Shocks Abroad, Pain at Home?

Bank-Firm Level Evidence on the International Transmission of Financial Shocks

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Abstract

We study the international transmission of shocks from the banking to the real sector during the global financial crisis. For identification, we use matched bank-firm level data, covering many small and medium-sized firms in Eastern Europe and Central Asia. We find that internationally-borrowing domestic and foreign-owned banks contract their credit more during the crisis than locally-funded domestic banks do. Firms dependent on credit and with a relationship with internationally-borrowing domestic or foreign banks suffer more in their financing and real performance; especially when single-bank, small or with limited tangible assets. Firms in countries with lower growth or financial development, more reliance on foreign funding or slower contract enforcement are also affected more. Overall our results suggest the existence of spillovers to the real sector through an international banking channel but with heterogeneous effects across firms and countries.

Keywords: international transmission, firm real effects, foreign banks, international wholesale funding, credit shock.

JEL: G01, G21, F23, F36.

1. INTRODUCTION

The U.S. and Western Europe suffered their worst banking crisis since the 1930s with global wholesale liquidity evaporating and Western banks suffering important losses. The crisis followed a period in which the globalization of the financial system dramatically deepened. European banks, in particular, extended their operations in the international wholesale market and increased their presence in many countries through the establishment of a foreign branch or subsidiary.[1] A crucial question on the academic and policy agendas therefore is whether the increased dependency on international wholesale funding and the increased presence of foreign banks intensified the international transmission of financial shocks across national borders with negative implications for the real economy.

Using unique, matched bank-firm level data, we examine the transmission of the global financial crisis through these two key channels stemming from financial globalization. In particular we aim to answer the following questions: Does the global financial crisis spread through international bank linkages? In particular, do domestic banks that rely on international wholesale funding cut credit to firms when this market dries up? Do financial problems in international banks propagate through their internal capital markets to subsidiaries contracting business lending in domestic markets? Are there consequently real effects for the domestic borrowers? And, are there heterogeneous effects across different types of banks, firms and countries? So, ultimately, the question this paper aims to answer: Is a globalized banking sector a shock absorber or a shock propagator, and what are the real effects of the transmitted shocks?[2]

Building on the seminal works of Peek and Rosengren (1997) and Peek and Rosengren (2000) a literature has emerged that studies the international transmission of shocks through

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[1] See Kalemli-Ozcan, Papaioannou and Peydró (2010) for the determinants of banking globalization, especially in Europe, and Claessens and van Horen (2014) for an overview of trends in foreign bank ownership.

[2] A small but emerging literature studies the importance of (domestic and international) financial shocks on certain types of real economic activity. On the domestic side, for example, studies show that financial shocks negatively affect corporate investments (Gan (2007); Duchin, Ozbas and Sensoy (2010); Amiti and Weinstein (2013)), export activity (Amiti and Weinstein (2011)), technology and capital spending and employment (Campello, Graham and Harvey (2010), Jiménez, Ongena, Peydró and Saurina (2013)). Studying the impact of international transmitted financial shocks on real economic activity Peek and Rosengren (2000) show that when Japanese banks became unhealthy this resulted in lower construction activity in US states heavily dependent on Japanese banks. Klein, Peek and Rosengren (2002) demonstrate that a number of foreign direct investment flows are sensitive to the financial health of banks supplying the firm with credit. Claessens, Tong and Wei (2011), studying large, publicly listed firms, find that the global financial crisis spread through trade and business cycle channels with negative consequences for firm performance. Finally, Paravisini, Rappoport, Schnabl and Wolfenzon (2012) find that the reversal of capital flows during the global financial crisis negatively affected the export capacity of Peruvian exporters.

the banking sector using country- and bank-level data. By comparing credit provided by countries or by banks with differential exposures to financial shocks, these studies provide evidence that indeed global banks transmitted shocks across borders through their local affiliates during the global financial crisis (see among others, Cetorelli and Goldberg (2011); Cetorelli and Goldberg (2012); Cull and Martinez Peria (2013); Claessens and van Horen (2013); de Haas and van Lelyveld (2014)).

However, the level of aggregation at which this international transmission is being analyzed is potentially problematic. Banks that are foreign owned (or that rely on international wholesale funding) may lend to different types of firms,[3] in which case measuring the correct overall impact of a shock on the real economy inevitably requires accounting for firm fundamentals. In addition, bank-level analyses (and country-level analyses even more so) can be misleading as aggregate volumes are driven by changes in lending to large firms, hiding the fact that the credit crunch might only affect small and medium-sized enterprises (SMEs) (Gertler and Gilchrist (1994)).

The use of credit registry data from a single country allows for better identification as with these data one can control for (un)observable firm fundamentals and at the same time can differentiate between large firms and SMEs. Schnabl (2012), for example, shows that the negative liquidity shock caused by the Russian crisis of 1998 resulted in a reduction of bank credit available to Peruvian firms. Studying the global financial crisis, Puri, Rocholl and Steffen (2011) find that German savings banks with substantial (though indirect) U.S. subprime exposures decreased lending more. Finally, Albertazzi and Bottero (2013) show that foreign banks active in Italy reduced credit more compared to Italian banks after the collapse of Lehman Brothers.

While these papers provide convincing evidence that banks transmit financial shocks across markets, they can say little about how these shocks impact real economic activity as firm-level information is restricted to general firm characteristics without any balance sheet information such as, for example, total assets. Taking this additional step is important, however, as a reduction in bank lending does not necessarily has to have any real effects if firms have ways to substitute bank credit for other forms of financing, including internal cash flows.[4] Furthermore, the use of credit registry data limits any analysis to only one country

[3] For empirical evidence on differential lending by banks with high and low liquidity and capital, see Kashyap and Stein (2000) and Jiménez, Ongena, Peydró and Saurina (2012). For evidence on differential lending by domestic versus foreign banks, see Mian (2006), Berger, Klapper, Martinez Peria and Zaidi (2008), Bruno and Hauswald (2013), Giannetti and Ongena (2009) and Gormley (2010) for example.

[4] For example, Kashyap, Stein and Wilcox (1993), Kroszner, Laeven and Klingebiel (2007) and Adrian, Colla and Shin (2012) show that in the presence of a shock to bank lending some firms are able to substitute to other forms of finance.

which reduces the external validity of the results and does not allow examining in what way country characteristics impact the international transmission of financial shocks.[5]

Our paper uniquely builds on and extends these various strands of literature by studying the impact of the international transmission of financial shocks through the use of international wholesale funding and foreign bank ownership on the financing and performance of both large firms as well as SMEs. We use unique, detailed, matched bank-firm-level data of 256 different banks that have relationships with 45,660 firms. The use of matched bank-firm level data allows for a better identification compared to country- or bank-level studies, as it allows us to control for firm fundamentals. As shown by Khwaja and Mian (2008) and Jiménez, Ongena, Peydró and Saurina (2013) once key firm characteristics are controlled for the inclusion of firm-level fixed effects, a prerequisite of loan-level data, has only a minor impact on the estimated coefficients.[6]

The firms and banks in our study are located across 14 countries in Eastern Europe and Central Asia. This region is especially suitable for identification as banks in this region were initially not affected by the Western banking crisis, a significant proportion of domestic banks used the international wholesale market to finance a credit boom at home in the years leading up to the crisis and foreign bank presence in this region has been large for some time (since the 1990s). Furthermore, the countries differ importantly in a number of key characteristics, including their level of financial development, pre-crisis growth, reliance on foreign funding and institutional quality. Therefore, our multi-country setting allows us to explore the impact of country heterogeneity on the international transmission of financial shocks.

Our identification strategy relies on exploiting variation before the crisis at both the bank and firm level. First, we identify three types of banks: (1) Domestic banks that are funded only locally (henceforth, locally-funded domestic banks), (2) domestic banks that borrow on the international wholesale market (henceforth, internationally-borrowing domestic banks), and (3) foreign-owned banks (henceforth, foreign banks). We argue that the global financial crisis affected mostly the internationally-borrowing domestic banks and foreign banks, thus potentially leading to a (relative) reduction in their supply of credit.

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[5] Some recent studies have used syndicated loan data to examine how financial crises affect cross-border bank lending (see, for example, de Haas and van Horen (2012), Giannetti and Laeven (2012) and De Haas and Van Horen (2013)). As these papers use loan-level data in a multi-country setting, they can account for country-, bank- and firm-heterogeneity. However, as syndicated loans are generally only granted to large firms they cannot study the impact of international transmission on SMEs. Furthermore, these studies are not able to provide any insights in the real effects.

[6] In addition, one can only control for firm-level fixed effects when firms have multiple bank relationships. Because many firms, in particular SMEs, only have a relationship with one bank (Degryse, Kim and Ongena (2009)), controlling for firm-level fixed effects would in effect result in the exclusion of two-thirds of our sample and a potential correspondent loss in external validity.

Next, we differentiate between firms that are dependent on bank credit and firms that do not rely on external financing from a financial intermediary. This is in contrast to Santos and Winton (2008) and Chava and Purnanandam (2011) who compare bank-dependent borrowers that have no access to public debt markets with borrowers that do have access to these markets. Hence compared to these two studies we exploit bank-dependency on the opposite side of the "no access – bank – public market" financing spectrum (Berger and Udell (1993), Greenbaum and Emmons (1998)). Our measure of credit dependency is based on firm balance sheet information. Credit-dependent firms are firms that borrowed between 2004 and 2007 and credit-independent firms are firms that did not borrow in this period, i.e., that only relied on a bank for a checking or a savings account for example. Therefore, while in Rajan and Zingales (1998), and the vast literature that builds on this seminal paper, credit-dependency is industry-specific and technology-determined, in our case it is firm-specific and time-predetermined (i.e., measured during normal times before the financial crisis hit). [7]

We assume that firms that rely on bank credit are dependent on their bank for financing and, therefore, should be more affected by any negative shock hitting their bank. For firms that do not rely on bank credit, a shock to their bank should have no (or a much more subdued) impact as these firms are simply depositing funds in the bank. Thus, by comparing the performance of "credit-dependent" and "credit-independent" firms linked to the three different types of banks, analyzing the same firm before and after the shock, and controlling for firm observable characteristics, we can provide the first clear and convincing evidence on the occurrence of a credit contraction caused by the international transmission of financial shocks and its impact on the real economy.

To further understand the role of credit supply-side frictions, we also exploit heterogeneity across firms and countries. We rely on corporate finance theory to distinguish firms according to their ability to mitigate a contraction in credit by their bank. Specifically, we examine the impact of having multiple bank relationships, the size of a firm and the availability of tangible assets. We exploit our multi-country setting by examining whether country characteristics like pre-crisis growth, financial development, dependence on foreign funding and the strength of the legal system affect the strength of the international transmission of financial shocks.

To execute this empirical strategy we link five databases. We start with the comprehensive world-wide bank-ownership dataset compiled by *Claessens and van Horen*

[7] Building on the work of Rajan and Zingales (1998), several studies have shown that industries or firms that depend more on external finance contract more during banking crises (see, among others, Kashyap, Lamont and Stein (1994), Dell'Ariccia, Detragiache and Rajan (2008), Kalemli-Ozcan, Kamil and Villegas-Sanchez (2011) and Chava and Purnanandam (2011)). As opposed to our paper, these studies cannot link the affected industries or firms to their financiers.

