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When Arm's Length Is Too Far. Relationship Banking over the Business Cycle

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Relationship Banking over the Business Cycle*

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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. For 21 countries we link the lending techniques that banks use in the direct vicinity of firms to these firms' credit constraints at two contrasting points of the business cycle. 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 were among the most affected firms when the credit cycle turned (Ongena, Peydró and Van Horen, 2013). As credit-constrained SMEs may delay the long-awaited economic recovery, SME finance has topped the policy agenda around the world. 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 et al., 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. Several 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] Some bankers also concede that the screening of loan applicants became more challenging when the credit cycle turned. Loan officers can now rely less

[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).

on collateral and hard information and instead need to take a deeper view of firms' prospects. This requires a more subtle judgment and 'softer' information, such as about the ability and commitment of firm owners and management (IIF, 2013). Not all banks may be equally equipped to produce such judgments during an economic downturn.

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 cull 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. Unlike previous papers, we explore variation in the importance of banks' lending techniques across the business and credit cycle.

Relationship lending—banks repeatedly interacting with clients to obtain and exploit proprietary borrower information (Boot, 2000)—has long 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 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; Uchida, Udell and Yamori, 2012).

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 SME

lending technique (Berger and Udell, 2006). Using transaction lending techniques that address problems of informational opacity—such as credit scoring, asset-based lending, and factoring—banks may assess repayment prospects even when informative financial statements are unavailable (e.g. Frame, Srinivasan, and Woosley, 2001).

Cross-country and country-specific evidence shows that banks can use both methods to reach out to smaller firms (De la Torre, Martinez Peria and Schmukler, 2010; Beck, Demirgüc-Kunt and Martinez Peria, 2011). However, this research is cross-sectional and therefore cannot examine possible variation in the effectiveness of these lending techniques at various stages of the business cycle. In contrast, recent work by Bolton, Freixas, Gambacorta and Mistrulli (2013, henceforth BFGM) 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

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

peak and the trough of the credit cycle. To identify relationship and transaction banks we 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 Banking 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 capture with a high degree of accuracy 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. This unique and detailed dataset also 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. This result holds when we employ a range of robustness tests and ways to address endogeneity. For 2008, we find that the impact of relationship banking on relaxing credit constraints is stronger for young, small, and non-exporting firms, firms with no other sources of external finance, and firms that lack tangible assets. This holds after controlling for bank ownership and bank health in the vicinity of the firm and for an array of firm characteristics. We also document 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. We interpret our findings as consistent with the hypothesis that relationship lending can be critical for alleviating 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 the bank-firm relationship or the distance between bank and firm. We, instead, elicit information from structured face-to-face interviews with the bank 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 technology. We test the robustness of our findings to alternative computations of this measure. 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, at least not in the region we study.

Second, unlike credit-registry data, our firm survey data contain information about both borrowing and non-borrowing firms, with the latter 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. It also provides us the possibility to gauge the sensitivity of the relationship between banks' lending models and firms' financing constraints to different macroeconomic situations.

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 bank's informational advantage allows it to enforce improved continuation or liquidation decisions. BFGM model the firm's optimal mix of transaction and relationship banking as a function of its 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.

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. We contribute to this literature by documenting firms' benefits from relationship lending over the credit cycle.

In doing so, we also link to work on the cyclicality of banks' credit supply. Rajan (1994) shows that if banks focus excessively on short-term outcomes, they may exacerbate credit contractions by not funding some profitable projects. Ruckes (2004)

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

provides a theoretical model to explain the fluctuation of bank credit policies over the business cycle. Because the proportion of creditworthy firms declines during recessions, banks need relatively precise information to identify these good borrowers. If such information is unavailable, banks base their decisions on general economic conditions rather than individual borrower assessments, and lend less. Our results suggest that banks with different lending techniques also differ in their ability to generate useful screening and monitoring information and hence to continue lending during a downturn.

Lastly, 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 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, Demirgüc-Kunt and Maksimovic, 2005) or combine information on actual financing patterns with demand for external finance (Beck, Demirgüc-Kunt and Maksimovic, 2008; Brown et al. 2011; Popov and Udell, 2012). Our paper falls into the latter category. Unlike previous papers, we relate firms' financing constraints to banks' business models at different points in the business and credit cycle.

We proceed as follows. The next section briefly documents the credit boom and bust in the region we study to set the stage for our empirical tests. Section 3 describes the data sources we combine, while Section 4 presents our identification strategy. Section 5 discusses our empirical results and Section 6 concludes.

2. Central and Eastern Europe through boom and bust

After the fall of the Berlin Wall, Central and Eastern Europe experienced a transformation of its banking systems in the 1990s and 2000s, partly driven by foreign bank entry but also by the building of the necessary institutions for market-based financial service provision. Perhaps the most important impact of foreign bank entry was the cutting of entrenched relationships between politically connected enterprises and the banking system (Berglöf and Roland, 1997). Combined with a rapid increase in cross-border funding flows, as capital accounts were liberalized, this resulted in fast financial deepening throughout the region. Increases in aggregate financial depth indicators, such as private credit to GDP, were accompanied by a rising share of enterprises with access to banks for working and investment capital.

With the onset of the global financial crisis, these persistently high credit growth rates tumbled dramatically (Figure 1). While year-on-year credit growth amounted to between 35 and 40 percent per year over the period 2005-07, growth turned negative in 2009 and then stabilized around a nominal credit growth rate of just 5 per cent per year. This sharp change in macroeconomic conditions is also reflected in GDP growth, which dropped from an average 4.8 percent in 2008 to -4.2 percent in 2009.

[Insert Figure 1 here]

This dramatically different macroeconomic and credit environment in 2005 and 2008-09 thus provides the necessary contrast to compare firms' financing constraints in these two periods and to relate them to banks' business models. Yet, relating SMEs' financing

constraints to banks' business models over the credit cycle has broader implications beyond the specific region we look at. As discussed above, SMEs have been more negatively affected than both households and large enterprises during the recent crisis and this holds across Europe. A recent report points to the lack of appropriate information about SMEs and banks' disinvestments in front-end staff that interface directly with borrowers as critical challenges for banks in Western Europe (IIF, 2013).

3. Data

We now introduce the main datasets that we combine to gauge the impact of banks' business models on firms' financing constraints over the business cycle. Our identification rests on joining three important pieces of information: data on firms' credit constraints at different points in time; the geo-coordinates of the bank branches surrounding these firms; and—crucially—data on the lending techniques of these banks.

