When Arm's Length Is Too Far.

Relationship Banking over the Business Cycle[*]

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March 2014

Abstract

Using a novel way to identify relationship and transaction banks, we study how banks' lending techniques affect funding to SMEs over the business cycle. We link across 21 countries the type of lending techniques that banks use in the direct vicinity of firms to these firms' credit constraints at two contrasting points of the business cycle. Using these detailed data, we show that relationship lending alleviates credit constraints during a cyclical downturn but not during a boom period. The positive impact of relationship lending in an economic downturn is strongest for smaller and more opaque firms and in regions where the downturn is more severe.

JEL codes: F36; G21; L26; O12; 016

Keywords: Relationship banking, credit constraints, business cycle

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1. Introduction

In the aftermath of the global financial crisis, policy makers' attention has focused on lending to small and medium-sized enterprises (SMEs) as these firms were among the most affected when the credit cycle turned (see, for example, Ongena, Peydro and Van Horen, 2013). As credit-constrained SMEs may delay the long-awaited economic recovery, politicians and policy makers around the world have taken decisive actions. U.S. President Obama signed the Small Business Jobs Act into law while in the U.K. the Bank of England launched a subsidized funding and guarantee scheme to boost SME credit. The German development bank KfW meanwhile initiated a funding scheme for *Spanish* SMEs as part of its strategy to promote growth in the European periphery.

While such initiatives may temporarily alleviate firms' funding constraints, they are unlikely to be a long-term panacea and it remains an open question how best to protect entrepreneurs in a more structural way from the cyclicality of credit. Some argue for countercyclical fiscal and monetary policies to stabilize the growth of firms that are (or can quickly become) credit constrained (Aghion, Angeletos, Banerjee and Manova, 2010). Others point towards a role for countercyclical capital buffers (Drehmann et al., 2010 and Repullo, 2013).

An as yet underexplored aspect is the role that banks' business models, in particular their use of relationship versus transaction lending, play in determining the cyclicality of credit. For instance, some commentators have urged banks to go 'back to basics' and to

put more emphasis on relationship lending as this may better insure firms against unexpected economic shocks.[1]

Against this background, we analyze to what extent the local presence of relationship vs. transaction lenders impacts firms' credit constraints at different stages of the credit cycle. We break new ground by culling hitherto unavailable information on banks' main lending techniques from almost 400 face-to-face interviews with the 'ultimate bank insiders': their CEOs. Our focus is on emerging Europe, a region with substantial variation in the lending technologies that banks apply—both between and within countries—and therefore an ideal testing ground for our purposes.

Relationship lending—banks repeatedly interacting with clients in order to obtain and exploit proprietary borrower information (Boot, 2000)—has traditionally been seen as the appropriate tool for banks to reach out to SMEs. Compared to larger firms, SMEs are more opaque and less likely to be able to post collateral. Compared to households, they are more heterogeneous and thus more costly to deal with. These characteristics put a premium on private information at the core of the lending relationship between bank and SME. Such 'soft' (unverifiable) information can be collected and updated through a long-term lending relationship (Petersen and Rajan, 1994; Berger and Udell, 1995).

Over the last decade, however, transaction or arm's-length lending—which relies on 'hard' (verifiable) information and assets—has been proposed as an alternative lending technique for SMEs (Berger and Udell, 2006). Using transaction lending techniques that specifically address problems of informational opacity, like credit scoring, asset-based

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[1] For example, "*Local Banks for Local People*" (The Telegraph, 28-05-2013) and, for a contrarian view, "*Let's Abolish Wall Street and Return to Local Banking!*" (Forbes, 13-09-2012).

lending, factoring etc, banks are able to assess repayment prospects even when informative financial statements are not available.

Cross-country and country-specific evidence shows that banks use both methods to reach out to smaller firms (De la Torre, Martinez Peria and Schmukler, 2010; Beck, Demirgüc-Kunt and Martinez Peria, 2011). This research, however, is cross-sectional and therefore cannot examine possible variation in the effectiveness of these lending techniques at various stages of the business cycle.

Recent work by Bolton, Freixas, Gambacorta and Mistrulli (2013, henceforth BFGM), however, suggests that relationship banks may have a prominent role in the continuation of lending during crisis times. Their theoretical model, in which relationship banks compete with transaction banks, shows that relationship banks incur higher costs and therefore charge higher lending rates than transaction banks in normal times. However, as relationship banks learn about the borrower over time, they can continue to lend at more favorable terms to profitable firms when a crisis hits. Relationship banks consequently relax firms' credit constraints more in crisis times than transactional banks. Employing data from the Italian credit registry from before and after the Lehman Brothers collapse, BFGM confirm these theoretical predictions.[2] Importantly, they define a firm-bank link as relationship based if both bank and firm headquarters are located in the same province.

Building on this literature, this paper combines several cross-country datasets to examine how different lending techniques co-vary with firms' financing constraints at the peak and the trough of the credit cycle. To identify relationship and transaction banks we

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[2] Gobbi and Sette (2012) use the same data source and show that longer bank-firm lending relationships resulted in the availability of more and cheaper credit after the collapse of Lehman Brothers.

use a novel approach in which we employ information on bank lending techniques culled from face-to-face interviews with 397 bank CEOs as part of the EBRD Bank Environment and Performance Survey (BEPS). We merge this information on the use of lending techniques with firm-level survey information and with newly collected data on the geographic location of bank branches across 21 countries in Eastern Europe and the Caucasus. These combined data allow us to paint a detailed picture of the type of banks that surround each individual firm in our dataset and to identify, at the local level, the impact of relationship versus transaction lending on firms' financing constraints over the business cycle. Furthermore, our unique, detailed dataset allows us to control for a large array of firm-, bank-, and locality covariates.

We find that a greater presence of relationship banks in the vicinity of the firm is associated with fewer credit constraints in 2008—when the credit cycle had turned—but not in 2005—during the credit boom. For 2008, we find that the impact of relationship banking on relaxing credit constraints is stronger for young, small, non-exporting firms, and firms with no other sources of external finance available, in particular those that lack tangible assets. This holds after controlling for bank ownership (foreign banks), bank strength (bank capital of banks in the vicinity of the firm, as in Popov and Udell, 2012), and an array of other firm and bank characteristics. We also find that the alleviating impact of relationship banking on firms' financing constraints is even stronger in those regions within a country that experienced a sharper business cycle downturn. Overall, we interpret our findings as consistent with the hypothesis that relationship lending can be critical for alleviating firms' financing constraints during an economic downturn.

To the best of our knowledge this is the first cross-country paper to link the share of relationship banks active in the vicinity of firms to these firms' credit constraints at different points in the business cycle. In doing so, we contribute in several important ways to the extant literature—including country-level studies such as BFGM. First, we introduce an innovative though straightforward way to classify bank lending techniques. Research on the impact of lending techniques on SME finance suffers from the problem that lending technologies are usually not identified and have to be proxied by, for example, the length of interaction or the distance between bank and firm. We, instead, elicit information from structured face-to-face interviews with the CEO which provides us with a direct measure of the lending technique used, without having to rely on (simplifying) assumptions about which banks use which lending technology. Importantly, we find substantial variation among both domestic and foreign-owned banks in their use of relationship lending, indicating that the traditional dichotomy between domestic (=relationship) and foreign (= transaction) banks does not seem to hold in practice. Second, unlike credit-registry data, our firm survey data contain information about both borrowing and non-borrowing firms, with the former split up in constrained versus non-constrained firms. This allows for a more accurate and complete picture of credit constraints among the business population at large. Third, using cross-country data allows us to draw broader inferences from our findings than a one-country study.

Our paper is related to an extensive theoretical and empirical literature on relationship lending. Theoretical contributions highlight both the dark and the bright side of bank-firm relationships. Sharpe (1990) and von Thadden (2004) show that by granting loans to firms banks obtain an informational advantage over competitors, providing them with

informational rents later in the relationship. Rajan (1992) introduces a bright side to relationship lending as the relationship bank's informational advantage allows it to enforce improved continuation decisions. Firms may want to establish several relationships as this reduces the informational holdup problem (von Thadden, 1992) or hedges against bank liquidity shocks (Detragiache, Garella and Guiso, 2000). BFGM model the firm's optimal mix of transaction and relationship banking as a function of their exposure to business-cycle risk. Firms more exposed to this risk will team up more with relationship banks as this allows them to secure better continuation financing terms in a crisis, when default risk increases and screening and monitoring becomes more important (Ruckes, 2004).