(2014) which distinguishes between domestic and foreign banks. To determine whether a domestic bank borrowed from the international wholesale markets, we use information on bond issuance and syndicated lending from *Dealogic*. Bank balance sheet information is taken from *Bankscope,* a database that records world-wide bank balance sheet data. Next, and crucial to make the connection between banks and firms, we use *Kompass* which records bank-firm relationships. Finally, we match this information to *Amadeus* which records balance sheet information on European non-financial firms. Both *Kompass* and *Amadeus* record information for both large firms and SMEs. Furthermore, the information in *Amadeus* not only allows us to study the real effects of international transmission, but also enables us to control for many firm-level fundamentals that can impact the quality and quantity of demand for credit during a crisis.

Our bank-level regressions show that, compared to domestic banks that are funded only locally, internationally-borrowing domestic and foreign banks contract their lending more during the crisis. However, this result could be driven by these banks lending to firms with higher risk or a lower demand for credit during the crisis or by adjustments in lending to large firms, potentially hiding the fact that especially credit to SMEs is contracting more.

However, our firm-level regressions confirm the occurrence of an international transmission of financial shocks. We find that credit-dependent firms with a relationship with these internationally-borrowing domestic or foreign banks suffer on average worse financial and real effects than those credit-dependent firms linked to locally-funded banks. Specifically, they experience a larger drop in short-term debt, see their profits deteriorate more, and experience a sharper reduction in their total assets and operational revenue growth between 2008 and 2009. For credit-independent firms we do not find a differential impact with respect to the type of bank the firm has a relationship with. Moreover, we find that the adverse shock to credit has a much stronger impact on firms with a single bank relationship, that are smaller, or that have less tangible assets they can pledge as collateral. Finally, firms in countries with lower growth or credit availability, more reliance on foreign funding or slower contract enforcement are also affected more. In sum, we show that during the global financial crisis financial shocks were transmitted through domestic banks' reliance on international wholesale funding and through foreign ownership of local banks. Both channels have a significant impact on the real economy.

The remainder of this paper is organized as follows. In the next section we describe our identification strategy in more detail. Section 3 describes how we construct our database. Section 4 presents the empirical results at the bank level and Section 5 presents the empirical results at the firm level. Section 6 concludes.

2. IDENTIFICATION

2.1. International Transmission of Financial Shocks

We aim to investigate whether the globalization of the financial sector has exacerbated the international transmission of financial shocks and how this affects firm financing and performance and, therefore, real economic activity. Specifically, we are interested in transmission through two key channels: The use of international wholesale funding and foreign bank ownership.

For this purpose, studying the global financial crisis is particular useful as it has two important distinguishing features. First, the default of Lehman Brothers on September 15, 2008, led to a collapse of the *international* interbank market directly affecting the funding position of banks dependent on international wholesale markets. In case these banks were not able to find alternative (local) sources of funding, the collapse of the international interbank market could negatively affect their domestic credit provisioning, providing a channel through which the crisis could be transmitted to countries initially not affected by the crisis.

Second, especially large Western banks with numerous foreign affiliates were affected by the crisis. If parent banks when faced with capital or funding shocks at home reduced lending to their foreign affiliates, this could upset the funding position of these affiliates with negative consequences for their local lending, proving a second channel of transmission.[8]

To test the strength of both transmission channels we focus on three groups of banks: Domestic banks that were funded only locally, domestic banks that also borrowed from the international wholesale market and foreign banks. The first group is our benchmark group. If the global financial crisis was transmitted through the channels of international wholesale funding or foreign ownership, the internationally-borrowing domestic and foreign banks should curtail credit more compared to locally-funded domestic banks.[9]

2.2. Credit-Dependent and Credit-Independent Firms

For several reasons our identification strategy does not rely on studying the behavior of *only* the bank – i.e., bank-level data. First, to the extent that different banks lend to different firms that are differentially affected by the crisis, the variation in credit across the three types of banks defined-earlier can be driven by demand. Second, the aggregate nature of banks'

[8] At the same time it is possible that parent banks when faced with reduced economic prospects in their home country allocate more funds to their subsidiaries in growth markets. This could reduce the magnitude of the transmission channel through foreign ownership.

[9] It is possible that the liquidity shock faced by internationally-borrowing domestic banks led these banks to reduce interbank lending to locally-funded domestic banks, with direct negative consequences for their lending as well. This makes our reported estimates conservative.

balance sheets implies that any changes in credit are driven by adjustments in lending to large firms, potentially hiding the fact that especially credit to SMEs is contracting. Third, and even more important, studying the credit contraction of banks alone cannot provide any insights in the real effects of international transmission of financial shocks as such shocks only affect real outcomes if there are credit market imperfections at both the bank and the firm level (Bernanke and Blinder (1988); Bernanke and Gertler (1989); Holmstrom and Tirole (1997); Stein (1998)).

To isolate demand (borrower fundamentals) from the credit supply shock (credit availability), differentiate between different types of firms, and at the same time study the real effects of international transmission, we also use firm balance sheet information and exploit the idea that – if financial frictions exist – the financial and real performance of a firm dependent on credit should be sensitive to shocks experienced by its suppliers of credit. At the same time, similar firms that are not dependent on bank credit (and only use a bank for a checking or savings account) should not be affected by such shocks.[10] Therefore, if international transmission took place through the channel of international wholesale funding or foreign ownership, then we should, controlling for other firm fundamentals, find that credit-dependent firms with a relationship with an internationally-borrowing domestic or foreign bank should be disproportionally affected in terms of their financing and real performance compared to firms with a relationship with a locally-funded domestic bank. At the same time, we should not find a differential impact for firms that have a (deposit) relationship with these two types of banks, but do not depend on credit.

Comparing the financial and real performance of these different types of firms provides the core of our identification strategy. However, to deepen our understanding of the existence of financial frictions as well as to strengthen our identification, we extend our analysis by further differentiating between firms according to their ability to mitigate a credit contraction by their bank. For this we rely on findings in the corporate finance theory.

A first characteristic that potentially affects a firm's ability to mitigate its bank's credit contraction is the number of banks with whom the firm has a relationship. Ruckes (2004) and Dell'Ariccia and Marquez (2006) show that switching to new banks during crises is difficult as adverse selection problems are the most severe then. Therefore, firms that have established relationships with multiple banks pre-crisis are more likely to be able to switch when their main bank is curtailing credit and thus will be less likely affected by a shock affecting their

[10] A material bank relationship can exist without (much) credit (Ongena and Smith (2000)). Indeed, the breadth of bank services used by a firm is a measure of the strength of the relationship, in terms of its scope (Boot and Thakor (2000)). The array of classic banking services beyond credit comprises deposits, the management of bank balances and temporary overdrafts, foreign exchange management, and the brokering of other financial activities.

main bank (see also Sharpe (1990), Detragiache, Garella and Guiso (2000), von Thadden (2004), among others).

A second potential influential firm characteristic is its size. It is well established in the corporate finance literature that large firms have more access to alternative sources of external finance (e.g., bond finance) compared to small firms. Furthermore, it might be easier for large firms, which tend to be less opaque, to switch to another, less funding constrained, bank. Therefore, financial frictions are likely less significant for large firms.[11]

Finally, the availability of tangible assets that can be used as collateral can also be an important mitigating factor. When information asymmetries between lenders and borrowers lead to credit rationing, borrowers with higher collateral can obtain funds more easily (Bester (1985)). Collateral can also serve as a mitigating device for moral hazard problems (Tirole (2006)). This suggests that credit-dependent firms with enough assets to pledge as collateral will be less affected by a credit contraction, either because their (funding-constrained) bank is more willing to provide them with credit or because these firms can switch more easily to a new bank.[12]

In other words, if the crisis spreads through bank reliance on international wholesale funding or through foreign bank ownership, then we should expect that, of the group of firms that are dependent on credit and that have a relationship with an internationally-borrowing domestic or with a foreign bank, especially single-bank firms, small firms and firms with limited tangible assets will experience a stronger reduction in their financial and real performance.

In sum, our identification strategy relies on the timing of the shock, bank type, firm credit-dependency, and firms' ability to mitigate a credit contraction, and will be underpinned by unique, detailed data (discussed in the next section) on bank-firm connections that link bank and firm balance sheet information.

3. DATA

3.1. Databases

The data set used in the analysis connects five databases lining up yearly information on balance sheet items for banks and firms that have relationships with these banks active in 14 countries in Eastern Europe and Central Asia, i.e., Bosnia-Herzegovina, Bulgaria, Croatia,

[11] Using data on borrowing by Pakistani firms, Khwaja and Mian (2008) find that credit shocks matter for small but not for large firms.

[12] The firm balance-sheet channel implies that larger firm size and tangible assets may reduce agency frictions and thus support credit availability during a crisis or when GDP contracts (see Bernanke and Gertler (1989) and the large literature following this seminal paper).

Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Serbia and Montenegro, Slovakia, Slovenia, Turkey, and Ukraine. Studying these countries is especially useful for our purpose as banks in this region were initially not affected by the Western banking crisis, foreign bank presence is substantial in many countries and a number of domestic banks in these countries used the international wholesale markets to finance a credit boom at home in the years leading up to the crisis.

We start with the comprehensive world-wide bank-ownership database compiled by *Claessens and van Horen (2014)*. The database provides panel information on bank ownership (domestic or foreign owned) for virtually all banks in the world and, therefore, is very useful for our analysis. From this database we identify all banks active in one of the countries in our sample at least 3 years prior to the onset of the global financial crisis and still active in 2009. We take the ownership in 2007 to categorize a bank as being domestic or foreign owned. Foreign owned implies that foreigners hold more than 50 percent of the shares of the bank.

Next, to determine whether a domestic bank borrowed from the international wholesale market we use information on bond issuance and syndicated lending from *Dealogic*. We consider a bank to be an international borrower when it borrowed at least once between 2004 and 2007 from the international syndicated loan or bond market.[13] To complete the bank-level data we use bank balance sheet information from *Bankscope,* a database that records world-wide bank balance sheet data.

Kompass provides the bank-firm connections that are crucial to our investigation. The database provides records for firms in 70 countries including firm address, executive names, industry, turnover, date of incorporation and, critically for our purposes, the firms' (primary) bank relationship(s). Giannetti and Ongena (2012) were among the first to use this database in their investigation which borrowers are able to benefit from foreign bank presence in Eastern European countries (see their paper and also Ongena and Şendeniz-Yüncü (2011) for a more detailed description of the database).

Kompass collects data using information provided by chambers of commerce and firm registries, but also conducts phone interviews with firm representatives. We use the 2010 vintage of the database and observe the (primary) bank relationship for all so-registered firms

[13] We employ a dummy instead of a continuous variable as our goal is to clearly demarcate between banks that have access to the international capital market and those that do not. Obviously, banks can also access international wholesale funding through different avenues like bilateral interbank borrowing, borrowing from money market funds, and through the use of derivatives markets. However, bank-level information on these exposures is not available for our set of countries. Given that attracting capital from the international capital market using syndicated loans is in general a first step for financial and non-financial firms towards accessing bond and other types of market financing, we surmise that borrowing activity in the international syndicate and bond markets is a good proxy for a bank's overall access to international wholesale funding.

active in one of our 14 sample countries. In contrast to other Kompass records that are sometimes updated (and time-stamped with a year), bank relationships in general are not updated and reflect the relationship at the moment the firm entered the database.[14] This however, is of limited concern as firm-bank relationships often last many years, sometimes decades, even during non-crisis periods (Ongena and Smith (2001); Degryse, Kim and Ongena (2009)).[15] We match the information in Kompass to our bank-level information and identify the firms whose main bank is one of the banks in our sample.