3.1. 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 over 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' 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 exact 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 industries, allowing us to use industry fixed effects in our regression framework. Stratification also yields more precise estimates.

We use two BEEPs waves: one conducted in 2005 (7.053 firms) and one in 2008-09 (7,047 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 (Figure 1).[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. The sampling for both BEEPS rounds was independent and based on separate draws.

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 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

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

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 70% of all sample firms in 2005 needed a loan, while 62% did in 2008. 34% of firms were financially constrained in 2005, while 40% were constrained in 2008, pointing to a substantial tightening of financing constraints in 2008. Given that both demand declined and constraints increased between 2005 and 2008, it is important to differentiate between both. Behind these averages lies substantial variation across and within countries (Table 2). While 12% of firms in Slovenia were financially constrained in 2005 and 17% in 2008-09, 64% of firms in Azerbaijan were financially constrained in 2005 and 78% in 2008-09. The variation over time also differs considerably across countries. While the share of financially constrained firms dropped in Belarus from 45% to 34% between 2005 and 2008-09, it increased from 28% to 50% in Latvia.

[Insert Tables 1 and 2 here]

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 a *former state-owned enterprise*; is an *Exporter*; and whether a firm's financial statements are *Audited* by an external auditor. We expect that larger, publicly listed, and audited firms—all transparency proxies that should be inversely related to information asymmetries—face less credit constraints. 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. In some of our analysis, we use additional firm characteristics that we will discuss below.

3.2. 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. For all countries we collected both

contemporaneous and historical information on branch locations, the latter going back to 1995. This allows us to paint a (gradually changing) picture of the branching landscape in each year over the period 1995-2011. Changes over time reflect branch closures and openings, either incrementally by existing banks or in step-wise fashion when banks entered or exited the market.

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 Brno, the second largest city of the Czech Republic, 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

[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.

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) branches. This reflects that most of the localities in our dataset are relatively large towns and cities. For instance, 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.

3.3. 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

[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). The median Belgian SME borrower in Degryse and Ongena (2005) is located 2.5 kilometers from the lending bank's branch.

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

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 the 21 sample countries.

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) of some importance 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. Question Q6 does not refer to a specific date as Fahlenbrach, Prilmeier and Stulz (2012) have shown that bank business models hardly change over time. We nevertheless inquired with a set of CEOs and they confirmed that "these things do not change".[9] Finally, as a robustness test (discussed in Section 5.2), we limit our analysis to banks that were not involved in a merger or acquisition and our results continue to hold.

Interestingly, relationship banking is prevalent among both domestic and foreign banks. Indeed, while 51% of the domestic banks identify themselves as relationship

[9] Additional data from the BEPS survey back up this assertion. We asked CEOs to rate, for 2007 and 2011, the importance of (i) training bank staff and (ii) introducing new IT technologies. Both activities may be related to changes in lending techniques. The survey answers reveal no strong shift in the prevalence of these activities over time. When we distinguish between relationship and transactional banks, we find that this holds for both bank types. This gives us further confidence that lending techniques are stable over time.

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.[10]

We further compare balance sheet and branching characteristics of relationship and transaction banks but do not find significant differences (and therefore do not tabulate them). Within the group of domestic banks, those with above-median levels of wholesale funding are less likely to be relationship lenders (p-value: 0.11). Banks with more extensive branch networks are more likely to be relationship lenders, both among domestic (p-value: 0.22) and foreign banks (p-value: 0.20). Foreign banks that are smaller in terms of total assets are also a bit more likely to be relationship lenders (p-value: 0.22).

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 53% in 2005 and 50% in 2008-09. This share, however, varied significantly across countries, from 90% in the Czech Republic to 19% in Georgia (Table 2, 2008-09). 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

[10] Likewise, recent evidence from the U.S. shows that small opaque firms are as likely to have small, local banks as their relationship bank as large, multimarket banks (Berger, Goulding, and Rice, 2014).

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 2 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 2 here]

Analogously to our definition of the locality-level relationship banking variable (*Share Relationship Banks)*, 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)), the average use of wholesale funding of these banks (gross loans to customer funding ratio) (*Wholesale funding*), and the share of foreign-owned banks (*Share foreign 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. As mentioned before, the dichotomy of relationship vs. transaction 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 to prevent this variable from confounding our estimates of the impact of local relationship lending.

4. Methodology

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 2008-09 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:

$$Y_{ijkl} = \beta_1 X_{ijkl} + \beta_2 L_{jk} + \beta_3 Share\ Relationsh\ ipBank_{jk} + \beta_4 C_k + \beta_5 I_l + \varepsilon_{ijkl} \quad (1)$$

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 to wipe out (un)observable variation at these aggregation levels. We cluster error terms at the country-level, thus allowing for errors to be correlated across firms within a country reflecting possible country-specific unobserved shocks.

Our main independent variable of interest is $Share\ Relationsh\ ipBank_{jk}$, the share of bank branches in locality *j* of country *k* that belong to 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. Since in our sample a firm's credit constraint is only observable if the firm expresses the need for a loan, we follow Popov and Udell (2012) and Hainz and Nabokin (2013) and rely on additional variables that are excluded from Equation (1) for the identification of the model. Specifically, 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.[11] All else equal, firms will then demand more external funding. A firm's application for a subsidy may also signal that it is in need of external funding.

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

5. Empirical results

5.1. Baseline results

We start our empirical analysis by summarizing in Table 3 the results of our Heckman selection equation. 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 covariates (unreported). We also include *Share Relationship banks*, our key locality-level variable that we 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 2008-09, 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 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 2008-09—when the credit cycle had turned. For each period we present two probit regressions (at the locality level and with different sets of control variables) and then three equivalent second-stage

Heckman regressions (at the level of the firm locality or the 5 (10) km circle around the firm). 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 2008-09. 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 26 percentage points (column [8]). These findings are large given that 48 percent of firms report to be constrained in 2008-09. Our results 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.[12]

Several of the control variables enter significantly and with coefficient signs consistent with the literature. Compared to medium-sized firms, small (large) firms are

[12] 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). Data source: Yale University G-Econ Project.

more (less) likely to be financially constrained. Exporters and audited firms are 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. Similarly, sole proprietorships were significantly more constrained during 2008-09 but not during 2005.