The empirical work on relationship banking is extensive.[3] Key contributions show that firms having relationships with banks enjoy improved credit availability (Petersen and Rajan, 1994), are less likely to pledge collateral, and get insurance from relationship banks (Berger and Udell, 1995). Banks can re-use borrower information when lending to the same borrower and the more experienced banks become, the more they rely on this proprietary information (Agarwal and Hauswald, 2010). Relationship lenders thus face lower variable lending costs and may be more inclined to continue lending during a business cycle downturn.

Our paper also contributes to the literature on firms' financing constraints. Many papers follow Fazzari, Hubbard, and Petersen (1988) and derive an empirical specification from the Euler equation that describes the firm's optimal investment pattern. Financially constrained firms are seen as having a higher investment-cash flow

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[3] For a review, see Degryse, Kim and Ongena (2009) or Kysucky and Norden (2013).

sensitivity, an assumption that has been questioned, however (e.g. Kaplan and Zingales, 1997). More recent papers focus on enterprise survey data and rely either on self-reported financing constraints (Beck, Demirgüç-Kunt and Maksimovic, 2005) or combine information on actual financing patterns with demand for external finance (Brown, Ongena, Popov and Yeşin, 2011; Popov and Udell, 2012). Our paper falls into the latter category.

The remainder of the paper is structured as follow. The next section describes the different data sources we combine, while Section 3 presents the methodology. Section 4 discusses our empirical results after which Section 5 concludes.

2. Data

In this section we introduce the data components that we combine to gauge the impact of relationship banking on firms' financing constraints. Our identification rests on joining three important pieces of information: data on firms' credit constraints at different points in time; the geographical coordinates of the bank branches that surround these firms; and—crucially—data on the lending techniques that these banks employ.

2.1. Firm data: credit constraints and covariates

We use the EBRD-World Bank's Business Environment and Enterprise Performance Survey (BEEPS) to measure the incidence of credit constraints among almost 14,000 firms across 21 countries in Eastern Europe and the Caucasus (see Table 2 for a country list). Face-to-face interviews were held with the owner or main manager of each of these enterprises. The purpose of the survey is to gauge the extent to which different features of the business environment (including access to finance) constitute obstacles to firms'

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operations. The survey also includes information on a large number of firm characteristics such as the number of employees, age, ownership, legal structure, export activity and industry. We also know the geographical location of each firm.

Firms were selected using random sampling with three stratification levels to ensure representativeness across industry, firm size, and region. Due to stratification, the sample includes firms from all non-agricultural sectors, allowing us to use sector fixed effects in our regression framework. Stratification also yields more precise estimates.

We use two BEEPs waves: one conducted in 2005 (6,948 firms) and one in 2008-09 (6,901 firms, see panel B of Figure A1 in the Appendix). The first wave was thus undertaken at a time when emerging Europe experienced a credit boom, whereas the second survey took place about a year after the credit cycle had turned.[4] This allows us to compare credit constraints at two very different points during the credit cycle, while keeping the rest of the firm environment—in particular the structure of the local banking landscape—constant.

By combining answers to various questions, we first distinguish between firms that needed a loan and those that did not have a demand for credit. Among the former group, we can then identify firms that were credit constrained: those that were either discouraged from applying for a loan or were rejected when they applied (Cox and Japelli, 1993; Duca and Rosenthal, 1993).

To gauge financing constraints at the firm level, we follow Popov and Udell (2012) and use BEEPS question K16: "*Did the establishment apply for any loans or lines of*

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[4] In three countries in our sample—Estonia, Latvia and Lithuania—the credit cycle started to turn as early as 2007 whereas in the other countries credit tapered off towards the third quarter of 2008 (Berglöf, Korniyenko, Plekhanov and Zettelmeyer, 2010).

credit in the last fiscal year?" For firms that answered "*No*", we move to question K17, which asks: "*What was the main reason the establishment did not apply for any line of credit or loan in the last fiscal year*". For firms that answered "*Yes*", question K18a subsequently asks: "*In the last fiscal year, did this establishment apply for any new loans or new credit lines that were rejected?*" We classify firms that answered "*Yes*" to K16 and "*No*" to K18a as unconstrained, while we classify firms as credit constrained if they either answered "*Yes*" to K18a or answered "*Interest rates are not favorable*"; "*Collateral requirements are too high*"; "*Size of loan and maturity are insufficient*"; or "*Did not think it would be approved*" to K17. This strategy allows us to differentiate between firms that did not apply for a loan because they did not need one and those that did not apply because they were discouraged (but actually needed a loan).

The summary statistics in Table 1 indicate that 64% of all sample firms in 2005 needed a loan, while 62% did in 2008. 28% of firms were financially constrained in 2005, while 40% were constrained in 2008, pointing to a substantial tightening of financing constraints in 2008. Behind these averages, however, lies substantial variation across (and within) countries (Table 2). While 7% of firms in Slovenia were financially constrained in 2005 and 15% in 2008, 62% of firms in Azerbaijan were financially constrained in 2005 and 77% in 2008. The variation over time also differs considerably across countries. While the share of financially constrained firms dropped slightly in Belarus from 38% to 34% between 2005 and 2008, it increased from 18% to 50% in Latvia.

[Insert Tables 1 and 2 here]

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We also use the BEEPS survey to create firm-level control variables that we use throughout our empirical analysis. These include firm size (*Small firm* and *Large firm* – making medium firms the base case); whether a firm is *Publicly listed*; is a *Sole proprietorship*; is an *Exporter*; and whether a firm's financial statements are *Audited* by an external auditor. We also create an indicator – *Asset tangibility* – of whether the firm is part of an industry that is characterized by relatively high (above median) levels of tangible assets (properties, plans and equipment). We expect that larger, publicly listed, and audited firms—all transparency proxies that should be inversely related to information asymmetries—face less credit constraints. Likewise, firms with more tangible and hence pledgeable assets should find it easier to access bank credit, all else equal. Table 1 (Appendix Table A1) provides summary statistics (definitions). In 2005, a bit more (less) than half of the firms were small (audited). Only very few firms (2%) were publicly listed while 27% exported.

2.2. Bank branch networks

The next step in our data construction is to collect information on the bank branches in the vicinity of each firm. We need *time-varying* information to create an accurate picture of the branch networks in both 2005 and 2008-09. We focus on branches that provide funding to SMEs, excluding those that only lend to households or large corporates. For this reason we also disregard banks with less than three branches in a country.

Such detailed information is not publicly available and we therefore hired a team of consultants with extensive banking experience to hand-collect these data. Information was gathered by either directly contacting the banks or by downloading data from bank

websites and subsequently double-checking them with the bank. In some countries—such as Hungary and Ukraine—the central bank was able to provide current as well as historical geo-coordinates for all bank branches. We cross-check all data with the (more limited) information available in the SNL Financial database. In total our dataset contains the geo-coordinates of 38,310 bank branches operated by 422 banks (see Panel A of Figure A1 in the Appendix). These banks represent 96.8 per cent of all bank assets in these 21 countries.[5] We merge this information with two other datasets: Bureau Van Dijk's BankScope, to get balance sheet and income statement data for each of these banks, and the Claessens and Van Horen (2014) database on bank ownership. We classify each bank as either foreign owned (at least half of its equity is in foreign hands) or domestically owned. For each foreign bank we also identify the name and city of incorporation of the parent bank.

We connect the firm and branch data in two ways. First, after making sure that the names of localities (cities and towns) are spelled consistently in both datasets, we match firms and branches by locality. For instance, we link all BEEPS firms in the Czech city of Brno to all bank branches in Brno.[6] The assumption is that a firm has access to all branches in the locality where it is incorporated. Second, we draw circles with a radius of 5 or 10 kilometers around the geo-coordinates of each firm and then link the firm to only those branches inside that circle.[7] On average, a locality in our dataset contains 21 bank branches in 2008 whereas a circle with a 5 (10) kilometer radius contains 18 (30)

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[5] Unweighted country average. Total bank assets as taken from BankScope for the year 2007.

[6] Only very few firms are based in a locality without any bank branches. We link these firms to the branches in the nearest locality. Excluding them from the analysis does not impact any of our results.

