.29)	257.461 (7.01)***	220.282 (3.20)***
Corporate Borrower	-7.799 (0.94)	-18.79 (1.38)	-6.931 (0.71)	-6.947 (0.41)
Government Borrower	-32.767 (0.90)	-19.299 (0.49)	28.42 (0.76)	67.553 (1.00)
Financial Industry	-9.098 (0.35)	-58.962 (2.08)**	-67.531 (1.98)**	-19.725 (0.52)
Manufacturing Industry	-11.705 (2.39)**	-6.976 (0.74)	-4.613 (0.71)	31.334 (2.43)**
High-Tech Industry	14.855 (2.19)**	6.575 (0.42)	20.275 (2.30)**	64.366 (3.04)***
<u>Other Loan Contract Terms</u>				
Deal Size	-3.993 (1.71)*	-6.959 (1.89)*	-9.352 (3.18)***	-6.23 (1.36)
Maturity	0.485 (4.52)***	0.939 (6.91)***	0.134 (0.95)	0.422 (2.57)**
Collateral	51.725 (10.00)***	71.031 (7.46)***	54.677 (8.50)***	26.5 (2.13)**
<u>Loan Purposes</u>				
Acquisition	38.316 (5.37)***	46.7 (4.19)***	42.066 (3.80)***	97.694 (6.07)***
Capital Expenditure	11.478 (0.64)	-97.121 (1.96)**	-11.762 (0.45)	-1.825 (0.03)
Refinancing	8.708 (0.80)	-53.048 (2.54)**	-0.399 (0.03)	-52.087 (1.73)*
Backup Line	8.922 (0.44)	-18.186 (0.35)	-92.554 (2.35)**	-100.248 (1.08)
Constant	435.904 (14.15)***	327.068 (5.84)***	385.548 (10.21)***	336.74 (4.80)***
R-squared	0.27	0.13	0.25	0.19
N	2,859	3,268	2,160	1,360

**Table 7: Relationship Lending**

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). In Panel A, the explanatory variable is Foreign Bank dummy. In Panel B, the explanatory variables are Foreign Bank dummy, borrower characteristics, other loan contract terms, and loan purposes. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of relationship borrowers. Columns 2 and 4 are estimated from the subsample of non-relationship borrowers. Numbers in the parentheses are the z statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively. Numbers in the parentheses are the t statistics. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

Panel A: Loan Spreads and Lending Relationship				
Y= Spread; Subsample =	Normal Times		Crisis	
	Relationship	Non-Relationship	Relationship	Non-Relationship
Foreign Bank	18.46 (1.71)*	10.839 (1.40)	5.496 (0.33)	-7.361 (0.94)
Constant	158.683 (32.89)***	224.489 (56.72)***	242.354 (34.27)***	282.509 (72.65)***
R-squared	<0.01	<0.01	<0.01	<0.01
N	2,209	4,092	1,135	2,432

Panel B: Loan Spreads, Lending Relationship, and Borrower Characteristics				
Y= Spread; Subsample =	Normal Times		Crisis	
	Relationship	Non-Relationship	Relationship	Non-Relationship
Foreign Bank	37.379 (3.49)***	1.012 (0.13)	6.901 (0.42)	0.521 (0.07)
Public	Yes	Yes	Yes	Yes
Borrower Characteristics	Yes	Yes	Yes	Yes
Other Loan Contract Terms	Yes	Yes	Yes	Yes
Loan Purposes	Yes	Yes	Yes	Yes
R-squared	0.2	0.16	0.23	0.19
N	2,162	3,965	1,118	2,402

**Table 8:** Loan Spreads with Bank and Borrower Characteristics

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). The explanatory variables are Foreign Bank dummy, other bank characteristics, other borrower characteristics, loan purposes, and other loan contract terms. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. Public Borrower dummy takes the value of one if the borrower is public. Bank Size, Bank Profitability, Bank NPL, Bank Equity, and Bank Liquidity are from BankScope. All other variables are obtained from Orbis and DealScan. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	52.409 (4.66)***	79.927 (5.01)***	44.693 (3.62)***	-18.927 (0.97)
<u>Bank Characteristics</u>				
Bank Size	-8.082 (2.84)***	-4.848 (1.02)	-4.61 (1.54)	-10.149 (1.77)*
Bank Profitability	55.889 (6.09)***	61.833 (4.01)***	-25.663 (3.88)***	-5.706 (0.52)
Bank NPL	23.395 (2.80)***	-23.458 (1.78)*	8.306 (1.58)	6.949 (0.79)
Bank Equity	-2.526 (2.57)**	-1.749 (1.48)	-0.132 (0.21)	-1.737 (1.69)*
Bank Liquidity	0.616 (2.69)***	-0.025 (0.06)	-0.204 (0.73)	1.305 (2.29)**
Borrower Characteristics	Yes	Yes	Yes	Yes
Other Loan Contract Terms	Yes	Yes	Yes	Yes
Loan Purposes	Yes	Yes	Yes	Yes
R-squared	0.34	0.21	0.28	0.24
N	1,845	1,498	1,354	661

**Table 9:** Developed vs. Developing Countries

Panel A of this table reports the number of loans in developed and developing countries during normal times and financial crisis. Normal times are 2004-2007. Crisis years are 2008-2011. Bank ownership data are from Claessens and Van Horen (2014)/ BankScope. Borrower listing status is from Orbis/Osiris. Developed Country is defined as a high-income economy and Developing Country is defined as a middle-income economy or lower, according to the World Bank's Atlas method.