Few of the locality-level control variables enter significantly. In line with Popov and Udell (2012), we find that firms in localities with branches of less solvent banks (lower Tier 1 ratio) experience tighter credit constraints in 2008-09, though the coefficients never enter significantly at the 5% level. We also control for the local share of foreign-owned banks and the average reliance of local banks on wholesale funding. 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.

5.2. Robustness tests

Table 5 presents 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 no impact in 2005 but a strong impact of relationship lending in 2008. While clustering by locality is appealing in principle, there are many localities with just

one firm. In those cases locality clustering amounts to not clustering the standard errors at all so that country-level clustering is actually the more conservative approach.

In columns 3 through 6 we then add two additional 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. In unreported regressions we also control for the number of bank branches in the locality. This does not influence the statistical or economic significance of our results either.

In column 7 we pool the 2005 and 2008-09 observations and include an interaction term between the share of relationship lenders and a 2008-09 dummy. This allows us to test directly whether the impact of relationship lending increases significantly during a cyclical downturn. The insignificant coefficient on the share of relationship lenders and the statistically significant negative coefficient for the interaction term confirm that the impact of the local presence of relationship lenders is indeed limited to the downturn.[13]

Next, we assess the robustness of our findings to alternative indicators of relationship lending. In columns 8 and 9 we use each bank's score (on a five-point scale) to the question how important relationship banking is for SME lending and take the branch-weighted average by locality: *Share Relationship Banks (continuous)*. The average score was relatively stable between 2005 and 2008-09 at 3.39 and 3.38, respectively. Our

[13] While the 2005 and 2008-09 waves of the BEEPS survey contain some firms that were interviewed in both waves, this sub-sample is too small to obtain sensible coefficient estimates.

findings are confirmed: the share of relationship lenders enters negatively and significantly in 2008-09 but positively and insignificantly in 2005. In columns 10 and 11, we use a relative measure of the local importance of relationship lending. We divide each bank's score for relationship lending by the score for fundamentals-based and cash-flow lending: *Share Relationship Banks (relative).* This relative indicator of relationship lending averaged 0.93 in both 2005 and 2008-09. It again enters negatively and significantly (at the 10 percent level) in 2008-09 but not in 2005.

[Insert Table 5 here]

In columns 12 and 13, we re-estimate our regressions with a linear probability (OLS) rather than probit model and confirm our findings. In columns 14-15 we drop the largest country in our sample, Ukraine, to make sure our findings are not driven by this single country. Again, we confirm our findings.

In unreported regressions, we also split the sample between EU and non-EU countries and, alternatively, ran a specification where we interact our relationship banking variable with an EU-country dummy. We find that the impact of the local presence of relationship lenders is equally strong in both country groups. This suggests that the protective impact of relationship lending operates independently of the level of economic development, adding to the external validity of our results.

Finally, in column 16-17, we exclude banks that experienced an ownership change during our sample period when computing *Share Relationship Banks*. We confirm our

findings for this group of banks whose lending techniques have arguable been the most stable over time (cf. Section 3.3).

5.3. Addressing endogeneity

We next gauge whether our findings may to some extent be driven by endogeneity. The insignificant coefficient of the share of relationship lenders in the loan demand regressions of Table 3 is reassuring. It suggests that relationship lenders did not select into localities with a higher demand for external finance during 2005 or 2008-09. However, we cannot exclude the possibility that new firms located into localities with a higher share of relationship lenders to secure funding through the business cycle. We therefore re-run our regressions dropping firms that were established less than five years ago, less than ten years ago, or less than 12 years ago.[14] Columns 1 through 6 of Table 6 report our results. Our findings are confirmed, with the share of relationship lenders entering positively and insignificantly for the 2005 regressions and negatively and significantly for the 2008-09 ones.

The regressions in columns 7 to 10 show the robustness of our findings by replacing the *current* branch-weighted share of relationship lenders with the *historical* branch-weighted share of relationship lenders in either 1995 or 2000. Using the lagged value of relationship lenders in a locality reduces the risk that our findings are driven by relationship lenders entering localities to serve firms with a higher need for external finance. This exercise confirms our previous findings of a positive and insignificant relationship in 2005 and a negative and significant relationship in 2008. In unreported

[14] The median age of firms in our sample is 12 years.

robustness tests, we also instrument the shares of relationship lenders in 2005 and 2008 with the share of relationship lenders in 1995 and again confirm our findings.

[Insert Table 6 here]

To further mitigate endogeneity concerns, we ran an (unreported) locality-level regression where the *dependent* variable is *Share relationship banks* in 2008. We then assess to what extent a battery of locality-level characteristics of the local firm population can explain the presence of relationship banks. We also include country and industry fixed effects. If the local presence of relationship lenders would to a large extent be driven by the composition of the business sector in a specific locality, then we should find significant relationships between our firm characteristics averaged at the locality level and the share of relationship lenders, the dependent variable. However, we do not find any significant relationship between, on the one hand, the share of small firms, the share of large firms, the share of sole proprietorships, the share of privatized firms, the share of exporters, or the share of audited firms and, on the other hand, the relative presence of relationship lenders. We only find a marginally significant positive relationship, at the 10% level, between the share of publicly listed firms and the share of relationship lenders. When we conduct an F-test for the joint significance of these locality-level firm characteristics, we cannot reject the null of no systematic relationship between firm characteristics and the presence of relationship lenders (p-value: 0.25). We conclude that the presence of relationship lenders in a specific locality appears to be unrelated to a large set of observable locality characteristics.

Lastly, we follow Altonji, Elder, and Taber (2005) and Bellows and Miguel (2009) to gauge the relative importance of possible omitted variable bias. Intuitively, what we do is to analyze how the coefficient for *Share Relationship Banks* changes once we include our rich set of firm-level and locality-level covariates. If this change is substantial, then it is more likely that adding more (currently unobservable) covariates would further reduce the estimated impacts. In contrast, if coefficients turn out to be stable when adding controls, then we can be more confident when interpreting our coefficient in a causal sense. We measure coefficient stability by calculating the ratio between the value of the coefficient in the regression including controls (numerator) and the difference between this coefficient and the one derived from a regression without covariates (denominator). This ratio shows how strong the covariance between the unobserved factors explaining firms' credit constraints and the local share of relationship banks needs to be, relative to the covariance between observable factors and the share of relationship lenders, to explain away the entire effect we find.