[7] According to the president of the Italian Bankers' Association "*the banker's rule of thumb is to never lend to a client located more than three miles from his office*" (quoted in Guiso, Sapienza and Zingales, 2004).

branches. This reflects that most of the localities in our dataset are relatively large towns and cities. For instance, the second largest city of the Czech Republic, Brno, covers an area of 230 km^2. This exceeds the surface of a 5 km circle (79 km^2) but is smaller than the surface of a 10 km circle (314 km^2). Consequently, the typical number of branches in our localities lies somewhere between that of a 5 km circle and that of a 10 km circle. Our main analysis uses the locality variables but we will show that all our results go through when using the alternative (circle) measures of spatial firm-bank closeness.

2.3. Measuring banks' lending techniques

We now have identified the bank branches that surround each sample firm. The third and final step in our data construction is to create variables at the locality (or circle) level that measure the key characteristics of these banks. All of these locality-level bank variables are averages that are weighted by the number of branches a bank operates in the locality.

The main variable of this type—*Share RelationshipBank*—measures the share of the banks in a locality that are relationship lenders as opposed to transaction lenders. To create this variable we turn to the 2nd Banking Environment and Performance Survey (BEPS II), jointly undertaken by the EBRD and Tilburg University.[8] As part of BEPS a common questionnaire in either English or the local language was administered during a face-to-face interview with almost 400 CEOs of the banks operating in the countries in our sample. The interviews were undertaken by a specialized team of senior financial consultants, each with considerable first-hand banking experience. The interviewed banks represent 80.1 per cent of all bank assets in our 21 countries.

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[8] For more details: http://www.ebrd.com/pages/research/economics/data/beps.shtml.

For our current purposes, we use BEPS question Q6, where CEOs were asked to rate on a five-point Likert scale the importance (frequency of use) of the following techniques when dealing with SMEs: relationship lending; fundamental and cash-flow analysis; business collateral; and personal collateral (personal assets pledged by the entrepreneur).

Although, as expected, almost all banks find building a relationship (knowledge of the client) important to their lending, about 60% of the banks in the sample find building a relationship "very important", while the rest considers it only "important" or "neither important nor unimportant". We categorize the former group of banks as relationship banks and the latter as transactional banks.

Interestingly, relationship banking is prevalent among both domestic and foreign banks. Indeed, while 51% of the domestic banks identify themselves as relationship lenders, this percentage is even higher among foreign banks (64%). In other words, the traditional dichotomy between domestic (=relationship) banks and foreign (=transaction) banks that is often (implicitly) assumed in the literature does not seem to hold in practice—at least not in our sample of 21 countries.

After having categorized each bank as being either a relationship or transaction bank we create a variable that equals the share of relationship banks in the locality of each firm. This allows us to answer the question: Are firms in a locality in which relatively many relationship banks are present less credit constrained during a financial crisis?

The summary statistics in Table 1 show that, on average, the share of relationship-based banks was 52% in 2005 and 50% in 2008. This share, however, varied significantly across countries, from 90% in the Czech Republic to 19% in Georgia (Table 1, 2008). Even more important for our identification purposes is that there is substantial variation

in relationship banking *within* countries and that this variation, as mentioned before, is largely unrelated to the local presence of foreign banks. For instance, while foreign banks own about 25% of the branches in the Moldovan cities of Orhei and Ceadir-Lunga, the share of relationship lenders in Orhei is relatively low at 40% whereas it amounts to 100% in Ceadir-Lunga.

This point is visualized more comprehensively in Figure 1 which shows a heat map of the importance of relationship banking in each of the localities where at least one BEEPS firm is based. Darker colors indicate a higher proportion of branches owned by relationship banks as opposed to transaction banks. The map shows that while relationship banking becomes somewhat less prevalent going further east, there is substantial variation *within* the 21 individual countries. This is exactly the cross-locality variation that we exploit in the remainder of this paper to test the conjecture that relationship banking alleviates credit constraints during an economic downturn.

[Insert Figure 1 here]

Analogously to our definition of the locality-level relationship banking variable (*Share RelationshipBank)*, we also calculate control variables that measure for each firm the average Tier 1 ratio of the surrounding banks (*Tier 1*, as in Popov and Udell (2012)) and the average use of wholesale funding of these banks (gross loans to customer funding ratio) (*Wholesale funding*) and the share of foreign owned banks. By doing so, we control for both the ownership and funding structure of the banks in a locality as both of these characteristics may independently impact firms' access to credit. The dichotomy of

relationship vs. transaction based lending has often been equated with the dichotomy of domestic vs. foreign bank ownership (Mian, 2006; Beck, Ioannidou and Schäfer, 2012). It is therefore important to control for local bank ownership structure to prevent this variable from confounding our estimates of the impact of local relationship lenders.

Moreover, we measure the average distance between the branches of relationship lenders in a locality and their local headquarters (*Local distance*) as well as the average distance between these branches and the headquarter of the parent bank (*Parent distance*), which is the same as the local headquarter for domestic banks but is the home-country headquarter for foreign banks. Following Aghion and Tirole (1997), Stein (2002) and Mian (2006) we conjecture that a higher within-bank distance makes the transmission of soft information more difficult, in particular when parent banks find it problematic to supervise management in far-away places (Rajan, Servaes, and Zingales, 2000).

The incentives of local officers may be less aligned with those of the parent bank if the domestic within-bank distance is longer, thus exacerbating internal agency problems (Scharfstein and Stein, 2000). In line with this reasoning, Alessandrini, Presbitero, and Zazzaro (2009) show for Italy that a greater distance between loan officers and headquarters adversely affects credit availability of local firms. Liberti and Mian (2009) find that when the hierarchical distance between the information-collecting agent and the manager that approves a loan is large, less 'soft' or subjective and more 'hard' information is used. This implies that a large hierarchical distance can hamper relationship lending, in particular during a business cycle downturn when uncertainty rises and screening and monitoring becomes more important. We proxy the average *Hierarchical distance* between the branches of relationship lenders and their parent banks

by measuring the proportion of the branches in a locality where only one hierarchical layer is involved in the approval of SME credit. We take this information from the BEPS survey.

3. Methodology

3.1. Baseline regressions

To estimate the relationship between the share of relationship banks in the vicinity of a firm and the probability that the firm is credit constrained, we estimate the following baseline model for both the 2005 and 2008 cross-section. Comparing the results for the two cross-sections allows us to evaluate the importance of relationship banking over the business cycle. We hypothesize that relationship banks were particularly helpful once the cycle had turned in 2008. Consider the model:

$$Y_{ijkl} = \beta_1 X_{ijkl} + \beta_2 L_{jk} + \beta_3 Share\,Relationship\,Bank_{jk} + \beta_4 C_k + \beta_5 I_l + \varepsilon_{ijkl} \qquad (1)$$

where Y_{ijkl} is a dummy variable equal to 1 if firm i in locality j of country k in industry l is credit constrained (rejected or discouraged), and zero otherwise. X_{ijkl} is a matrix of firm covariates to control for observable firm-level heterogeneity: *Small firm*; *Large firm*, *Publicly listed*; *Sole proprietorship*; *Privatized*; *Exporter*; and *Audited*. L_{jk} is a matrix of bank characteristics in locality j of country k: bank solvency (*Tier 1*), *Share foreign banks*, and *Wholesale funding*. This matrix of locality characteristics also includes dummies to identify capitals and cities (localities with at least 50,000 inhabitants). Firms

in cities may face different constraints than firms in the countryside. We further saturate the model with country and industry fixed effects C_k and I_l, with the latter defined at the ISIC Rev 3.1 2-digit level, to wipe out (un)observable variation at these aggregation levels.

Our main independent variable of interest is *Share Relationship Bank $_{jk}$*, the share of bank branches in locality j of country k that belong that banks for which relationship banking is "very important" when dealing with SMEs. We are interested in β_3 which can be interpreted as the impact of the intensity of relationship banking on firms' credit constraints.

We present probit regressions both with and without a first-stage Heckman selection equation where the need for a loan is the dependent variable. Remember that in our sample, a firm's credit constraint is only observable if the firm expresses the need for a loan. Following Popov and Udell (2012) and Hainz and Nabokin (2013), the identification of the model relies on additional variables that are excluded from Equation (1). We use a dummy that indicates if the firm judges competition to be "fairly severe", "severe", or "very severe"; and a dummy that is one if over the last three years the firm received subsidies from a local or national government or the EU. The economic intuition is that competitive markets reduce mark-ups and therefore firms' ability to finance investments internally.[9] All else equal, they will demand more external funding. A firm's application for a subsidy may also signal that it is in need of external funding.