Panel B of this table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). The explanatory variables are Foreign Bank dummy, Developed Country dummy, and their interaction. Developed Country dummy takes the value of one if the borrower is from a developed country and zero otherwise. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

Panel A: Number of Loans in Developed and Developing Countries

Number of Loans	Developed Countries			Developing Countries		
	Normal Times	Crisis Years	Percentage Changes	Normal Times	Crisis Years	Percentage Changes
All Loans	9,710	7,869	-18.96	565	592	4.78
Foreign Banks	1,872	1,150	-38.57	370	256	-30.81
Domestic Banks	7,838	6,719	-14.28	195	336	72.31
Public Borrowers	4,344	4,645	6.93	179	263	46.93
Private Borrowers	5,366	3,224	-39.92	386	329	-14.77
Foreign Banks/Public Borrowers	587	518	-11.75	116	124	6.9
Foreign Banks/Private Borrowers	1,285	632	-50.82	254	132	-48.03
Domestic Banks/Public Borrowers	3,757	4,127	9.85	63	139	120.63
Domestic Banks/Private Borrowers	4,081	2,592	-36.49	132	197	49.24

Panel B: Loan Spreads in Developed and Developing Countries

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	-44.128 (1.61)	-44.207 (1.14)	-32.327 (1.10)	-198.041 (4.57)***
Developed Country	6.915 (0.32)	126.529 (3.79)***	-16.26 (0.75)	-33.717 (0.98)
Foreign Bank x Developed Country	70.781 (2.50)**	71.444 (1.78)*	67.168 (2.19)**	176.942 (3.88)***
Constant	150.966 (6.97)***	118.862 (3.60)***	262.676 (12.25)***	340.702 (10.08)***
R-squared	0.01	0.03	0.01	0.03
N	2,910	3,391	2,178	1,389

**Table 10:** Fixed Effect Specifications

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). The explanatory variables are Foreign Bank dummy, other borrower characteristics, loan purposes, and other loan contract terms. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. All other variables are obtained from Orbis and DealScan. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the crisis subsample (2008-2011). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Panel A controls for country and industry fixed effects. Panel B controls for Country x Year fixed effects. Country fixed effects and Country x Year fixed effects are defined by borrower countries. Industry fixed effects are defined by borrower industry using Fama-French 49-industry classification. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

Panel A: Loan Spreads with Country and Industry Fixed Effects				
Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	15.657 (2.39)**	27.719 (2.38)**	29.649 (3.61)***	3.699 -0.25
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Borrower Characteristics	Yes	Yes	Yes	Yes
Other Loan Contract Terms	Yes	Yes	Yes	Yes
Loan Purposes	Yes	Yes	Yes	Yes
R-squared	0.33	0.19	0.31	0.26
N	2,859	3,268	2,160	1,360

Panel B: Loan Spreads with Country x Year Fixed Effects				
Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	21.615 (3.29)***	31.783 (2.74)***	29.562 (3.91)***	-8.902 (0.61)
Country x Year Fixed Effects	Yes	Yes	Yes	Yes
Borrower Characteristics	Yes	Yes	Yes	Yes
Other Loan Contract Terms	Yes	Yes	Yes	Yes
Loan Purposes	Yes	Yes	Yes	Yes
R-squared	0.3	0.18	0.4	0.27
N	2,859	3,268	2,160	1,360

**Table 11:** Alternative Definition of the Crisis Period

This table reports the coefficient estimates from the spread regressions. The dependent variable is All in Spread (drawn). The explanatory variables are Foreign Bank dummy, other borrower characteristics, loan purposes, and other loan contract terms. Foreign Bank dummy takes the value of one if bank and borrower are from different countries and zero otherwise. All other variables are obtained from Orbis and DealScan. Columns 1 and 2 are estimated from the normal-time subsample (2004-2007). Columns 3 and 4 are estimated from the alternative crisis subsample (2008-2009). Columns 1 and 3 are estimated from the subsample of public borrowers. Columns 2 and 4 are estimated from the subsample of private borrowers. Numbers in the parentheses are the t statistics computed from robust standard errors. \*, \*\*, and \*\*\* indicate statistical significance at the 10, 5, and 1% levels, respectively.

Y= Spread; Subsample =	Normal Times		Crisis	
	Public	Private	Public	Private
Foreign Bank	16.56 (2.68)***	8.161 (0.81)	33.083 (3.36)***	-43.563 (2.59)***
Borrower Characteristics	Yes	Yes	Yes	Yes
Other Loan Contract Terms	Yes	Yes	Yes	Yes
Loan Purposes	Yes	Yes	Yes	Yes
R-squared	0.27	0.13	0.23	0.13
N	2,859	3,268	1,499	1,055