This ratio amounts to -4.39 and -35 for the specifications in columns 8 (Heckman) and 7 (probit) of Table 3, respectively. This suggests that to explain the full effect of the local presence of relationship lenders, the covariance between unobserved factors and the share of relationship banks needs to be more than 4 times as high as the covariance of the included controls.[15] The negative sign reflects that the coefficient for the share of relationship lenders actually slightly *increases* when we add our covariates, suggesting that our estimates somewhat underestimate the true causal effect. We conclude that it is

[15] By way of comparison, Altonji et al. (2005) estimate a ratio of 3.55 which they interpret as evidence that unobservables are unlikely to explain the entire effect they document.

unlikely that unobserved heterogeneity can completely explain away the protective impact of local relationship lending that we document.

5.4. Firm heterogeneity

Theory predicts that relationship-based lending is especially important for smaller and relatively opaque firms. In Table 7 we therefore 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; the age of the firm; its exporter status; a dummy variable indicating whether a firm is audited; a dummy that indicates whether a firm is likely to have access to 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.[16] Descriptive statistics for all variables are reported in Table 1 and definitions and sources in Appendix Table A1. 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 almost 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 access to non-bank external funding, non-listed firms, and

[16] *Asset tangibility* indicates whether the firm is part of an industry that is characterized by relatively high (above median) levels of tangible assets (properties, plans and equipment).

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 literature that shows that relationship lending is more important for smaller, younger and non-exporting firms, firms with less transparent financial statements and those with less access to public external funding. In unreported specifications, we also include locality fixed effects (but drop industry effects). While *Share Relationship Banks* becomes encompassed by these locality effects, the coefficients on the interaction terms of *Share Relationship Banks* and our firm characteristics in 2008 are qualitatively similar to the ones reported in Table 7 (with *Employees*, *External funding* and *Publicly listed* statistically different from zero).

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 2008-09 was 36 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 7 here]

In short, smaller, younger and more opaque firms with less collateral to pledge faced more constraints in accessing credit during the credit crunch and we observe that these firms became especially constrained in localities where relationship lenders are few and far between. We note that the significant interaction effects in 2008 also further reduce

endogeneity concerns and suggest that our base specification indeed picks up a causal effect of the local prevalence of relationship lending on access to credit.

5.5. Relationship banking and regional business cycle variation

The effect of relationship lending might not only vary across firms with different characteristics but also with the macroeconomic environment in which they operate. In Table 8 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, exploiting new data on regional growth patterns.[17]

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 level where available and at the country level in the other cases. 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.

The results in Table 8 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. With the exception of column (1), the interaction terms of the share of relationship lenders with economic growth enter positively and significantly,

[17] 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.

suggesting that firms in areas with stronger negative growth benefitted more in terms of lower financing constraints if the share of relationship lenders was higher in 2008. Relationship lending is thus especially important in more adverse macroeconomic environments.

[Insert Table 8 here]

6. Conclusions

We collect for 21 countries information on the bank branches active in the direct vicinity of a large sample of surveyed firms. Furthermore, using information provided by CEOs of these banks themselves, we are able to determine whether the banks in the vicinity of each firm are either relationship or transaction lenders. Using these unique data, we examine the impact of relationship lending on firms' credit constraints at different points in the business cycle.

We find evidence that the importance of lending techniques for firms' financing constraints varies strongly across the business cycle. 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, younger and more opaque firms with less collateral to pledge. This credit constraint easing effect of relationship lenders is especially prominent in adverse macroeconomic environments and holds across countries at different stages of economic development. 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 (Chodorow-Reich, 2014). The effect of a financial crisis on the real economy would therefore 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 or have easier access to "Funding for Lending" type programs.

Supporting the collection of the necessary 'hard' information about SMEs through credit registries and thus incentivizing banks to invest more in generating 'soft' information themselves is another important policy message supported by our findings. Relatedly, our results also warn against an excessive short-term focus of banks, and their shareholders, on reducing costs by laying off loan officers and other frontline staff. In the medium term, and especially when an economic boom turns to bust, such cuts may negatively affect banks' ability to continue to distinguish between firms with and without adequate growth prospects.

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Figure 1
The Credit Cycle Across Emerging Europe

This figure shows annual nominal credit growth (%) across emerging Europe over the period 2005-13. The bars and line indicate total and corporate credit growth, respectively. Growth rates are based on the difference in end-year credit stocks. Source: CEIC.

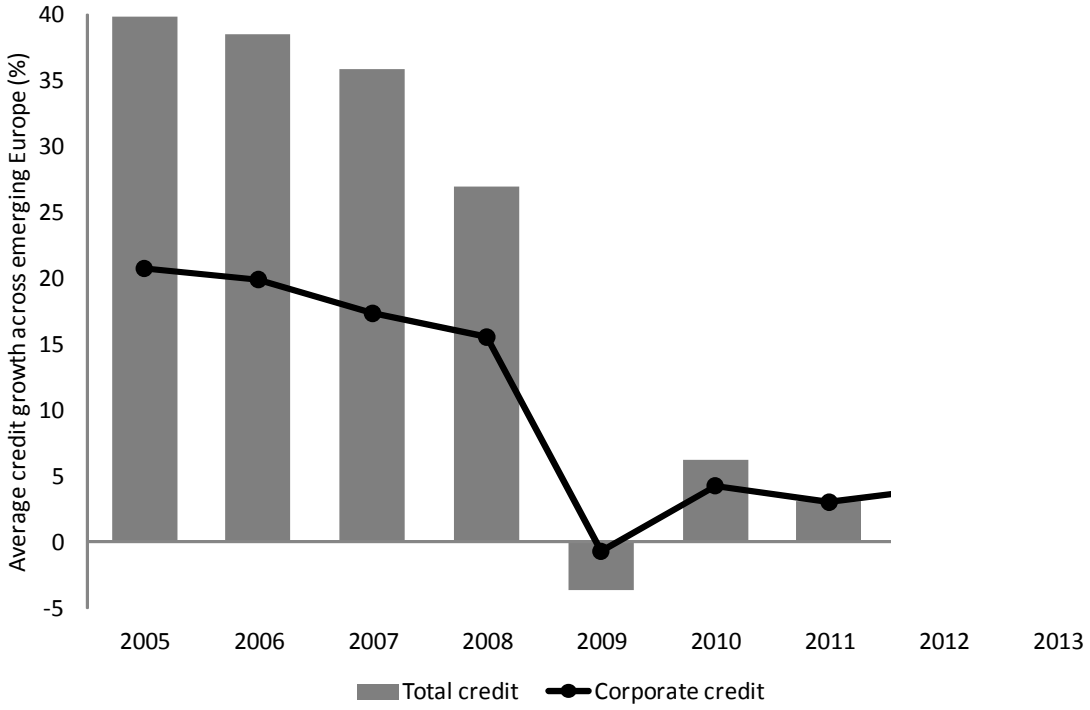


Figure 2
Regional Variation in Relationship Banking

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.