Unfortunately, Kompass does not provide balance sheet information for the firms. To access this information we match Kompass to *Amadeus* that records balance sheet information on European non-financial firms. This matching process is rather cumbersome as only a small portion of the firms can be matched directly by name (as writing conventions differ between the two databases). We therefore match the rest of the firms using information on website, email address and/or telephone number. For the matching by telephone number we consider a firm matched when we find a matching string of at least 6 consecutive numbers. We carefully checked the matched firms by cross-referencing address information to assure a correct match. In some cases we could match several branches of the same firm. In these instances we only retain the largest branch. In total we could match 45,660 firms active at least 3 years prior to the onset of the crisis and still active in 2009 and for which balance sheet information is available.[16]

With Amadeus in hand we can access all relevant firm characteristics and determine which firms are credit-dependent and which ones are not. As indicated before, having a bank relationship does not necessarily imply that firms have external financing needs and borrow from banks. Therefore, to distinguish between credit-dependent and credit-independent firms we use firm balance sheet information. Specifically, we consider a firm to be credit-dependent if its total borrowing (defined as short- and long term debt to credit institutions) was positive in at least one year between 2004 and 2007. Using this classification our sample contains

[14] Kompass is no longer able to supply historic firm records. The overlap with the 2005 vintage of the database we had access to from an earlier study is unfortunately too small for a meaningful analysis. This small overlap also suggests that most firms in our sample were included in the database after 2005 and that the bank relationship information we have is not stale.

[15] If the relationship information predates the crisis and firms managed to switch from shocked to unaffected banks to mitigate the transmitted contraction, our estimates will be conservative (as we will incorrectly link these potentially better financed and performing firms to the shocked banks). If the relationship information is recent, our estimates will also be conservative if worse financed and performing firms were in the end able to switch from shocked to unaffected banks. However, as explained in the previous section we will exploit differences between firms in the probability that they will be able to switch banks. This allows us to use observable firm characteristics to proxy for the probability of switching and provides an additional layer of confidence in our evidence.

[16] We were able to match more than 100,000 firms, but many firms in Amadeus do not have any balance sheet information available as they are mere legal entities with limited economic activity.

30,529 credit-dependent and 14,364 credit-independent firms (information on total borrowing was missing for the remaining firms).

3.2. Samples

Our final sample consists of 256 different banks that are connected with 40,409 different firms. Tables 1 and 2 provide the distribution of banks and firms by country. Of the 256 banks 130 are majority-owned by foreigners and are referred to as *Foreign Banks*. Among the 126 domestic banks, 39 banks borrowed at least once from the international syndicated loan or bond market between 2004 and 2007, and are therefore categorized as *Internationally-Borrowing Domestic Banks*. The remaining 87 domestic banks did not borrow internationally, and are therefore categorized as *Locally-Funded Domestic Banks*.

The three bank types are present across the 14 countries in our sample. In 8 countries (Bulgaria, Hungary, Lithuania, Poland, Romania, Slovenia, Turkey and Ukraine) all three bank types are concurrently present, comprising in total 160 banks, of which 40 are locally-funded domestic banks, 39 internationally-borrowing domestic banks and 81 foreign banks. As this group of countries allows for a better within-country interpretation of the estimates, we will use them in our main analysis.

As is clear from looking at the market shares, foreign banks are important in many countries in the region, sometimes even accounting for more than 90 percent of the assets (Lithuania and Slovakia). However, when looking at countries where all three types of banks are active, it is also clear that internationally-borrowing domestic banks in general play an important role in financial intermediation. As expected, locally-funded domestic banks tend to be smaller but still account for 14 percent of the banking assets in the countries in our sample.

As indicated in the previous section in our sample of 44,893 firms, 30,529 borrowed at least one year between 2004 and 2007 and are, therefore, categorized as *Credit-Dependent*. Credit-dependent and credit-independent firms are spread fairly equally among each of the three types of banks, providing enough variation across the six groups of firms to perform a meaningful estimation. Of the 44,893 firms in our sample, 6,426 have a relationship with (i.e. the firm indicated that its primary bank is) a locally-funded domestic bank, of which 4,268 are credit-dependent. A total of 7,179 firms have a relationship with an internationally-borrowing domestic bank, of which 4,911 are credit-dependent. And 31,288 firms have a relationship with a foreign bank of which 21,350 are credit-dependent. The fact that the majority of firms have a relationship with a foreign bank is representative of the fact that foreign banks hold the lion's share of bank assets in the countries in our sample. In countries that have all three bank types present, 15,454 firms are credit-dependent and 10,639 firms are credit-independent, with 3,238 firms having a relationship with a locally-funded domestic bank, 7,179 with an internationally-borrowing domestic bank and 15,676 with a foreign bank.

Table 3 provides an overview of the characteristics of the 6 different types of firms. The table shows that, as expected, credit-dependent firms tend to be much larger compared to credit-independent firms and tend to be more leveraged. They also are more likely to have a relationship with more than one bank and have a lower share of liquid assets. Finally, they are also more likely to be exporting firms.

When we compare within the group of credit-dependent firms looking at the countries were all three bank types are present (top part of Table 3), we see that firms with a relationship with an internationally-borrowing domestic bank or a foreign bank tend to be somewhat larger. However, when looking at how much they borrow, firms with a relationship with a locally-funded bank on average do borrow about the same amount relative to their asset share. Firms that have a relationship with an internationally-borrowing domestic bank or a foreign bank are more likely to be foreign-owned or have only one bank relationship, however, the probability of being an exporting firm is the same across the three types of firms. When looking at the full sample of countries (bottom part of Table 3), some bigger differences emerge, but this is mostly driven by differences in country coverage.

4. RESULTS: BANK LOAN GROWTH BY BANK TYPE

Before turning to our main firm-level regressions, it is insightful to first have a closer look at the bank-level data. Specifically, do internationally-borrowing domestic and/or foreign banks curtail lending more or less during the financial crisis than locally-funded domestic banks? To answer this question directly we estimate the following specification:

$$Loan\ Growth_{b,2009} = \beta_1 International_b + \beta_2 Foreign_b + \gamma' X_b + \varphi_j + \varepsilon_{b,2009} \quad (3)$$

where *Loan Growth* is the growth of loans provided by bank *b* in 2009, i.e., the log change in loans between year-end 2008 and at year-end 2009. We specifically study the change between 2008 and 2009 as this is the most severe part of the crisis and hence international transmission is most likely taking place in this period. Furthermore, this allows us to study the impact of a big shock (the collapse of Lehman Brothers) that was not correlated with economic activity in the countries in our sample. *International* is the abridged name for the dummy *Internationally-Borrowing Domestic Bank* that equals one if the domestic bank borrowed at least once from the international wholesale market (through a syndicated loan or bond issuance) between 2004 and 2007 and equals zero otherwise, and *Foreign* is the abridged name for the dummy *Foreign Bank* that equals one if the bank was foreign-owned in 2007 and equals zero otherwise.

X_b is a matrix of control variables and includes in various and appropriate combinations: *Country Characteristics, Bank Characteristics* and the lagged dependent variable. As country characteristics we include: (a) *Growth of Real GDP* and (b) *Inflation*, both of which are measured over the period 2008-2009. As bank characteristics we include the following dummy variables: (a) *Total Assets* equals the bank's total assets (in logs) in 2007; (b) *Liquidity Ratio* equals the ratio of the bank's liquid assets over total assets in 2007; (c) *Deposit Ratio* equals the ratio of the bank's customers deposits over total assets in 2007; and finally, (d) *Solvency Ratio* equals the ratio of the bank's equity over total assets in 2007.[17] Furthermore, in some models we also include country fixed effects (φ_j). Exact variable definitions and sources are presented in Table 4. The dependent variable is winsorized at the 1st and 99th percentile to mitigate the impact of possible outliers on the estimates.[18] All regressions include a constant. The model is estimated using OLS and standard errors are clustered by country.

The estimates are in Table 5. As the dependent variable is loan growth (i.e., the log change in loans), the estimated coefficients are straightforwardly interpretable. Our first set of regressions focuses on the group of countries where all three bank types are present, as this group of countries allows for better within-country interpretation of the results. The findings in Model (1) indicate that internationally-borrowing domestic banks contract their lending in 2009 by 11.8*** percentage points more than locally-funded domestic banks,[19] the benchmark group, while foreign banks contract their lending by 22.7*** percentage points more than this group.

Not all countries were affected equally by the crisis and real GDP growth and inflation might not capture these differences well enough. So Models (2) to (4) include country fixed effects to control for all (un)observable differences between countries. Furthermore, banks of a different type may also differ in their characteristics. For example, domestic banks that also borrow internationally are often larger than domestic banks that are only funded locally. In Model (3) and (4) we therefore add bank characteristics, and in Model (4) we also include loan growth one period lagged. Yet, the differences in lending contraction across bank types remains large, i.e., internationally-borrowing domestic and foreign banks contract loan growth in 2009 by 6.8*** and 14.8*** percentage points more, respectively, than domestic

[17] Results are similar if we use for the control variables the corresponding dummy variables for values below and above the relevant median (results are available upon request).

[18] Results are unaffected if we winsorize at the 5th and 95th percentile and qualitatively unchanged if we do not winsorize.

[19] As in the Tables, ***, **, and * indicates statistical significant at the 1, 5, and 10 percent level, respectively.

banks that are funded only locally. These differences are clearly sizeable and economically meaningful.

Finally, in Models (5) to (8) we re-run all regressions for all countries in our sample. Notice however that not all bank types are present in all countries implying that we are also in effect comparing different banks' loan growth across borders. We still continue to find that internationally-borrowing domestic and foreign banks contracted loan growth more than locally-funded domestic banks, although the magnitude of the contraction is somewhat lower (as is the statistical significance).

In sum, our results indicate that internationally-borrowing domestic and foreign banks contracted their lending more than locally-funded domestic banks during the crisis. Next, we investigate if the firms that were dependent on credit and had relationships with these banks were also affected more in their financing and real performance.

5. RESULTS: FIRM FINANCING AND PERFORMANCE

5.1. Estimated Specification

We next investigate if firm financing and performance in the crisis differs by bank type and firm dependency on credit prior to the crisis. Recall that a credit contraction should only impact firms dependent on credit. To capture this, we estimate the following specification:

$$\begin{aligned} Y_{i,2009} = {} & \beta_1 International_i + \beta_2 Foreign_i + \\ & + \beta_3 International_i * Credit\ Dependent_i + \beta_4 Foreign_i * Credit\ Dependent_i \\ & + \gamma' X_i + \varphi_j + \psi_k + \varepsilon_{i,2009} \end{aligned} \tag{4}$$

where $Y_{i,2009}$ is the dependent variable and represents, for a firm *i*, the rate of growth in short-term debt (i.e., current liabilities), the change in return on assets, the rate of growth in operational revenue, or the rate of growth in assets, in 2009 (i.e., the first or log difference between the variable measured at year-end 2009 and at year-end 2008). *International* is the abridged name for the dummy variable *Firm with an Internationally-Borrowing Domestic Bank* that equals one if the firm has a relationship with a domestic bank that also borrows internationally (i.e., the firm indicated that its primary bank is an internationally-borrowing domestic bank), and that equals zero otherwise. *Foreign* is the abridged name for the dummy variable *Firm with a Foreign Bank* that equals one if the firm has a relationship with a foreign bank, and that equals zero otherwise. *Credit-Dependent* is the abridged name for the dummy variable *Firm is Credit-Dependent* that equals one if the firm borrowed at least once between

2004 and 2007, and that equals zero otherwise. This variable captures the reliance of the firm on external financing and, therefore, indicates whether the firm is credit-dependent or not.