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[9] See Chevalier and Scharfstein (1996) on how higher price-cost mark-ups may allow firms to generate more internal funds and to invest more.

3.2. Extensions

In a second step we investigate whether a higher local share of relationship banks is particularly beneficial to specific types of firms. We address this by adding to our base model the interaction term *ShareRelationshipBank*FirmType* (while controlling for *FirmType* itself), where firm type indicates enterprises where we expect relationship banking to be particularly relevant. These include smaller and younger firms as well as non-audited, non-listed, and non-exporting firms. These characteristics all proxy for a firm's informational opaqueness and we expect that relationship banks are better suited to assuage the agency problems that come with such opaqueness. As we are interested in the role of relationship banking over the business cycle, we execute this for both cross-sections 2005 and 2008.

Next, we test whether the ability of relationship lenders to continue lending relationships during a downturn is particularly strong in those within-country regions where that downturn is most severe. To this end we exploit new data on regional growth patterns (see Gennaioli, La Porta, Lopez De Silanes and Shleifer, 2013).

Finally, we investigate whether distance or other relationship-lender characteristics influence the ability of relationship banks to loosen firms' credit constraints. To address this, we add to our base model the interaction term *ShareRelationshipBank*Relationship Bank Characteristic* as well as *Relationship Bank Characteristic* itself. We employ several indicators, each capturing different dimensions of a bank's organization.

4. Empirical results

4.1. Baseline results

We start our empirical analysis by summarizing in Table 3 the results of our Heckman selection equation. Here the dependent variable is a dummy that is one if the firm has a demand for bank credit and zero otherwise. The probit specification includes our two exogenous variables―*Competition* and *Received subsidies*―alongside our standard set of firm- and locality-level covariates (unreported). We also *Share relationship banks*, our key locality-level variable that we will use as a credit-supply shifter in the next stage of our analysis. We saturate the model with country and industry fixed effects.

As expected, both *Competition* and *Received subsidies* are positively and significantly correlated with a firm's demand for credit. Importantly, we find no relationship, neither in 2005 nor in 2008, between our local bank-structure variable and the demand for credit. This gives us confidence that *Share relationship banks* is not endogenous to local demand conditions and hence a good candidate to identify shifts in the supply of credit in the next stage.

[Insert Table 3 here]

Next, in Table 4 we now present regression specifications in line with Equation 1 to estimate the impact of the local presence of relationship banks on firms' access to debt. We first show results for 2005—the time of the credit boom—and then for 2008—when the credit cycle had turned. For each period we present two probit regressions (at the locality level) and then three equivalent second-stage Heckman regressions (at the level

of the firm locality or the 5 (10) km circle around the firm). The unreported first stage of

the Heckman procedure indicates that both subsequently excluded variables—

Competition and *Subsidized*—are, as expected, positively linked to the probability that a

firm demands credit (1% significance level). All models again include both country and

industry fixed effects.

[Insert Table 4 here]

The results in Table 4 show no significant relationship between the local importance of

relationship lending and firms' financing constraints in 2005 but a strong and

significantly negative relationship in 2008. When the credit cycle had turned, firms in

localities with relatively many relationship lenders were less constrained than

observationally similar firms in localities dominated by transaction lenders. The

economic magnitude of this effect is substantial: moving from a locality with 20%

relationship lenders to one with 80% relationship lenders reduces the probability of being

credit constrained in 2008 by 34 percentage points (column [8]). These findings are

consistent across different matching procedures between banks and firms (locality or

circle) and controlling for selection bias with the Heckman procedure or not. They also

hold controlling for a large number of enterprise characteristics and other characteristics

of the banks in the respective location.[10]

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[10] Our results also remain quantitatively and qualitatively unchanged when we control for local economic activity as proxied by the 2005 gross cell product (in US$ at market exchange rates). Here cells are terrestrial grids of 1 degree longitude by 1 degree latitude (approximately 100x100 km). Source: Yale University G-Econ Project.

Several of the control variables enter significantly and with coefficient signs consistent with the literature. Compared to medium-sized firms, small (large) firms are more (less) likely to be financially constrained. Exporters and audited firms are also less likely to experience credit constraints. These results hold for both survey waves, reflecting that firm opaqueness tends to cause agency problems in both good and bad times. Publicly listed firms became more constrained during the crisis as compared to non-listed firms, most likely reflecting the drying up of alternative funding sources.

Few of the locality-level control variables enter significantly. In line with Popov and Udell (2012), we find that firms in localities dominated by branches of less solvent banks (lower Tier 1 capital ratio) experience tighter credit constraints in 2008. However, the coefficient becomes imprecisely estimated when we use the 5 or 10 km circle to match banks with firms. We also control for the local share of foreign-owned banks and the average reliance of local banks on wholesale funding, but these variables do not explain anything over and above our relationship-banking measure. Finally, in the second-stage Heckman regressions (columns 3-5 and 8-10) the inverse Mills' ratio does not enter significantly, indicating that selection bias does not distort our probit results.

4.2. Robustness

In Table 5 we present a number of tests to gauge the robustness of our core results as presented in columns 3 and 8 of Table 4. In the first two columns we re-estimate these base specifications while now clustering the standard errors at the locality rather than the country level. We continue to find a strong impact of relationship lending in 2008 but not in 2005. Note that while clustering at the locality level is appealing in principle, there are

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many localities with just one firm. In those cases locality clustering amounts to not clustering the standard errors at all and country-level clustering is actually the more conservative approach.

In columns 3 through 6 we then add two new locality-level variables that proxy for the level of concentration and competition in the local credit market: a Herfindahl-Hirschman Index (HHI) and a (branch-weighted) Lerner index. In both cases our main results continue to hold. Importantly, we find that while the HHI has no impact on credit constraints in 2005, a more concentrated credit market worsens credit access during the crisis. This effect materializes over and above the beneficial impact of a relatively high local proportion of relationship lenders.

Finally, in column 7 we pool the 2005 and 2008 observations and include an interaction term between the share of relationship lenders and a 2008 dummy. This allows us to test directly whether the impact of relationship lending increases significantly during a cyclical downturn. The statistically significant negative coefficient for this interaction term confirms that the impact of the local presence of relationship lenders is indeed limited to the downturn.

[Insert Table 5 here]

4.3. Firm heterogeneity

Next, in Table 6 we present regressions to estimate how the impact of the local presence of relationship lenders on firms' access to finance varies across different types of firms. Specifically, we interact the share of relationship lenders with the number of employees;

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the age of the firm; its exporter status; a dummy variable indicating whether a firm is audited; a dummy that indicates whether a firm likely has access to non-bank funding from the state, a foreign parent, or the stock market; a dummy that indicates whether the firm is publicly listed; and a dummy that indicates whether the firm is in an industry with above-median levels of tangible assets. All specifications include our standard set of firm and locality controls as well as country and industry fixed effects (not reported).

It is striking that none of these interaction effects is precisely estimated in 2005 while in 2008 the link between the importance of relationship lending and firms' financing constraints consistently varies across firm groups in line with theory. Indeed, we find the negative relationship between relationship lending and credit constraints during a recession to be stronger for smaller and younger firms, non-exporting and non-audited firms, firms without external funding, non-listed firms, and firms with few tangible assets. This is consistent with both the financing constraints literature that has shown that these firms suffer more from market frictions in their access to external finance as well as the relationship lending literature that shows that relationship lending is more important for smaller, younger and non-exporting firms, firms with less transparent financial statements and less access to public external funding.

The economic impact of this firm heterogeneity is substantial too. For instance, when we compare two otherwise similar firms, one of which is audited and one of which is not, then the probability of being credit constrained in 2008 was 39 percentage points higher for the unaudited firm in a locality without any relationship lenders but only 20 percentage points higher in a locality where at least half of all branches are operated by relationship lenders.

[Insert Table 6 here]

In short, compared to more transparent firms, opaque firms had some more trouble in accessing credit during the credit boom and this was independent of the nature of the surrounding banks. While in 2008 this level effect continues to be present, we now also observe that opaque firms become especially constrained in localities where relationship lenders are few and far between.