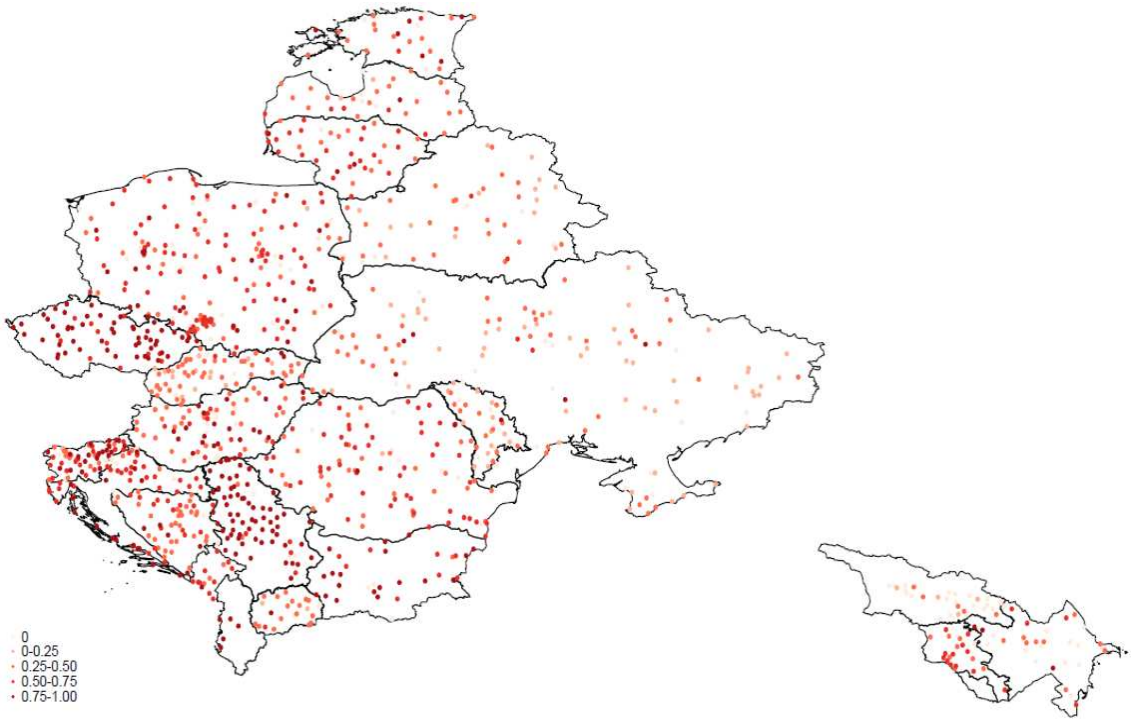


Table 1
Summary Statistics

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 Appendix Table A1.

	2005						2008-09					
	N	Mean	Median	Sd	Min	Max	N	Mean	Median	Sd	Min	Max
Firm-level variables												
Loan needed	7,053	0.70	1	0.46	0	1	7,047	0.62	1	0.48	0	1
Constrained	4,909	0.34	0	0.48	0	1	4,382	0.40	0	0.49	0	1
Small firm (< 20 employees)	7,053	0.55	1	0.50	0	1	7,045	0.42	0	0.49	0	1
Large firm (> 100 employees)	7,053	0.18	0	0.38	0	1	7,045	0.25	0	0.43	0	1
Publicly listed	7,053	0.02	0	0.14	0	1	7,111	0.12	0	0.32	0	1
Sole proprietorship	7,053	0.36	0	0.48	0	1	7,111	0.18	0	0.38	0	1
Privatized	7,053	0.12	0	0.33	0	1	7,111	0.18	0	0.38	0	1
Exporter	7,053	0.27	0	0.45	0	1	7,111	0.28	0	0.45	0	1
Subsidized	7,053	0.09	0	0.29	0	1	7,111	0.09	0	0.29	0	1
Competition	7,053	0.88	1	0.32	0	1	7,111	0.77	1	0.42	0	1
Employees (log)	7,053	3.09	2.77	1.57	1.10	9.16	7,045	3.51	3.30	1.39	0	9.81
Age (log)	7,045	2.45	2.40	0.74	1.39	5.19	6,972	2.54	2.56	0.70	0	5.21
External funding	7,053	0.21	0	0.40	0	1	7,111	0.22	0	0.41	0	1
Audited	6,881	0.47	0	0.50	0	1	6,922	0.46	0	0.50	0	1
Asset tangibility	2,834	0.46	0	0.50	0	1	2,686	0.51	1	0.50	0	1
Locality-level variables												
Share Relationship Banks	6,706	0.53	0.57	0.27	0	1	7,025	0.50	0.50	0.23	0	1
Share foreign banks	7,053	0.52	0.59	0.31	0	1	7,111	0.58	0.64	0.28	0	1
Tier 1	6,898	11.96	9.58	5.59	6.5	41.3	6,962	10.68	9.13	3.86	5.51	41.4
Wholesale funding	7,016	111.94	113.81	30.77	23.94	243.79	7,098	130.93	120.65	40.75	51.10	495.88
Capital	7,053	0.34	0	0.47	0	1	7,111	0.32	0	0.46	0	1
City	7,053	0.43	0	0.50	0	1	7,111	0.37	0	0.48	0	1
HHI	7,053	0.22	0.16	0.18	0.06	1	7,111	0.18	0.13	0.18	0.05	1
Lerner	6,989	0.40	0.41	0.06	0.14	0.73	7,094	0.40	0.40	0.05	0.17	0.65
Share Relationship Banks (continuous)	6,706	3.39	3.50	0.45	2.00	4.00	7,025	3.38	3.44	0.36	2.00	4.00
Share Relationship Banks (relative)	6,706	0.93	0.94	0.15	0.50	4.00	7,025	0.93	0.93	0.12	0.50	2.50
Share Relationship Banks (1995)	6,000	0.58	0.62	0.31	0.00	1.00	5,987	0.53	0.50	0.32	0.00	1.00
Share Relationship Banks (2000)	6,133	0.55	0.55	0.29	0.00	1.00	6,318	0.48	0.49	0.30	0.00	1.00