The two terms of interest are the interactions between the two bank relationship dummies, i.e., *International* and *Foreign*, and our measure of credit dependency, i.e., *Credit-Dependent*. The estimated coefficients on these interaction terms will capture whether there is evidence of transmission, i.e., if firms that are credit-dependent and that have a relationship with an internationally-borrowing domestic or foreign bank are affected more than firms that are credit-dependent and have a relationship with a locally-funded domestic bank. Equally important, however are the two bank relationship dummies, *International* and *Foreign*, which are not in any interaction term. These variables capture the impact of the credit supply shock on firms that are not dependent on credit and therefore the parameters should be insignificant, as the financial shock should only affect credit-dependent firms.

X_i is a matrix of control variables and includes *Firm Characteristics* and the lagged dependent variable. Firm characteristics are all defined as of 2007 and include: *Export Activities* equals one if the firm is active in an industry (at the 4-digit SIC level) that exported (exporting industries are determined for each country individually), and equals zero otherwise; *Foreign Owned* equals one if the firm is majority foreign-owned, and equals zero otherwise. *Age* is the logarithm of the number of years that the firm was active; *Total Assets* is the logarithm of total assets; *Liquidity Ratio* is the ratio of the current assets minus stocks over total liabilities; and, *Solvency Ratio* is the ratio of equity over total assets.[20]

Specifications further include industry times *Firm is Credit-Dependent* fixed effects (ψ_k), and country times *Firm is Credit-Dependent* fixed effects (φ_j). This implies that for both the credit-dependent and the credit-independent firms, separate full sets of industry and country fixed effects are included.[21] Exact variable definitions and sources are presented in Table 6. All dependent variables are winsorized at the 1st and 99th percentile to mitigate the impact of possible outliers on the estimates.[22] All regressions include a constant. The model is estimated using OLS and standard errors are clustered at the bank level.

But before turning to the main estimates in Tables 8 to 11, we assess in Table 7 if any sorting of firms by bank type occurs in the sample. The table presents the estimated coefficients of eleven OLS regressions of a number of firm characteristics that are employed

[20] Results are similar if for the last four variables we use the corresponding dummy variables for values below and above the relevant median (results are available upon request).

[21] We also experimented using country*industry fixed effects to allow for differences in the impact of the crisis within a country across industries. Results remain largely unchanged.

[22] Results are unaffected if we winsorize at the 5th and 95th percentile and qualitatively unchanged if we do not winsorize.

as either dependent or independent variables,[23] on the two bank relationship dummies, i.e., *Firm with Internationally-Borrowing Domestic Bank* and *Firm with Foreign Bank*, and a constant. All variables are measured in 2007. The lack of significance on any of the estimates indicates that there is little or none sorting going on with respect to the type of bank a firm has a relationship with.

5.2. Firm Financing

The estimates are in Table 8. Model (1), estimated for the 3-bank type country sample that includes 21,406 observations, indicates that credit-dependent firms having a relationship with an internationally-borrowing domestic or foreign bank experience rates of growth in their short term debt that are 8.9*** and 5.6*** percentage points lower than credit-dependent firms that have a relationship with a locally-funded domestic bank. By contrast, we find that the rate of growth in short-term debt does not differ from or is even higher for credit-independent firms with a relationship with an internationally-borrowing domestic or foreign bank compared to the short-term debt growth of a credit-independent firm with a relationship with a locally-funded domestic bank.[24]

This is our key result and implies that credit-dependent firms with a relationship with an internationally-borrowing domestic or with a foreign bank, i.e. the two types of banks that contract their credit growth more in 2009, experience a lower rate of growth in their short-term debt than credit-dependent firms with a relationship with a locally-funded domestic bank. These findings suggest that the supply of credit by internationally-borrowing domestic and foreign banks indeed contracted and provides evidence on the international transmission of financial shocks through the channels of international wholesale funding and foreign bank ownership.

Model (5) is estimated for the all-country sample (36,810 observations). Results are similar. Now, credit-dependent firms with a relationship with an internationally-borrowing domestic or foreign bank have a rate of growth in their short-term debt that is 6.2*** and 2.3 percentage points lower than credit-dependent firms with a locally-funded domestic bank. Again we do not find that credit-independent firms that have a relationship with an

[23] The firm characteristics are: The rate of growth in the firm's short-term debt, the change in return on assets, the rate of growth in operational revenue, the rate of growth in assets in 2007 (all winsorized at the 1st and 99th percentile), dummies that capture if the firm is credit-dependent, has export activities, or is foreign-owned, and firm age, total assets, liquidity and solvency.

[24] Results are very similar when we do not include firm-level controls. If anything the estimated coefficients are larger (in absolute value) when firm characteristics are controlled for. This suggests that it is unlikely that our results are upward biased because we are unable to control for unobserved firm characteristics.

internationally-borrowing domestic or foreign bank see a larger drop in their short-term debt (if anything they experience an increase).

5.3. Firm Performance

The results in the previous section indicate that the global financial crisis led to a credit contraction to firms dependent on external finance and related to banks most exposed to the crisis (either through their pre-crisis dependency on international wholesale funding or because they are foreign owned). Next, we examine whether this credit contraction had any real consequences for these firms. In order to do this we replace in Models (2) to (4) and (6) to (8) in Table 8 the rate of growth in short-term debt as the dependent variable with the change in return on assets, the rate of growth in operational revenue, or the rate of growth in assets, all in 2009.

The results for these firm real performance variables are fully aligned with the estimates for firm financing. For those credit-dependent firms with an internationally-borrowing domestic or foreign bank, the change in return on assets are 1.1** and 1.1** percentage points lower than for credit-dependent firms with a locally-funded domestic bank,[25] while similarly compared the rate of growth in operational revenue is 4.7*** and 3.7*** percentage points lower, and the rate of growth in assets is 3.5*** and 2.7*** percentage points lower. Again, credit-independent firms having a relationship with these two types of banks do not experience a drop in their profitability, operational revenue or asset growth compared to their peers having a relationship with a locally-funded domestic bank. Results are very similar when we look at the all-country sample (although somewhat less significant).

This is the second component of our key result which implies that credit-dependent firms with a relationship with an internationally-borrowing domestic or with a foreign bank show lower real performance than credit-dependent firms with a relationship with a locally-funded domestic bank. These findings suggest that the performance by these firms worsens as the credit they are granted contracts, providing direct evidence that the crisis spread through the international wholesale market and foreign ownership of banks with important consequences for the real economy.

5.4. Firm Possibilities to Offset a Credit Contraction

To provide further evidence that indeed a credit contraction is affecting the financing and performance of firms, we utilize variation across several dimensions that can affect a firm's ability to obtain funds during a credit crunch either through its ability to access alternative

[25] That both estimated coefficients in Table 8 round up to equal -1.082 is coincidental and not a typo (from 1.0815 and 1.0817, respectively).

sources of finance and/or through its ability to switch banks: The number of banks a firm has established a relationship with, the size of the firm and the share of its assets that are tangible and therefore can be pledged as collateral.

In Table 9 we split our sample of firms according to the three above-mentioned firm characteristics (we only report results for the 3-bank type countries, but the estimates for all countries are qualitatively equi-directional). In the first set of regressions in Panel A we include the group of firms that maintains a relationship with only one bank. The second set of regressions includes firms who maintain relationships with multiple banks. In panel B the sample is split between small firms (with assets smaller than the sample median in 2007) and large firms (with assets above the sample median). Finally, in panel C the sample is split between firms with intangible assets (share of tangible assets to total assets is below the sample median in 2007), i.e., firms with few assets to pledge as collateral, and firms with tangible assets (share of tangible to total assets above the sample median in 2007). The models we estimate are otherwise similar to those reported in Table 8 and include six firm characteristics, the lagged dependent variable, industry * *Firm is Credit-Dependent* fixed effects and country * *Firm is Credit-Dependent* fixed effects.

The three panels in Table 9 show that credit-dependent firms with a single bank relationship, that are smaller and, especially, firms with fewer tangible assets to pledge as collateral suffer most in terms of their financing and performance from the credit contraction of internationally- borrowing domestic banks or foreign banks. Again, single-bank firms, small firms, or firms with limited tangible assets that are credit-independent and have a relationship with each of these banks do not suffer disproportionately (and in some cases even perform better).

These results in Table 9 are in line with our priors that firms that are better able to obtain additional financing or to establish new financing opportunities (as they are more transparent or have more tangible assets to pledge as collateral) are less affected by a shock hitting their bank. As such, they strengthen our overall assessment that the findings in the previous section can be interpreted as indicating that financial transmission did occur during the global financial crisis through the channels of international wholesale funding and foreign bank ownership. In addition, they show that important differences exist across firms in how much they are affected by a credit contraction.

5.5. Country Characteristics Affecting Transmission

Next we exploit the unique cross-country dimension of our sample, and examine what country characteristics affect the strength of the international transmission of financial shocks. Our first variable of interest is real GDP growth in 2007 (taken from the IMF's *International Financial Statistics*). One could argue that in countries that experienced low pre-crisis growth

the resilience of firms to weather a financial shock will be lower as profit margins tend to be lower. On the other hand, credit might have been more excessive in fast growing countries, increasing the reliance on credit also for firms with limited growth prospects. In other words, ex ante it is not clear in which type of country the transmission would be more severe.

Second, we examine the impact of financial development as captured by the share of private credit to GDP in 2007 (from the IMF's *International Financial Statistics*). In a more developed financial system firms likely have more ways to find alternative sources of funding (including from other banks) when their bank is faced with a supply shock. If this is the case, the international transmission of financial shocks should be more reduced in this case.

Third, we compare countries with respect to the extent to which the banking system was dependent on foreign funding before the crisis. We use the BIS *Locational Statistics* to calculate for each country total cross-border borrowing by the banking system as a percentage of GDP in 2007. The more reliant the financial system is on foreign funding, the more likely firms have been affected by the global financial crisis.

Finally, we examine the impact of the legal system by studying whether the speed at which legal contracts are enforced affects the international transmission of shocks as measured by the World Bank *Doing Business Indicators* (in 2007). In the previous section we showed that firms with enough assets to pledge as collateral were less affected by the credit contraction. As the value of collateral also depends on the ease with which it can be obtained by the bank in case of default, it is to be expected that firms in countries with a fast working legal system will be less affected by international transmission of the global financial crisis.

In Table 10 we split the countries according to their economic growth, credit availability, reliance on foreign funding and speed of contract enforcement. We estimate comprehensive models that are otherwise similar to those reported in Tables 8 and 9 (and again focus on the 3-bank type countries, but the estimates for all countries are similar). The estimates suggest that credit-dependent firms in countries with lower pre-crisis growth, lower levels of financial development, more reliance on foreign funding and slower contract enforcement are affected more (than those in other countries) and that credit-independent firms remain almost unaffected. The finding regarding contract enforcement is particularly poignant as Table 9 established that credit-dependent firms with fewer tangible assets to pledge as collateral suffer most in terms of their financing and performance from the credit contraction of internationally- borrowing domestic banks or foreign banks. These results indicate that country characteristics, as well as firm characteristics, importantly affect the international transmission of financial shocks.