4.4. Relationship banking and regional business cycle variation

In Table 7 we analyze whether relationship lending is particularly beneficial to firms in regions that experience a more severe economic downturn. To this end we interact our local measure of relationship lending with output growth in 2008-09 or 2007-09.

In the first two columns we measure output growth at the country level (real GDP growth) whereas in columns 3 and 4 we measure output growth at the level of the region where the firm is based. Finally, in columns 5 and 6 we present a mixed approach where we measure output growth at the regional where available and at the country level in all other cases.[11] The local GDP data are consistently measured at the most disaggregated administrative level (typically states or provinces) that is available from local sources or alternatively at the lowest statistical division level, such as Eurostat's NUTS level.

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[11] Regional GDP growth data were not available for Albania, Azerbaijan, Belarus, Moldova and Serbia. See Gennaioli, La Porta, Lopez de Silanes and Shleifer (2013) for more details on the regional data.

The results in Table 7 confirm that the protective effect of the local presence of relationship lenders was particularly strong in those regions that were hit relatively hard by the 2007-09 financial crisis.

[Insert Table 7 here]

4.4. Relationship banking and bank heterogeneity

In Table 8 we analyze how the impact of relationship banking on access to credit in 2008 depends on a number of organizational, ownership, and hierarchical distance measures that characterize these relationship lenders.

In column (1) we first interact the share of relationship lenders with the geographical distance between the branch of these lenders and the headquarter of the parent bank, which is the local headquarter in the case of domestic banks and the home-country headquarter in the case of a foreign bank. For example, suppose in the city of Lublin, Poland there are three banks present: one domestic-owned with its headquarters in Warsaw and two foreign-owned, one operated by Citibank and one by UniCredit. We then use the great circle distance formula to calculate the distance between Lublin and Warsaw, between Lublin and New York and between Lublin and Milan and take the average of the three. The results indicate that the average within-bank distance among the banks in a locality does not appear to reduce the ability of local relationship lenders to mitigate credit constraints during an economic downturn.

In columns 2 and 3, we analyze whether the *within-country* distance between the bank branch and domestic headquarters matters. We can either measure this distance in

geographical (kilometers, column 2) or in hierarchical terms (column 3). In the latter case, we use a variable that measures the local share of relationship banks where only one hierarchical layer is involved in the approval of SME credit loans. We take this information from the BEPS II survey. We find no evidence that relationship lending suffers from such domestic distance constraints either.

Finally, in columns 4 and 5 we test whether there is an independent effect of the local proportion of relationship branches that is owned by foreign owned banks (column 4) or that is owned by banks that are relatively financially strong (above median Tier 1 ratio in the country of operation). We do this to gauge whether the mitigating effect of relationship lending during the crisis varies by bank ownership or health. As discussed above, in our sample we do *not* find a strong correlation between the importance that a bank attaches to relationship lending and its ownership. Table 5 shows that there is also no evidence that the credit constraint mitigating effect of relationship lending varies across bank ownership (or health) per se.

[Insert Table 8 here]

5. Conclusions

We studied the impact of relationship lending on firms' access to finance in both a credit boom and bust using bank and firm survey data. We collected, for a large sample of countries, information on bank branches active in the direct vicinity of the surveyed firms. Furthermore, using information provided by CEOs of the banks themselves we were able to determine whether the banks in the vicinity of the firm were either

relationship or transaction banks. Using these unique data, we examined the impact of relationship lending on firms' credit constraints at different points in the business cycle. We found evidence that the importance of lending techniques for firms' financing constraints varies importantly across the business cycle. Specifically, while transaction and relationship lending seem substitutes during good times, relationship lending appears to be a more adequate lending technique during cyclical downturns. This holds in particular for smaller and generally more opaque firms and independent of the exact legal and institutional environment. Our results are in line with the theoretical predictions of Bolton, Freixas, Gambacorta and Mistrulli (2013) and indicate that relationship banks indeed gather information on their borrowers which enables them to continue to provide loans during economic downturns when transaction banks seem to withdraw.

Our results have important policy implications. While the recent literature has clearly pointed to the benefits of having diverse lending techniques within a banking system, relationship lending seems to have a more prominent role to play during economic downturns. During such periods SME lending tends to be particularly subdued, potentially delaying and weakening the subsequent phase of economic recovery. Therefore, the effect of a financial crisis on the real economy would likely be smaller if more firms could be induced to seek a long-term banking relationship and if relationship banks would be more shielded from the effects of a financial crisis, for example by holding a higher share of equity.

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Figure 1
Regional Variation in Relationship Banking

This heat map plots the geographical localities in our dataset. Each dot indicates a locality that contains at least one surveyed firm. Darker colors indicate a higher proportion of bank branches owned by relationship banks as opposed to transaction banks. Relationship banks are defined as banks whose CEO mentioned that relationship lending was a "Very important" technique when lending to SMEs.
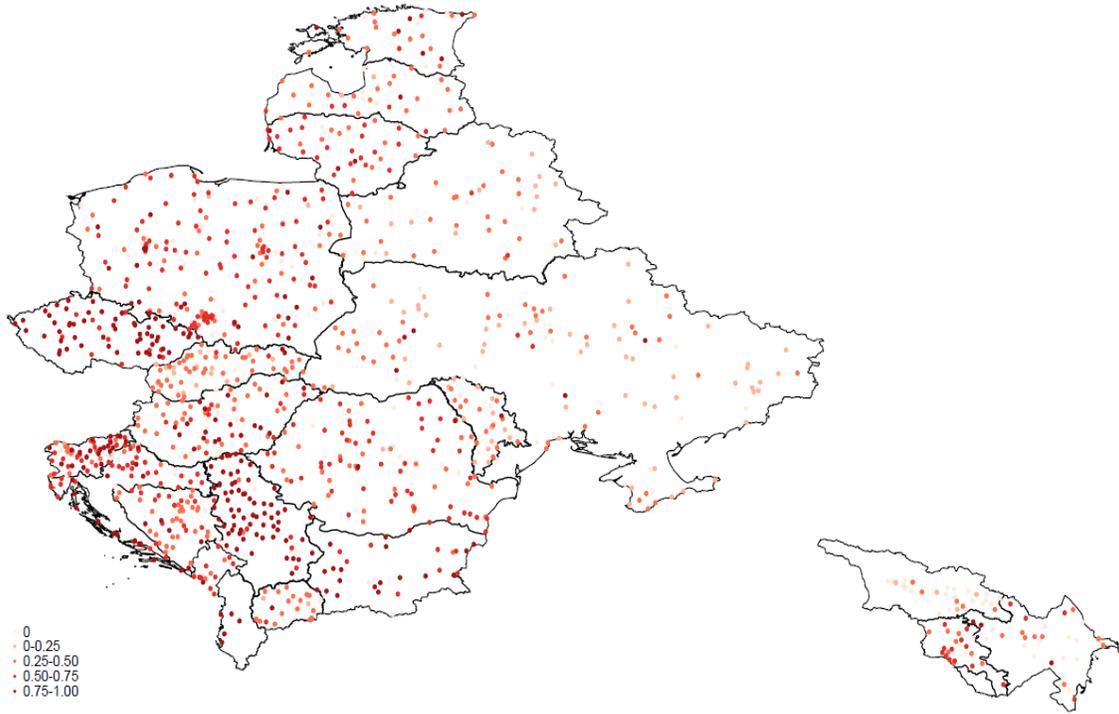
Table 1
Summary Statistics

This table shows summary statistics for all variables used in the empirical analysis. Sd: standard deviation. All variable definitions and data sources are provided in Annex Table A1.