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	2008-09	2005	2008-09	2005	2008-09
Albania	0.67	0.43	0.29	0.36	0.92	0.83
Armenia	0.74	0.59	0.32	0.35	0.35	0.46
Azerbaijan	0.52	0.55	0.64	0.78	0.36	0.45
Belarus	0.79	0.75	0.45	0.34	0.26	0.27
Bosnia	0.75	0.78	0.20	0.36	0.59	0.56
Bulgaria	0.67	0.58	0.35	0.48	0.84	0.77
Croatia	0.78	0.64	0.13	0.36	0.74	0.71
Czech Republic	0.55	0.52	0.41	0.30	1.00	0.90
Estonia	0.60	0.54	0.23	0.25	0.57	0.53
Georgia	0.62	0.64	0.36	0.36	0.18	0.19
Hungary	0.78	0.41	0.28	0.32	0.60	0.58
Latvia	0.70	0.59	0.28	0.50	0.49	0.45
Lithuania	0.71	0.60	0.29	0.22	0.61	0.59
Macedonia	0.67	0.60	0.55	0.49	0.40	0.39
Moldova	0.79	0.71	0.31	0.41	0.27	0.28
Poland	0.68	0.54	0.45	0.38	0.60	0.59
Romania	0.72	0.63	0.31	0.29	0.58	0.55
Serbia	0.76	0.77	0.37	0.38	0.81	0.79
Slovak Republic	0.61	0.54	0.21	0.38	0.27	0.31
Slovenia	0.72	0.64	0.12	0.17	0.67	0.64
Ukraine	0.69	0.68	0.37	0.51	0.11	0.27

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 (2008-09). The first (last) three columns show 2005 (2008-09) 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 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 and locality covariates are the same as those included in Table 4.

	2005			**2008-09**		
	Locality	5 km	10 km	Locality	5 km	10 km
	[1]	[2]	[3]	[4]	[5]	[6]
Share Relationship Banks	-0.082	0.024	0.028	0.046	0.051	0.089
	(0.157)	(0.141)	(0.163)	(0.139)	(0.122)	(0.138)
Competition	0.317***	0.309***	0.311***	0.250***	0.246***	0.239***
	(0.045)	(0.044)	(0.042)	(0.043)	(0.041)	(0.042)
Subsidized	0.264***	0.278***	0.266***	0.297***	0.294***	0.288***
	(0.084)	(0.083)	(0.084)	(0.086)	(0.086)	(0.081)
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.	6,451	6,739	6,631	6,616	6,670	6,821
Pseudo R2	0.052	0.052	0.052	0.054	0.055	0.054

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 bank credit during the credit boom (2005) and the credit crunch (2008-09). The first (last) five columns show 2005 (2008-09) 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 the 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					**2008-09**				
	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	0.017	0.191	0.169	0.240	0.159	-0.431***	-0.470***	-0.439***	-0.427***	-0.403**
	(0.246)	(0.270)	(0.244)	(0.200)	(0.202)	(0.134)	(0.152)	(0.156)	(0.162)	(0.182)
Small firm (<20 empl)	0.482***	0.503***	0.449***	0.431***	0.456***	0.370***	0.373***	0.351***	0.335***	0.348***
	(0.045)	(0.050)	(0.080)	(0.075)	(0.079)	(0.051)	(0.051)	(0.057)	(0.064)	(0.071)
Large firm (>100 empl)	-0.326***	-0.297***	-0.286***	-0.313***	-0.300***	-0.272***	-0.271***	-0.232***	-0.226***	-0.221**
	(0.095)	(0.096)	(0.088)	(0.087)	(0.087)	(0.043)	(0.046)	(0.066)	(0.080)	(0.087)
Publicly listed	-0.169	-0.174	-0.143	-0.150	-0.152	0.237***	0.244***	0.229***	0.222***	0.209***
	(0.167)	(0.166)	(0.154)	(0.148)	(0.155)	(0.072)	(0.073)	(0.070)	(0.067)	(0.067)
Sole proprietorship	0.063	0.075	0.098	0.076	0.085	0.114**	0.124**	0.126**	0.135**	0.116**
	(0.069)	(0.064)	(0.062)	(0.064)	(0.066)	(0.053)	(0.052)	(0.058)	(0.058)	(0.056)
Privatized	-0.032	0.013	0.025	0.011	0.014	0.086	0.103	0.114	0.127*	0.130*
	(0.057)	(0.059)	(0.061)	(0.057)	(0.058)	(0.080)	(0.081)	(0.078)	(0.077)	(0.075)
Exporter	-0.249***	-0.258***	-0.224***	-0.232***	-0.239***	-0.201***	-0.202***	-0.184***	-0.170**	-0.171**
	(0.054)	(0.056)	(0.067)	(0.062)	(0.064)	(0.056)	(0.055)	(0.063)	(0.067)	(0.069)
Audited	-0.252***	-0.275***	-0.260***	-0.279***	-0.264***	-0.215***	-0.217***	-0.200***	-0.181***	-0.170***
	(0.054)	(0.054)	(0.062)	(0.059)	(0.060)	(0.051)	(0.052)	(0.052)	(0.057)	(0.059)
Tier 1		-0.005	-0.003	-0.005	0.002		-0.017*	-0.017	-0.015	-0.019
		(0.009)	(0.010)	(0.010)	(0.011)		(0.011)	(0.012)	(0.011)	(0.015)
Share foreign banks		0.128	0.162	0.099	0.362		-0.106	-0.037	-0.064	0.127
		(0.345)	(0.324)	(0.331)	(0.323)		(0.254)	(0.264)	(0.261)	(0.312)
Wholesale funding		-0.000	-0.000	-0.001	0.000		-0.000	-0.001	-0.000	0.000
		(0.002)	(0.001)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
Capital		0.184**	0.152*	0.139*	0.158**		0.031	0.005	-0.017	-0.012
		(0.089)	(0.085)	(0.081)	(0.080)		(0.077)	(0.093)	(0.097)	(0.098)
City		-0.107*	-0.104*	-0.115***	-0.083		-0.040	-0.030	0.002	-0.004
		(0.058)	(0.053)	(0.042)	(0.058)		(0.057)	(0.059)	(0.052)	(0.056)
Inverse Mills' ratio			0.482	0.479	0.432			0.292	0.384	0.385
			(0.362)	(0.346)	(0.359)			(0.269)	(0.286)	(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.	4,610	4,527	4,527	4,693	4,651	4,105	4,077	4,085	4,121	4,208
Pseudo R2	0.13	0.13	0.13	0.13	0.13	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]-[17] 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 2005-08/09 sample. In columns [8]-[9] the main independent variable is a branch-weighted average of how banks in a locality rate the importance of relationship lending on a 5-point scale (ranging from 0 to 4). In columns [10]-[11] the main independent variable is a branch-weighted average of how banks in a locality rate the importance of relationship lending on a 5-point scale relative to their rating of fundamental/cash flow-based lending on a 5-point scale. Columns [12]-[13] show the results of a linear probability model. Columns [14]-[15] exclude all Ukrainian observations. Columns [16]-[17] exclude banks with ownership change in computing Share Relationship Banks. ***, **, * 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**	**Share Relationship Banks (continuous)**		**Share Relationship Banks (relative)**		**Linear probability model**		**Excluding Ukraine**		**Excluding banks with ownership change**	
	2005	2008-09	2005	2008-09	2005	2008-09	2005; 2008-09	2005	2008-09	2005	2008-09	2005	2008-09	2005	2008-09	2005	2008-09
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
Share Relationship Banks	0.169	-0.439***	0.182	-0.421***	0.182	-0.436***	0.174	0.089	-0.233**	-0.115	-0.520*	0.067	-0.152***	0.258	-0.471***	0.327*	-0.313*
	(0.212)	(0.155)	(0.259)	(0.149)	(0.263)	(0.157)	(0.252)	(0.153)	(0.116)	(0.268)	(0.279)	(0.084)	(0.054)	(0.228)	(0.173)	(0.198)	(0.184)
HHI			-0.167	0.348**													
			(0.141)	(0.153)													
Lerner index					-0.415	0.504											
					(0.846)	(1.084)											
Share Relationship Banks*2008-09							-0.607**										
							(0.284)										
Firm controls	Yes	Yes	Yes	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	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,527	4,085	4,527	4,085	4,519	4,084	8,612	4,527	4,085	4,527	4,085	4,527	4,085	4,138	3,545	4,527	4,085
Pseudo R2	0.132	0.099	0.132	0.100	0.132	0.099	0.119	0.131	0.098	0.131	0.098	0.146	0.118	0.136	0.098	0.132	0.099