5.6. Robustness

To further check the robustness of our findings, we assess the estimates when we change the way we measure our credit dependency variable or vary the time period over which the dependent variable is calculated for all specifications in Table 8, i.e., for the rate of growth in short-term debt, the change in return on assets, the rate of growth in operational revenue, and the rate of growth in assets across the 3-bank type or all countries.

Instead of using a dummy variable to capture whether the firm is dependent on bank credit or not, in Panel A of Table 11 we use a continuous variable, i.e., *Firm Total Borrowing*, which equals the total borrowing of the firm over the period 2004 – 2007 (in logs).[26] As controls we include firm characteristics and firm total borrowing, the lagged dependent variable, and sets of industry and country fixed effects (this makes the specifications equivalent to those employed in Table 8).

We continue to find the expected negative signs for the interaction terms; though the estimates are not always statistically significant. Given our previous results that show that only small firms are affected by the credit crunch this is not entirely surprising. In fact, when we split the sample again in small and large firms (results not shown) we find very similar results as the ones reported in Table 9.

In Panel B in Table 11 we double the length of time period over which the dependent variable is calculated from 08-09 to 07-09 (and otherwise resort back to the precise specifications run from Table 8 onwards). Results are mostly similar. Next, in Panel C we first-difference the dependent variable turning it into a rate of growth-in-growth in short-term debt or operational revenue. Again, results are mostly unaffected.

In Panel D we run a placebo test by studying the rate of growth in short-term debt or operational revenue in 2006 (i.e., from year-end 2005 to year-end 2006). Now the estimates indicate that there are no growth differentials between the various groups of firms, i.e., credit-dependent compared to credit-independent firms (with a locally-funded domestic bank) and within the group of credit-dependent firms between firms with a relationship with an internationally-borrowing domestic or a foreign bank as compared to those with a relationship with a locally-funded domestic bank. This test highlights the genuinely differential impact of the shock that we identified in our main exercises.

Finally, in Panel E we study the "long-term" effects of the shock by studying the rate of growth in short-term debt or operational revenue in 2010 (i.e., from year-end 2009 to year-end 2010). The estimates show almost no growth differentials between the various groups of

[26] We alternatively employ the average borrowing over the same time period and results are virtually the same.

firms indicating that all studied bank- and/or firm-type combinations seemingly similarly accommodated and absorbed the shock within two years after its occurrence.

6. CONCLUSION

The recent global financial crisis which was followed by a strong recession in many advanced countries makes it essential to understand the international transmission of shocks to the real economy through the globalized banking system. In this paper we analyze two key international channels that may have played a crucial role during the recent crisis, i.e., the reliance of domestic banks for their funding on international wholesale markets and foreign bank ownership.

To identify the potency of either channel, we analyze banks and firms located across countries in Eastern Europe and Central Asia. In these countries banks were not immediately affected by the Western banking crisis, but before the crisis there were many domestic banks borrowing from international wholesale markets and foreign banks provided an important share of intermediated lending. Crucial for identification, we use a dataset of *bank-firm* relationships matched with both bank- and firm- balance-sheet data. The matched dataset allows us to circumvent the typical shortcomings that plague the identification of the international transmission of financial shocks with either country- or bank-level data, i.e., to convincingly control for firm fundamentals, and it also enables us to analyze loans to small and medium-sized firms and to analyze both its financial and real effects in a multi-country setting. These are the key contributions of this paper.

We find that compared to locally-funded domestic banks, internationally-borrowing domestic banks and foreign banks cut back their lending more during the crisis. When we analyze firm-level effects (controlling for firm fundamentals) we find that especially credit-dependent firms borrowing from internationally-borrowing domestic or foreign banks suffer negative financial and real effects on average, especially when having only a single bank relationship, when small, when having limited tangible assets. Furthermore, firms are more affected when based in countries with low pre-crisis growth, low financial development, more reliance on foreign funding or slow contract enforcement. By contrast, we do not find a differential effect for credit-independent firms.

In sum, the robust results point towards the existence of an international bank lending channel that flows with almost similar potency through international wholesale funding and through foreign ownership but with heterogeneous effects across firms and countries. Our findings therefore have important implications for both theory and policy. On the bank side, our findings suggest that in order to avoid such credit contractions domestic banks may have to be discouraged somewhat from overly relying on wholesale borrowing and that further

regulatory changes should encourage foreign banks to move towards a sustainable business model whereby new lending by subsidiaries is more financed by domestic funds (Kolev and Zwart (2013)). On the firm side, our findings qualify past government policies in many developing countries that unilaterally pushed for formal corporate financing, and hence promoted firm credit-dependency while repressing reliance on informal financing (Ayyagari, Demirgüç-Kunt and Maksimovic (2010), Degryse, Lu and Ongena (2013)). These policies come at a cost of exposing firm financing and performance to domestic and international credit shocks and hence by increasing their variability and vulnerability. Given that overall our estimates suggest that the spillovers through the international banking channel on the real sector are notably heterogeneous across banks, firms and countries, *one policy may not fit all*.

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TABLE 1

NUMBER AND MARKET SHARE OF LOCALLY-FUNDED DOMESTIC BANKS, INTERNATIONALLY-BORROWING DOMESTIC BANKS AND FOREIGN BANKS AND WHETHER ALL THREE BANK TYPES ARE PRESENT IN THE COUNTRY

	Domestic Bank				*Foreign Bank*		Total		3 Bank Types Present
	Locally-Funded		*Internationally-Borrowing*						
Country	Number	Market Share	Number	Market Share	Number	Market Share	Number	Market Share	
Bosnia-Herzegovina	7	0.11	0	-	7	0.62	14	0.73	No
Bulgaria	4	0.10	4	0.15	8	0.75	16	1.00	Yes
Croatia	18	0.10	0	-	9	0.87	27	0.97	No
Czech Republic	6	0.15	0	-	9	0.80	15	0.95	No
Estonia	2	0.03	0	-	2	0.68	4	0.72	No
Hungary	1	0.01	1	0.38	12	0.61	14	0.99	Yes
Lithuania	1	0.01	2	0.08	5	0.91	8	1.00	Yes
Poland	9	0.08	2	0.20	21	0.72	32	1.00	Yes
Romania	2	0.08	1	0.09	13	0.80	16	0.97	Yes
Serbia and Montenegro	13	0.27	0	-	10	0.70	23	0.97	No
Slovakia	1	0.08	0	-	12	0.92	13	1.00	No
Slovenia	6	0.22	5	0.55	6	0.23	17	1.00	Yes
Turkey	10	0.25	10	0.71	6	0.04	26	1.00	Yes
Ukraine	7	0.04	14	0.52	10	0.28	31	0.83	Yes
Total	87	0.14	39	0.34	130	0.49	256	0.98	
In Countries with 3 Bank Types Present	40	0.11	39	0.34	81	0.29	160	0.74	

NOTE. -- Market shares are based on asset share in 2007. Market shares of the three groups in each country do not have to add up to 100% as not all banks active in a country are included in our sample. Total assets in each country is taken from the bank ownership database of Claessens and Van Horen (2013a). Total market share reflects the market share of the group of banks relative to all bank assets in the 14 countries in our sample.

TABLE 2

THE NUMBER OF CREDIT-DEPENDENT AND CREDIT-INDEPENDENT FIRMS THAT HAVE A RELATIONSHIP WITH LOCALLY-FUNDED DOMESTIC BANKS, WITH INTERNATIONALLY-BORROWING DOMESTIC BANKS AND WITH FOREIGN BANKS , AND THE TOTAL NUMBER OF FIRMS THAT HAVE A RELATIONSHIP WITH A BANK

Number of Firms that Have a Relationship with a		*Domestic Bank*				*Foreign Bank*		Total
		Locally-Funded		*Internationally-Borrowing*				
Country	3 Bank Types Present	*Credit-Dependent*	*Credit-Independent*	*Credit-Dependent*	*Credit-Independent*	*Credit-Dependent*	*Credit-Independent*	
Bosnia-Herzegovina	No	24	7	0	0	10	1	42
Bulgaria	Yes	8	0	42	4	631	70	755
Croatia	No	1,721	222	0	0	10,234	1,994	14,171
Czech Republic	No	0	0	0	0	949	880	1,829
Estonia	No	0	0	0	0	653	155	808
Hungary	Yes	14	9	359	668	1,647	2,114	4,811
Lithuania	Yes	0	0	0	1	21	7	29
Poland	Yes	424	144	847	377	4,818	2,534	9,144
Romania	Yes	158	1,403	16	371	191	1,552	3,691
Serbia and Montenegro	No	1,010	204	0	0	137	31	1,382
Slovakia	No	0	0	0	0	337	231	568
Slovenia	Yes	780	110	2,228	331	1,244	194	4,887
Turkey	Yes	5	0	289	20	6	0	320
Ukraine	Yes	124	59	1,130	496	472	175	2,456
Total		4,268	2,158	4,911	2,268	21,350	9,938	44,893
Countries with 3 Bank Types Present		1,513	1,725	4,911	2,268	9,030	6,646	26,093

NOTE. -- Only firms with non-missing information on total borrowing between 2004 and 2007 are included. For firms with multiple branches we include the largest one.

TABLE 3

CHARACTERISTICS OF THE SIX FIRM TYPES

	3-Bank Type Countries					
	Credit-Dependent Firms			*Credit-Independent Firms*		
With a Relationship with a	*Domestic Bank*		*Foreign Bank*	*Domestic Bank*		*Foreign Bank*
	Locally-Funded	*Internationally-Borrowing*		*Locally-Funded*	*Internationally-Borrowing*	
Number of Firms	1,513	4,911	9,030	1,725	2,268	6,646
Size	8,123	10,144	10,480	3,186	3,068	4,383
Total borrowing	1,407	1,794	1,647	0	0	0
Multiple Banks	0.41	0.36	0.33	0.28	0.28	0.37
Share Tangible Assets	0.38	0.36	0.34	0.39	0.32	0.28
Export Activities	0.28	0.28	0.28	0.12	0.14	0.15
Foreign Owned	0.12	0.22	0.20	0.22	0.21	0.24
Young Firm	0.17	0.16	0.17	0.20	0.20	0.21
Liquidity Ratio	0.01	0.01	0.01	0.02	0.02	0.02
Solvency Ratio	0.40	0.41	0.43	0.47	0.53	0.50
	All Countries					
	Credit-Dependent Firms			*Credit-Independent Firms*		
With a Relationship with a	*Domestic bank*		*Foreign bank*	*Domestic bank*		*Foreign bank*
	Locally-Funded	*Internationally-Borrowing*		*Locally-Funded*	*Internationally-Borrowing*	
Number of Firms	4,268	4,911	21,350	2,158	2,268	9,938
Size	5,346	9,321	6,266	2,740	2,867	3,406
Total borrowing	1,052	1,695	1,142	0	0	0
Multiple Banks	0.44	0.36	0.42	0.29	0.28	0.33
Share Tangible Assets	0.35	0.36	0.32	0.35	0.32	0.24
Export Activities	0.17	0.28	0.19	0.10	0.14	0.14
Foreign Owned	0.25	0.22	0.25	0.26	0.21	0.29
Young Firm	0.13	0.16	0.17	0.19	0.20	0.18
Liquidity Ratio	0.01	0.01	0.01	0.02	0.02	0.03
Solvency Ratio	0.36	0.41	0.38	0.48	0.53	0.51

NOTE. -- Only firms with non-missing information on total borrowing between 2004 and 2007 are included. For firms with multiple branches we include the largest one. All firm characteristics are based on 2007 information except size and total borrowing which reflect averages over 2005-2007. Firm size reflects total assets and total borrowering captures total short and long term debt from credit insitutions. Both variables are measured in thousand euros and are winsorized at the 1st and 99th percentile. For exact variable definitions and sources see Table 6.