	2005						2008					
	N	Mean	Median	Sd	Min	Max	N	Mean	Median	Sd	Min	Max
Firm-level variables												
Loan needed	6,675	0.64	1	0.48	0	1	6,837	0.62	1	0.49	0	1
Constrained	4,302	0.28	0	0.45	0	1	4,233	0.40	0	0.49	0	1
Small firm (< 20 employees)	6,948	0.55	1	0.50	0	1	6,838	0.41	0	0.49	0	1
Large firm (> 100 employees)	6,948	0.18	0	0.38	0	1	6,838	0.25	0	0.43	0	1
Publicly listed	6,948	0.02	0	0.14	0	1	6,901	0.12	0	0.32	0	1
Sole proprietorship	6,948	0.36	0	0.48	0	1	6,901	0.17	0	0.38	0	1
Privatized	6,948	0.12	0	0.33	0	1	6,901	0.18	0	0.38	0	1
Exporter	6,948	0.27	0	0.45	0	1	6,901	0.28	0	0.45	0	1
Subsidized	6,948	0.09	0	0.29	0	1	6,901	0.09	0	0.29	0	1
Competition	6,948	0.88	1	0.32	0	1	6,901	0.77	1	0.42	0	1
Employees (log)	6,948	3.09	2.77	1.57	1.10	9.16	6,838	3.52	3.30	1.40	0	9.81
Age (log)	6,940	2.45	2.40	0.74	1.39	5.19	6,764	2.54	2.56	0.71	0	5.21
External funding	6,948	0.21	0	0.40	0	1	6,901	0.22	0	0.42	0	1
Audited	6,777	0.47	0	0.50	0	1	6,724	0.47	0	0.50	0	1
Locality-level variables												
Share relationship banks	6,832	0.52	0.5	0.26	0	1	6,805	0.50	0.47	0.23	0	1
Share foreign banks	6,948	0.51	0.54	0.28	0	1	6,901	0.55	0.63	0.29	0	1
Tier 1	6,524	13.27	10.37	7.11	6.7	41.01	6,844	12.04	9.28	6.51	5.51	41.4
Wholesale funding	6,816	109.38	101.86	36.63	12.96	217.04	6,868	133.79	132.06	31.63	51.10	217.04
Capital	6,948	0.34	0	0.48	0	1	6,901	0.32	0	0.47	0	1
City	6,948	0.42	0	0.49	0	1	6,901	0.37	0	0.48	0	1
Distance HQ (log)	6,946	6.25	6.41	0.74	0.99	8.13	6,901	6.19	6.27	0.67	0.99	7.82
Local distance (log)	6,948	3.72	4.48	2.05	0	6.52	6,901	3.90	4.45	1.88	0	6.67
Share one hierarchical layer	6,832	0.18	0.11	0.19	0	1	6,805	0.22	0.20	0.22	0	1

Table 2
Relationship Banking and Credit Constraints

This table shows country means for some of our main variables. *Loan needed* indicates the proportion of firms that needed a loan during the last fiscal year. *Constrained* indicates the proportion of firms that needed a loan but were either discouraged from applying for one or were rejected when they applied. *Share relationship banks* is the number of branches of relationship banks in a locality divided by the total number of bank branches in that locality, averaged across all BEEPS localities in a country.

	Loan needed		Constrained		Share relationship banks	
	2005	2008	2005	2008	2005	2008
Albania	0.62	0.43	0.23	0.36	0.93	0.84
Armenia	0.68	0.59	0.31	0.35	0.36	0.48
Azerbaijan	0.45	0.55	0.62	0.77	0.38	0.46
Belarus	0.73	0.75	0.38	0.34	0.25	0.26
Bosnia	0.73	0.78	0.16	0.36	0.59	0.56
Bulgaria	0.62	0.58	0.28	0.49	0.84	0.77
Croatia	0.73	0.64	0.08	0.37	0.74	0.71
Czech Republic	0.49	0.52	0.32	0.30	1.00	0.90
Estonia	0.57	0.54	0.17	0.25	0.46	0.47
Georgia	0.56	0.64	0.28	0.35	0.17	0.19
Hungary	0.75	0.42	0.23	0.31	0.59	0.58
Latvia	0.63	0.59	0.18	0.50	0.49	0.45
Lithuania	0.66	0.60	0.25	0.23	0.64	0.61
Macedonia	0.60	0.60	0.49	0.49	0.40	0.39
Moldova	0.74	0.71	0.25	0.41	0.28	0.28
Poland	0.62	0.54	0.37	0.39	0.63	0.63
Romania	0.65	0.63	0.22	0.29	0.55	0.52
Serbia	0.70	0.76	0.35	0.36	0.79	0.85
Slovak Republic	0.58	0.54	0.14	0.38	0.27	0.31
Slovenia	0.71	0.64	0.07	0.15	0.67	0.64
Ukraine	0.67	0.68	0.35	0.51	0.11	0.28

Table 3

Relationship Banking and Credit Demand Through the Credit Cycle

This table shows first-stage Heckman selection regressions to estimate the impact of the local presence of relationship banks on firms' demand for bank credit during the credit boom (2005) and the credit crunch (2008). The first (last) three columns show 2005 (2008) estimates. Local banking variables used in columns [1] and [4] are defined at the level of the locality where a firm is based whereas those used in columns [2],[5] and [3],[6] are constructed by taking into account the bank branches in a spatial ring around the firm with a 5 or 10 km radius, respectively. In all regressions the dependent variable is a dummy variable that is '1' if the firm was needed credit. Robust standard errors are clustered by country and shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions. Firm covariates are the same as those included in Table 4.

	2005			**2008**		
	Locality	5 km	10 km	Locality	5 km	10 km
	[1]	[2]	[3]	[4]	[5]	[6]
Share relationship banks	-0.178	-0.068	0.001	0.166	0.056	0.136
	(0.166)	(0.154)	(0.166)	(0.154)	(0.142)	(0.134)
Competition	0.311***	0.300***	0.309***	0.247***	0.246***	0.235***
	(0.049)	(0.058)	(0.048)	(0.040)	(0.038)	(0.042)
Subsidized	0.299***	0.305***	0.270***	0.299***	0.319***	0.309***
	(0.087)	(0.086)	(0.088)	(0.084)	(0.094)	(0.085)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	6,279	5,559	6,212	6,518	6,271	6,692
Pseudo R2	0.055	0.055	0.054	0.054	0.056	0.055

Table 4

Relationship Banking and Credit Constraints Through the Credit Cycle

This table shows baseline regressions to estimate the impact of the local presence of relationship banks on firms' access to finance during the credit boom (2005) and the credit crunch (2008). The first (last) five columns show 2005 (2008) estimates. Columns [1]-[2] and [6]-[7] show probit regressions while the other columns show second-stage results of a Heckman selection procedure (the excluded variables in the first stage are *Competition* and *Subsidized*). Local banking variables used in columns [1]-[3] and [6]-[8] are defined at the level of the locality where a firm is based whereas those used in columns [4],[9] and [5],[10] are constructed by taking into account the bank branches in a spatial ring around the firm with a 5 or 10 km radius, respectively. In all regressions the dependent variable is a dummy variable that is '1' if the firm was credit constrained. Robust standard errors are clustered by country and shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