Table 6
Relationship Banking and Credit Constraints: Endogeneity

This table shows alternative specifications of our baseline regressions in Table 4 to address possible endogeneity concerns. 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 country and shown in parentheses. Columns [1]-[2], [3-4], and [5-6] are based on samples that exclude firms younger than 5, 10, and 12 years, respectively (12 years is the median firm age in the total sample). In columns [7]-[8] and [9]-[10] the contemporaneous share of relationship banks in each locality is replaced by the historical share of these banks in 1995 and 2000, respectively. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

	Firms 5 years and older		**Firms 10 years and older**		**Firms 12 years and older**		**Share Relationship Banks (1995)**		**Share Relationship Banks (2000)**	
	2005	2008-09	2005	2008-09	2005	2008-09	2005	2008-09	2005	2008-09
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Share RelationshipBank	0.125	-0.478***	0.202	-0.390**	0.147	-0.464**	0.044	-0.346***	0.178	-0.299**
	(0.237)	(0.157)	(0.254)	(0.193)	(0.262)	(0.212)	(0.211)	(0.073)	(0.146)	(0.128)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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.	4,174	3,738	2,776	2,904	2,153	2,525	4,063	3,537	4,137	3,683
Pseudo R2	0.134	0.103	0.150	0.106	0.158	0.111	0.134	0.099	0.134	0.100

Table 7

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 (2008-09) differed across firm types. The first (last) eight columns show 2005 (2008-09) 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.

	2005							**2008-09**						
Firm type →	Employees	Age	Exporter	Audited	External funding	Publicly listed	Asset tangibility	Employees	Age	Exporter	Audited	External funding	Publicly listed	Asset tangibility
	[1]	[2]	[3]	[5]	[6]	[7]	[8]	[9]	[10]	[12]	[13]	[14]	[15]	[16]
Share Relationship Banks	0.055	0.089	0.148	0.296	0.102	0.173	-0.008	-1.040***	-1.065***	-0.572***	-0.598***	-0.532***	-0.535***	-0.431*
	(0.380)	(0.514)	(0.262)	(0.240)	(0.265)	(0.244)	(0.347)	(0.312)	(0.364)	(0.192)	(0.182)	(0.170)	(0.165)	(0.257)
Share Relationship Banks * Firm type	0.028	0.032	0.082	-0.278**	0.304	-0.233	-0.034	0.181**	0.244**	0.409*	0.333*	0.448***	0.594**	0.448**
	(0.070)	(0.165)	(0.295)	(0.138)	(0.270)	(0.579)	(0.243)	(0.078)	(0.123)	(0.219)	(0.188)	(0.167)	(0.250)	(0.205)
Firm type	-0.262***	0.088	-0.269*	-0.116	0.094	-0.002	-0.339**	-0.282***	-0.139*	-0.391***	-0.363***	-0.184**	-0.045	-0.372***
	(0.080)	(0.076)	(0.157)	(0.076)	(0.153)	(0.381)	(0.144)	(0.062)	(0.073)	(0.116)	(0.115)	(0.089)	(0.132)	(0.090)
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.	4,527	4,520	4,527	4,527	4,527	4,527	1,929	4,085	4,023	4,085	4,085	4,085	4,085	1,652
Pseudo R2	0.146	0.134	0.132	0.132	0.136	0.132	0.168	0.107	0.101	0.100	0.100	0.101	0.100	0.122

Table 8
Relationship Banking and Regional Business Cycle Variation

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	-0.324*	-0.400***	-0.546***	-0.631***	-0.362**	-0.444***
	(0.189)	(0.151)	(0.206)	(0.198)	(0.153)	(0.150)
Share Relationship Banks *Output growth 2008-09	1.869		2.510**		2.451**	
	(1.464)		(1.237)		(1.093)	
Share Relationship Banks *Output growth 2007-09		1.711**		1.151**		1.229**
		(0.863)		(0.576)		(0.481)
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.	4,085	4,085	3,099	3,099	4,085	4,085
Pseudo R2	0.099	0.099	0.095	0.093	0.101	0.100