TABLE 4
SUMMARY STATISTICS OF BANK VARIABLES

Variable *Type* and Name	Unit	Variable Definition	*Sample* *Src.*	*3-Bank Type Countries* Nr. of Obs.	Mean	St. Dev.	Median	*All Countries* Nr. of Obs.	Mean	St. Dev.	Median
Dependent Variable											
Δ%Loan	log	Log change in total lending by bank *b* between 2008 and 2009	*B*	160	0.01	0.41	0.01	256	0.03	0.34	0.02
Bank Type											
Internationally-Borrowing Domestic Bank	1/0	= 1 if a domestic bank that has borrowed at least once from international syndicated loan or bond market between 2004 and 2007, = 0 otherwise	*CvH, D*	208	0.21	0.41	0	318	0.14	0.35	0
Foreign Bank	1/0	= 1 if the bank is majority foreign owned in 2007, = 0 otherwise	*CvH*	207	0.48	0.50	0	317	0.48	0.50	0
Country Characteristics											
Growth Real GDP	-	The rate of growth of real GDP in the country of the bank in 2009	*W*	208	-0.07	0.06	-0.06	318	-0.06	0.05	-0.05
Inflation	-	The inflation rate in the country of the bank in 2009	*W*	208	0.09	0.09	0.06	300	0.08	0.08	0.05
Bank Characteristics											
Total Assets	log	Log total assets of bank *b* in 2007	*B*	158	14.60	1.54	14.64	254	14.32	1.62	14.35
Liquidity Ratio	ratio	Ratio of bank *b*'s liquid assets over total assets in 2007	*B*	156	0.23	0.15	0.18	252	0.26	0.15	0.24
Deposit Ratio	ratio	Ratio of bank *b*'s customer deposits over total assets in 2007	*B*	152	0.52	0.21	0.55	246	0.56	0.21	0.59
Solvency Ratio	ratio	Ratio of bank *b*'s equity over total assets in 2007	*B*	158	0.13	0.09	0.10	254	0.13	0.10	0.10

NOTE. -- The data sources (*Src.*) are: *B*: Bureau van Dijk Bankscope; *CvH*: Claessens and van Horen (2013a); *D*: Dealogic; and *W*: Worldbank.

TABLE 5
BANK LOAN GROWTH IN 2009 AND BANK TYPE

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	*3-Bank Type Countries*				*All Countries*			
Bank Type								
Internationally-Borrowing Domestic Bank	-0.118***	-0.120***	-0.080***	-0.068***	-0.056*	-0.067**	-0.045*	-0.032
	(0.000)	(0.000)	(0.000)	(0.004)	(0.068)	(0.033)	(0.055)	(0.202)
Foreign Bank	-0.227***	-0.214***	-0.155***	-0.148***	-0.130**	-0.121**	-0.100***	-0.094***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.019)	(0.032)	(0.009)	(0.005)
Country Characteristics								
Growth Real GDP	1.056***				1.120***			
	(0.000)				(0.000)			
Inflation	-0.248***				-0.238***			
	(0.003)				(0.007)			
Bank Characteristics								
Total Assets			-0.001	-0.006			0.018*	0.015
			(0.910)	(0.655)			(0.064)	(0.178)
Liquidity Ratio			-0.078	-0.078			0.027	0.023
			(0.561)	(0.644)			(0.826)	(0.865)
Deposit Ratio			0.048	0.077			0.012	0.025
			(0.507)	(0.310)			(0.782)	(0.632)
Solvency Ratio			-0.569	-0.608			0.073	0.097
			(0.335)	(0.216)			(0.854)	(0.799)
Lagged Dependent Variable				0.213**				0.249***
				(0.047)				(0.005)
Country Fixed Effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
R-squared	0.281	0.300	0.414	0.456	0.181	0.213	0.300	0.356
Number of Observations	160	160	140	140	242	256	226	226

NOTE. -- The models are estimated using OLS. The dependent variable is Δ%Loan which is the log change in total lending by bank b between 2008 and 2009. It is winsorized at the 1st and 99th percentile. All variable definitions are provided in Table 4. A constant is always included. Coefficients are listed in the first row, p-values based on robust standard errors that are corrected for clustering at the country level are reported in the row below in parentheses. "Yes" indicates that the set of fixed effects is included. "No" indicates that the set of fixed effects is not included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 6
SUMMARY STATISTICS OF FIRM VARIABLES

Variable *Type* and Name	Unit	Variable Definition	*Sample* *Src.*	*3-Bank Type Countries* Nr. of Obs.	Mean	St. Dev.	Median	*All Countries* Nr. of Obs.	Mean	St. Dev.	Median
Dependent Variables											
Δ%Short-Term Debt	log	The log change in short-term debt of firm *i* (including short term debts to credit institutions, long term financial debts payable within the year, credit to suppliers and other current liabilities of the firm) between 2008 and 2009	*A*	21,416	-0.10	0.59	-0.07	36,826	-0.09	0.59	-0.06
ΔROA	-	The first-difference change in return on assets of firm *i* between 2008 and 2009	*A*	21,178	-2.82	14.64	-1.03	37,422	-3.19	15.19	-1.06
Δ%Operational Revenue	log	The log change in operational revenue of firm *i* between 2008 and 2009	*A*	21,386	-0.20	0.49	-0.14	37,261	-0.23	0.56	-0.16
Δ%Assets	log	The log change in total assets of firm *i* between 2008 and 2009	*A*	21,447	-0.04	0.32	-0.03	37,825	-0.05	0.33	-0.04
Firm Relationship and Credit Dependency Variables											
Firm with Internationally-Borrowing Domestic Bank	1/0	= 1 if firm *i* has a relationship with an internationally-borrowing domestic bank, = 0 otherwise	*K*	23,234	0.28	0.45	0	40,759	0.16	0.36	0
Firm with Foreign Bank	1/0	= 1 if firm *i* has a relationship with a foreign bank, = 0 otherwise	*K*	23,234	0.59	0.49	1	40,759	0.70	0.46	1
Firm Is Credit-Dependent	1/0	= 1 if firm *i* borrowed at least once between 2004 and 2007, = 0 otherwise	*A*	22,884	0.61	0.49	1	40,409	0.70	0.46	1
Firm Switching Possibility Variables											
Firm with Single Bank	1/0	= 1 if firm *i* reports to have a single bank relationship, = 0 otherwise	*K*	23,234	0.66	0.47	1	40,759	0.61	0.49	1
Firm with Multiple Banks	1/0	= 1 if firm *i* reports to have multiple bank relationships, = 0 otherwise	*K*	23,234	0.34	0.47	0	40,759	0.39	0.49	0
Small Firm	1/0	= 1 if firm *i*'s total assets are below the median in 2007, = 0 otherwise	*A*	23,234	0.35	0.48	0	40,758	0.48	0.50	0
Large Firm	1/0	= 1 if firm *i*'s total assets are above or equal to the median in 2007, = 0 otherwise	*A*	23,234	0.65	0.48	1	40,758	0.52	0.50	1
Intangible Firm	1/0	= 1 if firm *i*'s intangible over total assets are below the median in 2007, = 0 otherwise	*A*	23,118	0.45	0.50	0	40,635	0.50	0.50	0
Tangible Firm	1/0	= 1 if firm *i*'s intangible over total assets are above or equal to the median in 2007, = 0 otherwise	*A*	23,118	0.55	0.50	1	40,635	0.50	0.50	1
Firm Characteristics											
Export Activities	1/0	= 1 if firm *i* is active in an industry (at the 4-digit SIC level) in a country that exported in 2007, = 0 otherwise	*A, ITC*	23,234	0.24	0.42	0	40,759	0.19	0.39	0
Foreign Owned	1/0	= 1 if majority of the shares of firm *i* are held by foreigners, = 0 otherwise	*A*	23,234	0.21	0.41	0	40,759	0.25	0.43	0
Age	log	The log number of years that firm *i* was active in 2007	*A*	23,234	2.64	0.56	2.71	40,759	2.64	0.54	2.71
Total Assets	log	The log total assets of firm i in 2007	*A*	23,234	7.52	1.77	7.42	40,758	6.97	1.93	6.87
Liquidity Ratio	ratio	Ratio of firm *i*'s current assets minus stocks over total liabilities in 2007	*A*	23,234	1.61	3.35	0.96	40,759	1.70	3.74	0.97
Solvency Ratio	ratio	Ratio of firm *i*'s equity over total assets in 2007	*A*	23,234	45.13	24.57	43.43	40,759	41.67	26.04	39.49

NOTE. -- The data sources (*Src.*) are: *A*: Bureau van Dijk Amadeus; *K*: Kompass; and ITC: International Trade Center.

TABLE 7

FIRM FINANCING, PERFORMANCE AND CHARACTERISTICS IN 2007 AND THE TYPE OF BANK A FIRM HAS A RELATIONSHIP WITH

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Dependent Variable (Firm)	Δ%Short-Term Debt	ΔROA	Δ%Operational Revenue	Δ%Assets	Firm Is Credit-Dependent	Export Activities	Foreign Owned	Firm Age	Total Assets	Liquidity Ratio	Solvency Ratio
Sample	*3-Bank Type Countries*										
Firm with Internationally-Borrowing Domestic Bank	0.030	-0.304	0.009	-0.018	0.217	0.037	0.032	0.004	0.204	0.070	0.947
	(0.176)	(0.633)	(0.701)	(0.305)	(0.299)	(0.397)	(0.651)	(0.948)	(0.193)	(0.627)	(0.739)
Firm with Foreign Bank	0.013	-0.108	0.016	-0.005	0.109	0.028	0.037	0.031	0.460***	0.131	2.114
	(0.498)	(0.865)	(0.401)	(0.713)	(0.585)	(0.513)	(0.446)	(0.547)	(0.000)	(0.316)	(0.285)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.000	0.000	0.000	0.000	0.018	0.001	0.001	0.001	0.008	0.000	0.001
Number of Observations	23,980	23,847	24,019	24,193	26,093	26,791	26,860	25,577	26,118	25,340	25,047
Sample	*All Countries*										
Firm with Internationally-Borrowing Domestic Bank	0.027	-0.252	0.028	0.000	0.020	0.082***	-0.039	-0.042	0.558***	0.057	4.899*
	(0.138)	(0.515)	(0.159)	(0.982)	(0.899)	(0.001)	(0.557)	(0.395)	(0.001)	(0.590)	(0.086)
Firm with Foreign Bank	-0.012	-0.249	-0.005	-0.018	0.018	0.022	0.013	-0.026	0.131	0.248***	2.071
	(0.399)	(0.447)	(0.723)	(0.210)	(0.899)	(0.392)	(0.754)	(0.488)	(0.520)	(0.004)	(0.348)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.001	0.000	0.001	0.001	0.000	0.004	0.002	0.000	0.008	0.001	0.003
Number of Observations	40,970	41,805	41,627	42,263	44,893	45,515	45,660	43,826	44,611	43,696	43,302

NOTE. -- The models are estimated using OLS. The dependent variables are the rate of growth in the firm's short-term debt, the change in return on assets, the rate of growth in operational revenue, the rate of growth in assets in 2007 (all winsorized at the 1st and 99th percentile), dummies that capture if the firm is credit-dependent, has export activities, or is foreign-owned, and firm age, total assets, liquidity and solvency. All variable definitions are provided in Table 6. Coefficients are listed in the first row, p-values based on robust standard errors that are corrected for clustering at the bank level are reported in the row below in parentheses. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 8