	2005					**2008**				
	Probit		Heckman			Probit		Heckman		
	Locality		Locality	5 km	10 km	Locality		Locality	5 km	10 km
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Share relationship banks	0.012	0.184	0.141	0.048	0.022	-0.482***	-0.613***	-0.561***	-0.429***	-0.426**
	(0.345)	(0.280)	(0.256)	(0.240)	(0.240)	(0.153)	(0.179)	(0.185)	(0.147)	(0.169)
Small firm (<20 empl)	0.473***	0.486***	0.427***	0.487***	0.472***	0.378***	0.382***	0.349***	0.297***	0.336***
	(0.066)	(0.073)	(0.079)	(0.091)	(0.092)	(0.050)	(0.051)	(0.062)	(0.077)	(0.071)
Large firm (>100 empl)	-0.343***	-0.317***	-0.305***	-0.291***	-0.305***	-0.274***	-0.276***	-0.229***	-0.184**	-0.207**
	(0.100)	(0.103)	(0.098)	(0.109)	(0.097)	(0.045)	(0.047)	(0.070)	(0.074)	(0.082)
Publicly listed	-0.242	-0.203	-0.179	-0.317*	-0.202	0.237***	0.244***	0.223***	0.186***	0.201***
	(0.170)	(0.173)	(0.172)	(0.166)	(0.173)	(0.073)	(0.075)	(0.071)	(0.058)	(0.061)
Sole proprietorship	0.055	0.086	0.098	0.094	0.103	0.108*	0.112**	0.124**	0.129**	0.113**
	(0.091)	(0.090)	(0.086)	(0.074)	(0.084)	(0.056)	(0.055)	(0.059)	(0.059)	(0.056)
Privatized	0.002	0.027	0.036	0.069	0.046	0.080	0.091	0.105	0.114	0.115
	(0.065)	(0.070)	(0.071)	(0.070)	(0.072)	(0.081)	(0.083)	(0.081)	(0.074)	(0.081)
Exporter	-0.264***	-0.273***	-0.239***	-0.273***	-0.252***	-0.197***	-0.200***	-0.175***	-0.117	-0.157**
	(0.065)	(0.066)	(0.066)	(0.075)	(0.070)	(0.059)	(0.058)	(0.067)	(0.079)	(0.070)
Audited	-0.276***	-0.294***	-0.271***	-0.228***	-0.245***	-0.217***	-0.216***	-0.190***	-0.154**	-0.165***
	(0.057)	(0.056)	(0.062)	(0.062)	(0.060)	(0.052)	(0.052)	(0.056)	(0.061)	(0.060)
Tier 1		-0.009	-0.007	-0.006	0.004		-0.020***	-0.020***	-0.004	-0.002
		(0.008)	(0.008)	(0.007)	(0.008)		(0.009)	(0.009)	(0.015)	(0.015)
Share foreign banks		0.215	0.262	0.184	0.839*		-0.132	-0.089	-0.073	0.071
		(0.420)	(0.404)	(0.381)	(0.338)		(0.266)	(0.255)	(0.236)	(0.334)
Wholesale funding		0.003	0.003	0.000	0.000		0.000	0.000	0.001	0.000
		(0.002)	(0.001)	(0.000)	(0.000)		(0.002)	(0.002)	(0.001)	(0.001)
Capital		0.184	0.159	0.171*	0.150		0.014	-0.024	-0.035	-0.000
		(0.094)	(0.088)	(0.104)	(0.087)		(0.067)	(0.088)	(0.100)	(0.102)
City		0.002	0.013	-0.002	-0.009		-0.065	-0.052	0.013	0.005
		(0.056)	(0.053)	(0.061)	(0.055)		(0.046)	(0.048)	(0.062)	(0.064)
Inverse Mills' ratio			0.473	0.250	0.382			0.359	0.555	0.455
			(0.384)	(0.405)	(0.399)			(0.273)	(0.269)	(0.284)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,162	4,059	4,059	3,655	4,055	4,052	4,022	4,022	3,868	4,126
Pseudo-R2	0.14	0.15	0.15	0.14	0.15	0.10	0.10	0.10	0.10	0.10

Table 5
Relationship Banking and Credit Constraints: Robustness Tests

This table shows various robustness tests of our baseline results in Table 4. In all regressions the dependent variable is a dummy variable that is '1' if the firm was credit constrained. All local banking variables are defined at the level of the locality where a firm is based. Unreported covariates are the same as in Table 4. Robust standard errors are clustered by locality in columns [1]-[2] and by country in columns [3]-[7] and shown in parentheses. Columns [3]-[4] include a locality-level and branch-weighted Herfindahl Hirschman Index (HHI) that measures local credit-market concentration. Columns [5]-[6] include a locality-level and branch-weighted Lerner index to measure local credit-market competition. Column 7 is estimated for a pooled 2005-08 sample. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

	Clustering at locality level		Additional controls local credit markets				Pooled sample
	2005	2008	2005	2008	2005	2008	2005-08
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Share relationship banks	0.141	-0.561***	0.139	-0.538***	0.235	-0.575***	0.140
	(0.287)	(0.185)	(0.264)	(0.172)	(0.253)	(0.194)	(0.259)
HHI			-0.141	0.381**			
			(0.247)	(0.158)			
Lerner index					-0.993	0.852	
					(1.058)	(1.293)	
Share relationship banks*2008							-0.703***
							(0.268)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,059	4,022	4,059	4,022	4,059	4,022	8,081
Pseudo R2	0.150	0.102	0.150	0.102	0.150	0.103	0.135

Table 6

Relationship Banking and Credit Constraints Through the Credit Cycle: Firm Heterogeneity

This table shows regressions to estimate how the impact of the local presence of relationship lenders on firms' access to debt finance during the credit boom (2005) and the credit crunch (2008) differed across firm types. The first (last) eight columns show 2005 (2008) estimates. All columns show second-stage results of a Heckman selection procedure (the excluded variables in the first stage are *Competition* and *Subsidized*) where *Share relationship banks* is measured at the locality level. Firm controls: *Small firm*, *Large firm*, *Publicly listed*, *Sole proprietorship*, *Privatized*, *Exporter*, *Audited*. Locality controls: *Tier 1*, *Share foreign bank*, *Wholesale funding*, *Capital* and *City*. In all regressions the dependent variable is a dummy variable that is '1' if the firm was credit constrained. Robust standard errors are clustered by country and shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

Firm type →	2005							2008						
	Employees	Age	Exporter	Audited (ex public)	External funding	Publicly listed	Asset tangibility	Employees	Age	Exporter	Audited (ex public)	External funding	Publicly listed	Asset tangibility
	[1]	[2]	[3]	[5]	[6]	[7]	[8]	[9]	[10]	[12]	[13]	[14]	[15]	[16]
Share relationship banks	0.145	0.076	0.161	0.236	0.040	0.138	-0.228	-1.120***	-1.350***	-0.721***	-0.777***	-0.646***	-0.662***	-0.630**
	(0.407)	(0.656)	(0.297)	(0.285)	(0.272)	(0.256)	(0.253)	(0.427)	(0.457)	(0.211)	(0.220)	(0.199)	(0.199)	(0.263)
Share relationship banks * Firm type	-0.011	0.016	-0.075	-0.232	0.434	0.422	0.334	0.179**	0.301**	0.467**	0.438**	0.407**	0.596**	0.539***
	(0.098)	(0.219)	(0.360)	(0.234)	(0.370)	(0.848)	(0.331)	(0.080)	(0.142)	(0.226)	(0.185)	(0.192)	(0.288)	(0.191)
Firm type	-0.246***	0.093	-0.200	-0.154	0.059	-0.433	-0.485**	-0.266***	-0.157**	-0.410***	-0.403***	-0.164*	-0.046	-0.390***
	(0.083)	(0.111)	(0.183)	(0.117)	(0.198)	(0.614)	(0.190)	(0.086)	(0.079)	(0.121)	(0.114)	(0.096)	(0.141)	(0.092)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Number of obs.	3,899	3,894	3,899	3,804	3,899	3,899	1,738	4,022	3,960	4,022	4,022	4,022	4,022	1,614
Pseudo R2	0.167	0.152	0.150	0.150	0.155	0.150	0.197	0.110	0.104	0.103	0.103	0.103	0.103	0.130

Table 7
Relationship Banking and Regional Variation in Crisis Intensity

This table shows regressions to estimate how the impact of the local presence of relationship lenders on firms' access to credit in 2008 depended on the severity of the crisis impact in the region where the firm is incorporated. Output growth is measured at the country level in columns [1]-[2]; at the regional level in [3]-[4]; and at the regional level where available and country level otherwise in [5]-[6]. All columns show second-stage results of a Heckman selection procedure (the excluded variables in the first stage are *Competition* and *Subsidized*) where *Share relationship banks* is measured at the locality level. Firm controls: *Small firm*, *Large firm*, *Publicly listed*, *Sole proprietorship*, *Privatized*, *Exporter*, *Audited*. Locality controls: *Tier 1*, *Share foreign bank*, *Wholesale funding*, *Capital* and *City*. In all regressions the dependent variable is a dummy variable that is '1' if the firm was credit constrained. Robust standard errors are clustered by country and shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

	Country GDP growth		Regional GDP growth		Regional GDP growth if available; country GDP growth otherwise	
	[1]	[2]	[3]	[4]	[5]	[6]
Share relationship banks	-0.414**	-0.525***	-0.681***	-0.752***	-0.495***	-0.576***
	(0.169)	(0.167)	(0.262)	(0.266)	(0.180)	(0.175)
Share relationship banks*Output growth 2008-09	2.610		2.887**		2.725**	
	(1.702)		(1.431)		(1.277)	
Share relationship banks*Output growth 2007-09		2.391**		1.541***		1.504***
		(1.029)		(0.533)		(0.502)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,022	4,022	3,046	3,046	4,022	4,022
Pseudo R2	0.102	0.102	0.100	0.098	0.104	0.103