Appendix

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

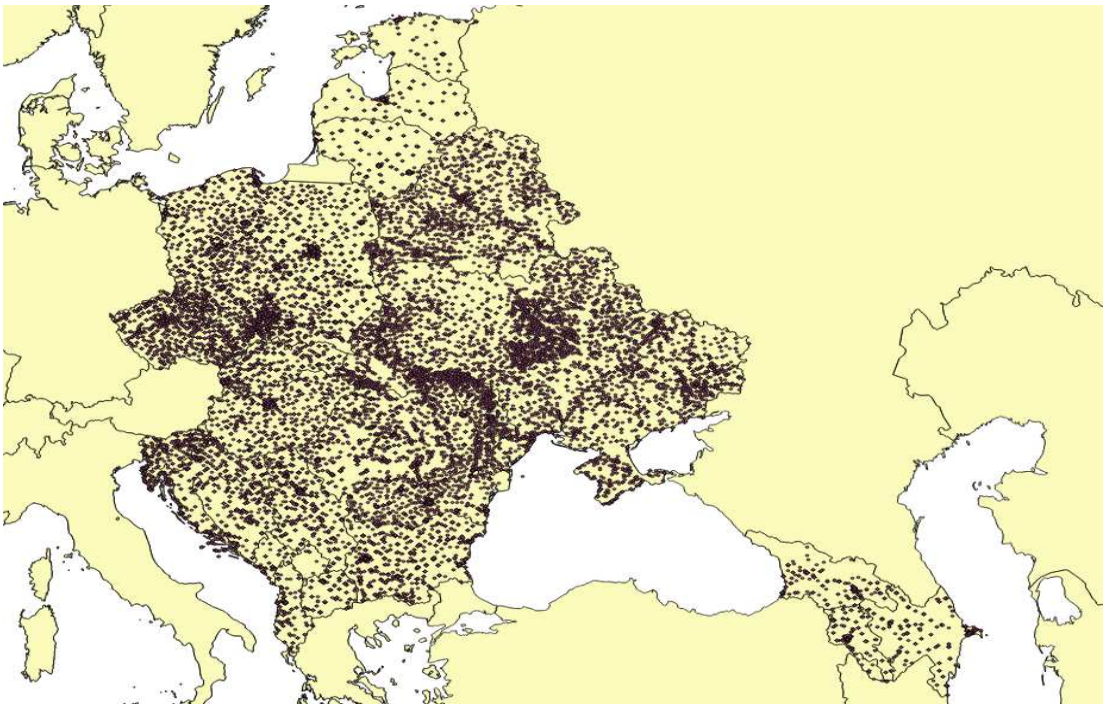
Table A1 (cont'd)
Variable Definitions and Sources

	Definition	Source	Unit
Share Relationship Banks (continuous)	Branch-weighted average of how banks in a locality rate the importance of relationship lending on a 5-point scale (ranging from 0 to 4)	BEPS	Share
Share Relationship Banks (relative)	Branch-weighted average of how banks in a locality rate the importance of relationship lending on a 5-point scale *relative* to their rating of the main alternative lending technique, fundamental/cash flow-based lending	BEPS	Share
Share Relationship Banks (1995)	No. branches of relationship banks/total no. bank branches in the locality in 1995. Relationship banks are those banks for whom relationship lending is a "Very important" lending technique	BEPS	Share
Share Relationship Banks (2000)	No. branches of relationship banks/total no. bank branches in the locality in 2000. Relationship banks are those banks for whom relationship lending is a "Very important" lending technique	BEPS	Share

Figure A1

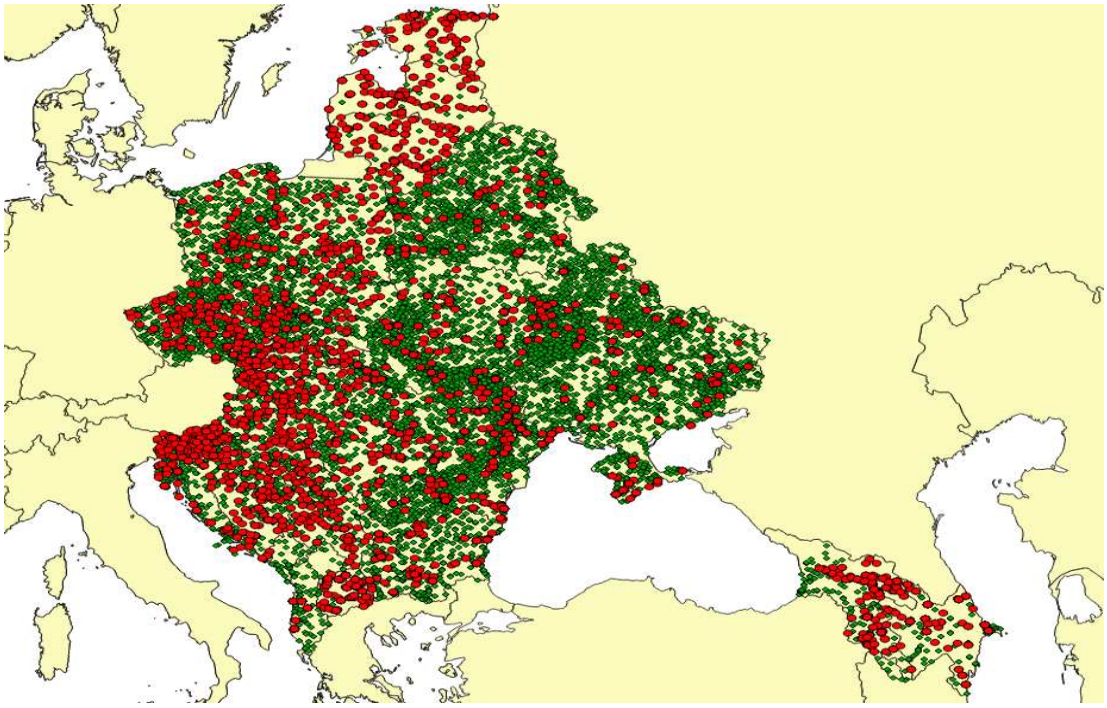
Panel A. Regional Distribution of Bank Branches

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.



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