CHANGE IN FIRM FINANCING AND PERFORMANCE IN 2009, THE TYPE OF BANK A FIRM HAS A RELATIONSHIP WITH, AND THE CREDIT-DEPENDENCY OF THE FIRM

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable (Firm)	Δ%Short-Term Debt	ΔROA	Δ%Operational Revenue	Δ%Assets	Δ%Short-Term Debt	ΔROA	Δ%Operational Revenue	Δ%Assets
Sample	*3-Bank Type Countries*				*All Countries*			
Firm Relationship and Credit Dependency Variables								
Firm with Internationally-Borrowing Domestic Bank	0.057**	0.579	0.019*	0.013*	0.053**	0.464	0.031**	0.013*
	(0.011)	(0.123)	(0.091)	(0.095)	(0.016)	(0.210)	(0.035)	(0.082)
Firm with Foreign Bank	0.021	0.382	0.005	0.003	0.016	0.370	0.024*	0.003
	(0.261)	(0.314)	(0.593)	(0.707)	(0.381)	(0.284)	(0.093)	(0.743)
Firm with Internationally-Borrowing Domestic Bank * Firm Is Credit-Dependent	-0.089***	-1.082**	-0.047***	-0.035***	-0.062***	-0.765*	-0.045***	-0.022***
	(0.000)	(0.018)	(0.001)	(0.000)	(0.003)	(0.073)	(0.002)	(0.004)
Firm with Foreign Bank * Firm Is Credit-Dependent	-0.056***	-1.082**	-0.037***	-0.027***	-0.023	-0.774**	-0.036***	-0.012*
	(0.000)	(0.015)	(0.004)	(0.003)	(0.129)	(0.038)	(0.006)	(0.085)
Firm Characteristics								
Export Activities	0.045***	-0.358	0.034***	0.019***	0.019	0.031	0.029***	0.017***
	(0.001)	(0.198)	(0.005)	(0.003)	(0.103)	(0.892)	(0.001)	(0.000)
Foreign Owned	-0.027**	-0.259	0.020**	-0.015**	-0.014*	-0.585***	0.012**	-0.008*
	(0.028)	(0.365)	(0.013)	(0.011)	(0.076)	(0.006)	(0.047)	(0.068)
Age	-0.029***	0.576**	-0.021***	-0.022***	-0.032***	1.061***	-0.011**	-0.022***
	(0.001)	(0.012)	(0.001)	(0.000)	(0.000)	(0.000)	(0.034)	(0.000)
Total Assets	-0.006**	0.632***	0.008***	0.001	-0.008***	0.442***	0.003	-0.000
	(0.017)	(0.000)	(0.000)	(0.636)	(0.000)	(0.000)	(0.118)	(0.877)
Liquidity Ratio	0.007***	-0.041	-0.001	-0.001	0.009***	0.057*	0.000	-0.000
	(0.001)	(0.276)	(0.608)	(0.464)	(0.000)	(0.053)	(0.760)	(0.324)
Solvency Ratio	0.000***	-0.045***	0.001***	0.001***	0.000	-0.056***	0.001***	0.000***
	(0.007)	(0.000)	(0.000)	(0.000)	(0.220)	(0.000)	(0.000)	(0.000)
Lagged Dependent Variable	-0.179***	-0.378***	-0.005	-0.014	-0.170***	-0.355***	-0.002	-0.008
	(0.000)	(0.000)	(0.686)	(0.183)	(0.000)	(0.000)	(0.803)	(0.201)
Industry * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.059	0.163	0.074	0.034	0.052	0.148	0.051	0.023
Number of Observations	21,406	21,129	21,359	21,446	36,810	37,344	37,192	37,824

NOTE. -- The models are estimated using OLS. The dependent variables are the rate of growth in the firm's short-term debt, the change in return on assets, the rate of growth in operational revenue, and the rate of growth in assets in 2009 and are winsorized at the 1st and 99th percentile. All variable definitions are provided in Table 6. A constant is always included. Coefficients are listed in the first row, p-values based on robust standard errors that are corrected for clustering at the bank level are reported in the row below in parentheses. "Yes" indicates that the set of fixed effects is included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 9

CHANGE IN FIRM FINANCING AND PERFORMANCE IN 2009, BY FIRM RELATIONSHIP MULTIPLICITY, SIZE AND ASSET INTANGIBILITY

	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)
Dependent Variable (Firm)	**Δ%Short-Term Debt**	**ΔROA**	**Δ%Operational Revenue**	**Δ%Assets**	**Δ%Short-Term Debt**	**ΔROA**	**Δ%Operational Revenue**	**Δ%Assets**
Panel A: Single versus Multiple Bank Firms	*Single-Bank Firms*				*Multiple-Bank Firms*			
Firm with Internationally-Borrowing Domestic Bank	0.064**	0.109	0.012	0.003	0.048**	1.312**	0.029	0.036***
	(0.012)	(0.844)	(0.369)	(0.742)	(0.040)	(0.037)	(0.279)	(0.001)
Firm with Foreign Bank	0.020	0.812	0.008	-0.004	0.019	-0.767	-0.009	0.015
	(0.355)	(0.114)	(0.556)	(0.636)	(0.309)	(0.240)	(0.671)	(0.193)
Firm with Internationally-Borrowing Domestic Bank	-0.107***	-0.932	-0.060***	-0.034***	-0.055**	-1.274**	-0.024	-0.042***
* Firm Is Credit-Dependent	(0.000)	(0.195)	(0.001)	(0.003)	(0.049)	(0.041)	(0.423)	(0.005)
Firm with Foreign Bank	-0.081***	-1.580***	-0.060***	-0.034***	-0.003	0.268	0.014	-0.013
* Firm Is Credit-Dependent	(0.000)	(0.004)	(0.001)	(0.002)	(0.895)	(0.708)	(0.560)	(0.343)
R-squared	0.062	0.175	0.082	0.030	0.072	0.147	0.077	0.067
Number of Observations	14,297	14,082	14,270	14,319	7,109	7,047	7,089	7,127
Panel B: Small versus Large Firms	*Small Firms*				*Large Firms*			
Firm with Internationally-Borrowing Domestic Bank	0.064**	0.625	0.028*	0.013	0.019	0.644	-0.012	-0.004
	(0.018)	(0.215)	(0.085)	(0.208)	(0.477)	(0.345)	(0.705)	(0.773)
Firm with Foreign Bank	0.025	0.816*	0.008	-0.004	0.005	-0.708	-0.008	0.002
	(0.265)	(0.060)	(0.545)	(0.640)	(0.815)	(0.235)	(0.578)	(0.878)
Firm with Internationally-Borrowing Domestic Bank	-0.098***	-1.625**	-0.070***	-0.033***	-0.055**	-0.743	-0.004	-0.020
* Firm Is Credit-Dependent	(0.000)	(0.012)	(0.000)	(0.006)	(0.047)	(0.363)	(0.899)	(0.215)
Firm with Foreign Bank	-0.041**	-2.165***	-0.040**	-0.022**	-0.059**	0.558	-0.022	-0.025
* Firm Is Credit-Dependent	(0.047)	(0.000)	(0.021)	(0.045)	(0.011)	(0.467)	(0.353)	(0.120)
R-squared	0.072	0.155	0.067	0.039	0.060	0.177	0.093	0.047
Number of Observations	10,702	10,564	10,679	10,726	10,704	10,565	10,680	10,720

TABLE 10

CHANGE IN FIRM FINANCING AND PERFORMANCE IN 2009, BY COUNTRY CHARACTERISTICS IN 2007

Dependent Variable (Firm)	(1a) Δ%Short-Term Debt	(2a) ΔROA	(3a) Δ%Operational Revenue	(4a) Δ%Assets	(1b) Δ%Short-Term Debt	(2b) ΔROA	(3b) Δ%Operational Revenue	(4b) Δ%Assets
Panel A: Low versus High GDP Growth Countries	*Low GDP Growth*				*High GDP Growth*			
Firm with Internationally-Borrowing Domestic Bank	0.086***	1.517***	0.029**	0.024***	-0.002	-0.565	0.001	-0.010
	(0.000)	(0.000)	(0.038)	(0.000)	(0.973)	(0.408)	(0.979)	(0.618)
Firm with Foreign Bank	0.033***	0.755**	0.008	0.007	-0.021	-0.351	-0.004	-0.012
	(0.000)	(0.034)	(0.490)	(0.291)	(0.668)	(0.628)	(0.865)	(0.536)
Firm with Internationally-Borrowing Domestic Bank	-0.096***	-2.682***	-0.084**	-0.071***	-0.033	0.151	-0.026	-0.010
* Firm Is Credit-Dependent	(0.001)	(0.000)	(0.033)	(0.000)	(0.301)	(0.805)	(0.221)	(0.442)
Firm with Foreign Bank	-0.016	-2.929***	-0.055	-0.029	-0.021	-0.136	-0.027	-0.014
* Firm Is Credit-Dependent	(0.568)	(0.000)	(0.126)	(0.119)	(0.522)	(0.819)	(0.156)	(0.218)
R-squared	0.066	0.153	0.060	0.048	0.059	0.176	0.077	0.022
Number of Observations	7,367	7,334	7,380	7,427	14,039	13,795	13,979	14,019
Panel B: Low versus High Credit to GDP Countries	*Low Credit to GDP*				*High Credit to GDP*			
Firm with Internationally-Borrowing Domestic Bank	0.066***	0.835*	0.017	0.019**	0.082**	-0.415	0.039	0.003
	(0.009)	(0.055)	(0.113)	(0.032)	(0.024)	(0.587)	(0.330)	(0.877)
Firm with Foreign Bank	0.015	0.360	0.003	-0.000	0.113**	0.665	0.026	0.039**
	(0.471)	(0.399)	(0.783)	(0.980)	(0.016)	(0.477)	(0.490)	(0.030)
Firm with Internationally-Borrowing Domestic Bank	-0.115***	-2.507***	-0.069***	-0.067***	-0.102***	0.559	-0.054	-0.011
* Firm Is Credit-Dependent	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.485)	(0.177)	(0.626)
Firm with Foreign Bank	-0.086***	-1.980***	-0.064***	-0.047***	-0.115***	-0.653	-0.036	-0.047***
* Firm Is Credit-Dependent	(0.000)	(0.001)	(0.000)	(0.000)	(0.009)	(0.518)	(0.353)	(0.008)
R-squared	0.068	0.156	0.068	0.037	0.057	0.202	0.087	0.041
Number of Observations	14,550	14,370	14,569	14,616	6,856	6,759	6,790	6,830
Panel C: Low versus High Foreign Funding Countries	*Low Foreign Funding*				*High Foreign Funding*			
Firm with Internationally-Borrowing Domestic Bank	-0.046	-0.521	-0.025	-0.032**	0.086***	0.872***	0.026	0.022***
	(0.277)	(0.483)	(0.228)	(0.022)	(0.000)	(0.001)	(0.124)	(0.000)
Firm with Foreign Bank	-0.076*	-0.819	-0.039**	-0.043***	0.033***	0.778**	0.016	0.013*
	(0.070)	(0.268)	(0.036)	(0.001)	(0.002)	(0.018)	(0.221)	(0.055)
Firm with Internationally-Borrowing Domestic Bank	-0.023	-0.289	-0.016	-0.008	-0.101***	-1.121**	-0.046***	-0.032***
* Firm Is Credit-Dependent	(0.526)	(0.693)	(0.582)	(0.603)	(0.000)	(0.010)	(0.003)	(0.001)
Firm with Foreign Bank	-0.005	-0.048	-0.004	0.004	-0.026*	-1.417***	-0.040**	-0.027***
* Firm Is Credit-Dependent	(0.873)	(0.944)	(0.868)	(0.754)	(0.089)	(0.002)	(0.017)	(0.002)
R-squared	0.067	0.168	0.078	0.029	0.063	0.163	0.060	0.058
Number of Observations	13,851	13,634	13,814	13,897	7,555	7,495	7,545	7,549
Panel D: Slow versus Fast Enforcement Countries	*Slow Enforcement of Legal Contracts*				*Fast Enforcement of Legal Contracts*			
Firm with Internationally-Borrowing Domestic Bank	0.068***	0.394	0.017	0.020**	0.049	0.162	-0.050	-0.029
	(0.004)	(0.315)	(0.126)	(0.011)	(0.557)	(0.907)	(0.422)	(0.311)
Firm with Foreign Bank	0.018	0.398	0.010	0.004	0.026	-0.117	-0.076	-0.035
	(0.355)	(0.324)	(0.318)	(0.608)	(0.776)	(0.937)	(0.206)	(0.240)
Firm with Internationally-Borrowing Domestic Bank	-0.094***	-1.098**	-0.049***	-0.042***	-0.105	0.839	0.062	0.030
* Firm Is Credit-Dependent	(0.000)	(0.044)	(0.000)	(0.000)	(0.192)	(0.658)	(0.431)	(0.257)
Firm with Foreign Bank	-0.053***	-1.270***	-0.049***	-0.034***	-0.060	0.855	0.106	0.049
* Firm Is Credit-Dependent	(0.000)	(0.009)	(0.000)	(0.000)	(0.481)	(0.677)	(0.177)	(0.122)
R-squared	0.064	0.156	0.071	0.035	0.064	0.201	0.096	0.052
Number of Observations	15,884	15,663	15,834	15,886	5,522	5,466	5,525	5,560
Included in Panels A to D								
Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE. -- The models are estimated using OLS for the 3-bank type countries. The dependent variables are the rate of growth in the firm's short-term debt, the change in return on assets, the rate of growth in operational revenue, and the rate of growth in assets in 2009 and are winsorized at the 1st and 99th percentile. In panels A to D the sample is split between firms that are in (an equal number of) countries with low (high) GDP growth, credit to GDP growth, foreign credit (including cross-border credit received), and slow (fast) enforcement of legal contracts. All regressions include Firm Characteristics, the Lagged Dependent Variable, Industry * Firm Is Credit-Dependent Fixed Effects and Country * Firm Is Credit-Dependent Fixed Effects. Firm characteristics include: (a) Export Activities, (b) Foreign Owned, (c) Age, (d) Total Assets, (e) Liquidity Ratio, and (f) Solvency Ratio. All variable definitions are provided in Table 6. Coefficients are listed in the first row, p-values based on robust standard errors that are corrected for clustering at the bank level are reported in the row below in parentheses. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 11
FURTHER ROBUSTNESS TESTS