Table 8
Relationship Banking and Bank Heterogeneity

This table shows regressions to estimate how the impact of the local presence of relationship lenders on firms' access to credit in 2008 depended on various other characteristics of the relationship lenders in the firm's locality. All columns show second-stage results of a Heckman selection procedure (the excluded variables in the first stage are *Competition* and *Subsidized*) where *Share relationship banks* is measured at the locality level. Firm controls: *Small firm*, *Large firm*, *Publicly listed*, *Sole proprietorship*, *Privatized*, *Exporter*, *Audited*. Locality controls: *Tier 1*, *Share foreign bank*, *Wholesale funding*, *Capital* and *City*. In all regressions the dependent variable is a dummy variable that is '1' if the firm was credit constrained. Robust standard errors are clustered by country and shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

Relationship bank characteristics →	Parent distance	Local distance	Hierarchical distance	Share foreign bank	Bank health
	[1]	[2]	[3]	[4]	[5]
Share relationship banks	-2.013*	-0.501	-0.554**	-0.635*	-0.572***
	(1.079)	(0.316)	(0.243)	(0.345)	(0.167)
Share relationship banks * Relationship bank characteristic	0.260	0.017	0.721	0.068	0.171
	(0.187)	(0.075)	(0.562)	(0.382)	(0.217)
Relationship bank characteristic	-0.128	0.017	-0.157	0.024	-0.198
	(0.130)	(0.055)	(0.385)	(0.246)	(0.144)
Firm controls	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Number of obs.	3,898	3,904	3,919	3,827	4,022
Pseudo R2	0.100	0.100	0.099	0.093	0.103

Table A1
Variable Definitions and Sources

This table shows variables definitions and data sources for all all variables used in the empirical analysis.

	Definition	Source	Unit
Firm-level variables			
Loan needed	Dummy=1 if firm needs a loan; 0 otherwise	BEEPS	0/1
Constrained	Dummy=1 if firm needs a loan but was discouraged from applying or rejected when it applied; 0 otherwise	BEEPS	0/1
Small firm (< 20 empl)	Dummy= 1 if firm employs less than 20 people; 0 otherwise	BEEPS	0/1
Large firm (> 100 empl)	Dummy= 1 if firm employs more than 100 people; 0 otherwise	BEEPS	0/1
Public	Dummy=1 if firm is a shareholder company with publicly traded shares; 0 otherwise	BEEPS	0/1
Sole proprietorship	Dummy=1 if firm is a sole proprietorship; 0 otherwise	BEEPS	0/1
Privatized	Dummy=1 if firm is a former state enterprises that was subsequently privatized; 0 otherwise	BEEPS	0/1
Exporter	Dummy=1 if part or all of the firm's production is exported; 0 otherwise	BEEPS	0/1
Subsidized	Dummy=1 if over the last three years the firm received any subsidies from a local or national government or the EU; 0 otherwise	BEEPS	0/1
Competition	Dummy=1 if firm judges competitive pressure to be fairly severe, sever, or very severe; 0 otherwise	BEEPS	0/1
Employees (log)	Log of the number of permanent, full-time employees of the firm at end of last fiscal year	BEEPS	-
Age (log)	Log of the firm age in years	BEEPS	-
External funding	Dummy =1 if firm is state-owned, foreign-owned, and/or has publicly traded shares; 0 otherwise	BEEPS	0/1
Audited	Dummy =1 if the financial statements of the firm are audited by an external auditor; 0 otherwise	BEEPS	0/1
Asset tangibility	Dummy= 1 if the firm is in an industry with an above-median fraction of assets represented by net property, plant and equipment for US firms in the same industry during 1980–89; 0 otherwise	Aghion and Kharrubi (2013)	0/1
Locality-level variables			
Share relationship banks	No. branches of relationship banks/total no. bank branches in the locality. Relationship banks are those banks for whom relationship lending is a "Very important" lending technique	BEPS	Share
Share foreign banks	No. branches of foreign-owned banks/total no. bank branches in the locality	BEPS	Share
HHI	Locality-level Herfindahl-Hirschmann Index. Market shares measured by branches.	BEPS	Share
Lerner index	Locality-level Lerner index. Branch-weighted average of Lerner index as estimated for each bank	BankScope/BEPS	Share
Country GDP growth	Real GDP growth in a country	IMF	%
Regional GDP growth	Real growth GDP in a region	National sources	%
Bank health	Share of banks in a locality with a tier 1 ratio above the 2007 country mean (branch weighted)	BankScope/BEPS	Share
Tier 1	Average tier 1 capital ratio of banks in a locality (branch weighted)	BankScope/BEPS	Share
Wholesale funding	Average wholesale funding (gross loans/customer funding ratio) of banks in a locality (branch weighted)	BankScope/BEPS	Share
Capital	Dummy= 1 if locality is the capital of the country; 0 otherwise	BEPS	0/1
City	Dummy= 1 if locality has between 50,000 and 1 million inhabitants; 0 otherwise	BEPS	0/1
Local distance (log)	Average km distance (log) between the branches of relationship banks in a locality and their local HQ (branch weighted)	BEPS	-
Parent distance (log)	Average km distance (log) between the branches of relationship banks in a locality and their HQ, which is the local HQ for domestic banks and the parent (home-country) HQ for foreign banks (branch weighted)	Claessens and Van Horen (2014)/BEPS	-
Hierarchical distance	No. branches of relationship banks where only one hierarchical layer is involved in the approval of SME credit loans/total no. bank branches in the locality	BEPS	Share

Figure A1
Panel A. Regional Distribution of Bank Branches

This map plots the geographical localities of all bank branches in our dataset (2009). Each dot indicates a locality that contains at least one bank branch. Source: BEPS II survey.
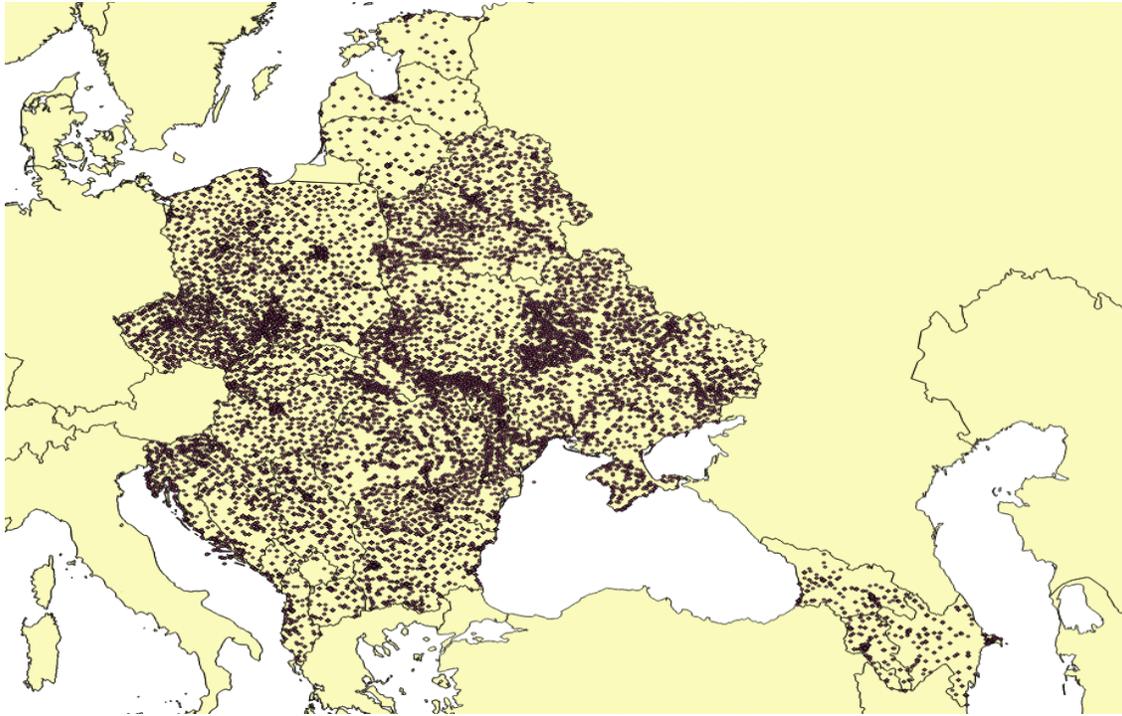
Panel B. Regional Distribution of Bank Branches and Firms

This map plots the geographical localities of all bank branches (2009, green dots) and firms (2009, red dots) in our dataset . Source: BEPS II (banks) and BEEPS 2008-09 surveys.