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable (Firm)	Δ%Short-Term Debt	ΔROA	Δ%Operational Revenue	Δ%Assets	Δ%Short-Term Debt	ΔROA	Δ%Operational Revenue	Δ%Assets
Sample	*3-Bank Type Countries*				*All Countries*			
Panel A: Continuous Variable, 2008-2009								
Firm with Internationally-Borrowing Domestic Bank	0.042*	0.332	0.008	0.009	0.045**	0.370	0.009	0.013
	(0.072)	(0.555)	(0.579)	(0.358)	(0.025)	(0.407)	(0.574)	(0.128)
Firm with Foreign Bank	0.021	-0.011	0.003	-0.002	0.026	0.326	0.021*	0.003
	(0.267)	(0.982)	(0.753)	(0.813)	(0.107)	(0.381)	(0.070)	(0.726)
Firm with Internationally-Borrowing Domestic Bank	-0.010***	-0.091	-0.005	-0.004**	-0.008***	-0.102	-0.002	-0.003**
* Firm Total Borrowing	(0.003)	(0.401)	(0.149)	(0.045)	(0.009)	(0.167)	(0.478)	(0.015)
Firm with Foreign Bank	-0.009***	-0.050	-0.005**	-0.003	-0.006***	-0.116*	-0.005***	-0.002*
* Firm Total Borrowing	(0.001)	(0.604)	(0.045)	(0.179)	(0.003)	(0.061)	(0.005)	(0.081)
Firm Characteristics and Firm Total Borrowing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.059	0.162	0.072	0.032	0.053	0.147	0.050	0.023
Number of Observations	21,406	21,129	21,359	21,446	36,810	37,344	37,192	37,824
Panel B: Different Time Period, 2007-2009								
Firm with Internationally-Borrowing Domestic Bank	0.056***	1.249***	0.038**	0.003	0.054**	1.150***	0.056***	0.005
	(0.007)	(0.005)	(0.013)	(0.810)	(0.011)	(0.007)	(0.009)	(0.676)
Firm with Foreign Bank	0.041**	0.830*	-0.000	-0.003	0.039*	0.802*	0.027	-0.000
	(0.040)	(0.100)	(0.984)	(0.657)	(0.050)	(0.071)	(0.257)	(0.981)
Firm with Internationally-Borrowing Domestic Bank	-0.091***	-1.354**	-0.058***	-0.029*	-0.061**	-1.056**	-0.062***	-0.018
* Firm Is Credit-Dependent	(0.000)	(0.015)	(0.007)	(0.096)	(0.018)	(0.042)	(0.007)	(0.221)
Firm with Foreign Bank	-0.079***	-1.519***	-0.033	-0.021	-0.042**	-1.242**	-0.039	-0.008
* Firm Is Credit-Dependent	(0.001)	(0.009)	(0.143)	(0.195)	(0.043)	(0.014)	(0.102)	(0.500)
R-squared	0.174	0.059	0.206	0.276	0.185	0.064	0.193	0.269
Number of Observations	19,773	19,478	19,735	19,849	34,815	35,318	35,193	35,869
Panel C: Growth-in-Growth, (2005-2006)-(2008-2009)								
Firm with Internationally-Borrowing Domestic Bank	0.031	1.031**	0.022	0.001	0.008	0.723	0.036	-0.004
	(0.180)	(0.043)	(0.235)	(0.904)	(0.747)	(0.188)	(0.114)	(0.764)
Firm with Foreign Bank	0.032*	0.768	0.009	-0.000	0.007	0.422	0.032	-0.007
	(0.067)	(0.163)	(0.527)	(0.986)	(0.764)	(0.454)	(0.124)	(0.609)
Firm with Internationally-Borrowing Domestic Bank	-0.069**	-1.411**	-0.048**	-0.019	-0.033	-0.896	-0.050**	-0.012
* Firm Is Credit-Dependent	(0.016)	(0.025)	(0.034)	(0.246)	(0.267)	(0.164)	(0.028)	(0.456)
Firm with Foreign Bank	-0.068***	-1.411*	-0.054**	-0.012	-0.027	-0.784	-0.058***	-0.005
* Firm Is Credit-Dependent	(0.004)	(0.050)	(0.015)	(0.415)	(0.281)	(0.221)	(0.004)	(0.678)
R-squared	0.046	0.030	0.116	0.140	0.037	0.024	0.084	0.092
Number of Observations	16,895	16,610	16,835	16,973	31,404	31,951	31,761	32,478
Panel D: Placebo Test, 2005-2006								
Firm with Internationally-Borrowing Domestic Bank	0.020	0.969***	0.020	0.014	0.035**	0.869***	0.022*	0.021**
	(0.186)	(0.001)	(0.105)	(0.132)	(0.027)	(0.003)	(0.072)	(0.035)
Firm with Foreign Bank	0.002	0.477*	0.002	0.003	0.016	0.483*	0.005	0.010
	(0.895)	(0.066)	(0.813)	(0.712)	(0.309)	(0.069)	(0.644)	(0.268)
Firm with Internationally-Borrowing Domestic Bank	-0.013	-0.759**	-0.023	-0.013	-0.020	-0.707*	-0.019	-0.013
* Firm Is Credit-Dependent	(0.466)	(0.025)	(0.158)	(0.254)	(0.250)	(0.065)	(0.240)	(0.311)
Firm with Foreign Bank	0.007	-0.234	0.009	-0.004	0.003	-0.283	0.015	-0.001
* Firm Is Credit-Dependent	(0.712)	(0.498)	(0.546)	(0.731)	(0.858)	(0.419)	(0.251)	(0.915)
R-squared	0.080	0.147	0.088	0.152	0.073	0.142	0.068	0.108
Number of Observations	16,779	16,663	16,781	16,939	31,599	32,404	32,208	32,765
Panel E: Long-Term Effects, 2009-2010								
Firm with Internationally-Borrowing Domestic Bank	0.025*	-0.119	0.008	-0.003	0.017	-0.048	0.010	-0.002
	(0.070)	(0.826)	(0.579)	(0.678)	(0.247)	(0.929)	(0.532)	(0.809)
Firm with Foreign Bank	0.023*	-0.335	-0.011	-0.001	0.016	-0.196	-0.008	-0.001
	(0.063)	(0.275)	(0.207)	(0.850)	(0.229)	(0.499)	(0.366)	(0.805)
Firm with Internationally-Borrowing Domestic Bank	0.004	0.078	0.011	0.013	0.002	0.315	0.012	0.011
* Firm Is Credit-Dependent	(0.824)	(0.875)	(0.513)	(0.225)	(0.921)	(0.553)	(0.532)	(0.300)
Firm with Foreign Bank	0.006	0.237	0.023*	0.007	-0.002	0.535	0.023	0.007
* Firm Is Credit-Dependent	(0.721)	(0.473)	(0.055)	(0.353)	(0.877)	(0.116)	(0.109)	(0.381)
R-squared	0.060	0.161	0.051	0.042	0.059	0.144	0.084	0.092
Number of Observations	20,512	19,570	19,853	19,952	35,079	34,635	34,634	35,328
Included in Panels B to E								
Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country * Firm Is Credit-Dependent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NOTE. -- The models are estimated using OLS. The dependent variables are the rate of growth in the firm's short-term debt, the change in return on assets, the rate of growth in operational revenue, and the rate of growth in assets in 2009 and are winsorized at the 1st and 99th percentile. In Panel A Firm Total Borrowing equals (1 plus) the sum of total borrowing of the firm over the period 2005-2007 (in logs). All regressions in Panel A include Firm Characteristics, Firm Total Borrowing, the Lagged Dependent Variable, Industry Fixed Effects and Country Fixed Effects. All regressions in Panels B to E include Firm Characteristics, the Lagged Dependent Variable, Industry * Firm Is Credit-Dependent Fixed Effects and Country * Firm Is Credit-Dependent Fixed Effects. Firm characteristics include: (a) Export Activities, (b) Foreign Owned, (c) Age, (d) Total Assets, (e) Liquidity Ratio, and (f) Solvency Ratio. All variable definitions are provided in Table 6. Coefficients are listed in the first row, p-values based on robust standard errors that are corrected for clustering at the bank level are reported in the row below in parentheses. "Yes" indicates that the set of characteristics or fixed effects is included. *** Significant at 1%, ** significant at 5%, * significant at 10%.