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

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Keywords: Relationship banking, credit constraints, credit cycle

JEL codes: F36; G21; L26; O12; O16

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1. Introduction

In the aftermath of the global financial crisis, small and medium-sized enterprises (SMEs) were among the firms most affected by the turning credit cycle (Ongena, Peydró and Van Horen, 2013). As fears increased that credit-constrained SMEs could delay the long-awaited economic recovery (Chodorow-Reich, 2014), policy-makers increasingly focused their attention on initiatives to expand SME finance. For example, U.S. President Obama signed the Small Business Jobs Act, authorizing a program to boost small business credit. In the UK, the Bank of England launched a subsidized SME funding and guarantee scheme. The European Central Bank's recent targeted long-term refinancing operation (TLTRO) was intended to stimulate eurozone bank lending to SMEs in particular. Beyond short-term crisis responses, the question remains open on 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, Borio, Gambacorta, Jiménez and Trucharte, 2010 and Repullo, 2013).

This paper analyzes an as yet underexplored aspect, the role of banks' business models—in particular their use of relationship versus transaction lending—in determining the cyclicality of credit. We cull hitherto unavailable information on banks' main lending techniques from 397 face-to-face interviews with the "ultimate bank insiders": their CEOs. Using this novel dataset, we analyze to what extent the local presence of relationship versus transaction banks impacts firms' credit constraints at different stages of the credit cycle. 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 bank lending techniques across the credit and business cycle. Our analysis includes both borrowing firms and firms that were either rejected or discouraged from applying for a loan. Using firm-level survey data on the need for loans also allows us to control for demand-side effects and to isolate the supply-side effect of different lending techniques across the 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 with larger firms, SMEs—which are typically not publicly traded—are more opaque and less likely to be able to post collateral. These characteristics put a premium on private information at the core of the relationship between banks and SMEs. Such "soft" (unverifiable) information can be collected and updated through a long-term lending relationship (Petersen and Rajan, 1994, 1995; Berger and Udell, 1995; Stein, 2002; Uchida, Udell and Yamori, 2012). Relationship lenders may therefore be better positioned to reach out to SMEs given their advantage in screening and monitoring opaque borrowers.

Over the past 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 (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 credit cycle. Theory, however, suggests that relationship lenders may play a prominent role in the continuation of lending during crisis times. In particular, previous work suggests an (implicit) insurance role of relationship lenders against adverse macroeconomic conditions (e.g., Berger and Udell, 1992; Berlin and Mester, 1999; Preece and Mullineaux, 1996). In addition, theory suggests that relationship lenders can acquire valuable information over the course of the lending relationship that allows them to adapt lending conditionality under changing conditions (Rajan, 1992; von Thadden, 1995). Bolton, Freixas, Gambacorta and Mistrulli (2013) show that as relationship banks learn about the borrower over time, they can continue to lend on more

favorable terms to profitable firms when a crisis hits and, consequently, relax firms' credit constraints more in crisis times than transactional banks.

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 use a novel approach in which we employ information on bank lending techniques collected through face-to-face interviews with 397 bank CEOs as part of the EBRD's Banking Environment and Performance Survey (BEPS). We merge this information on the use of lending techniques with firm-level survey information on firms' financing constraints and with newly collected data on the geographic location of bank branches across 21 countries in Central and 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 credit 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 firms being credit constrained in 2008-09—when the credit cycle had turned—but not in 2005—during the credit boom. This holds after controlling for bank ownership and bank health in the vicinity of the firm and for an array of firm characteristics. This result is robust to a range of specification tests and ways to address endogeneity. For 2008-09, 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, i.e. firms that are more likely to be constrained in a credit cycle downturn. 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. Finally, we provide evidence that suggests that the local presence of relationship banks, and the associated alleviation of credit constraints, has a positive impact on firm growth in the aftermath of the global financial crisis and is not associated with evergreening of non-

performing loans. As such, 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 paper to link the share of relationship banks active in the vicinity of firms to these firms' credit constraints at different points of the credit cycle. Moreover, we are able to analyze these data in a cross-country context compared to previous country studies.[1] In doing so, we contribute in several important ways to the extant literature. 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 or breadth 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 using alternative computations of this measure.

Second, unlike studies using 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 us to paint a more complete picture of credit constraints among the business population at large and to focus on supply-side effects while controlling for credit-demand shifts. Including non-borrowing firms in our analysis is critical in the region we study where the majority of firms do not use bank funding. Third, using cross-country data

[1] Bolton et al. (2013) use data from the Italian credit registry from before and after the Lehman Brothers collapse, rely on the distance between the firm and the bank's headquarters as a gauge of the lending technique involved, and show that firms closer to their banks' headquarters were offered more favorable continuation lending terms and faced lower default rates. Sette and Gobbi (2014) use the same data source and find that longer bank-firm lending relationships resulted in more and cheaper credit after the collapse of Lehman Brothers. In a similar vein, Puri, Rocholl and Steffen (2011) show that German banks affected by the global financial crisis were more likely to continue to lend to existing retail clients than to grant credit to as yet unknown loan applicants.

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. Fourth, we also study whether the relaxing of firms' credit constraints during the cyclical downturn, due to local relationship lending, has an impact on firms' real outcomes. This provides important insights into the aggregate effects of different bank business models and allows us to distinguish between "zombie lending" and "helping hand" hypotheses of relationship lending (Caballero, Hoshi and Kashyap, 2008; Peek and Rosengren, 2005).

Our paper is related to an extensive theoretical and empirical literature on relationship lending. This literature builds on modern banking theories that focus on the role of financial intermediaries as producers of private information (Leland and Pyle, 1977; Campbell and Kracaw, 1980; Diamond, 1984; Broecker, 1990). Recent 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) and Chemmanur and Fulghieri (1994) introduce a bright side to relationship lending as the bank's informational advantage allows it to enforce improved continuation or liquidation decisions.

The empirical work on relationship banking is extensive.[2] Key contributions show that firms having relationships with banks enjoy improved credit availability (Petersen and Rajan, 1994), are less likely to pledge collateral, and pay lower rates (Berger and Udell, 1995). Banks can re-use borrower information when lending to the same firm and the more experienced banks become, the more they rely on this proprietary information (Agarwal and Hauswald, 2010). Relationship banks thus face fewer information problems, lower variable lending costs and may be more inclined to continue lending during a credit cycle downturn. We contribute to this literature by documenting firms' benefits from relationship lending over the credit cycle.

[2] See for instance Berger and Udell (2002) and for a review Degryse, Kim and Ongena (2009) or Kysucky and Norden (2014).

In doing so, we also link to the 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) 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 fewer 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 borrower information and hence their ability to continue lending during a cyclical downturn. Our paper thus contributes to this literature by showing that the predominance of different lending techniques in a banking system has a first-order impact on the effect of a credit downturn on the real economy.

Lastly, our paper 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 (for example, 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, Ongena, Popov and Yeşin, 2011; Popov and Udell, 2012).[3] Our paper falls into the latter category. We add to this literature by relating firms' financing constraints to banks' business models at different points in the credit and business cycle.

Before proceeding, we would like to address a few methodological concerns. First, our data do not allow us to observe actual lending relationships. By using data for both borrowing and non-borrowing firms, however, we are able to gauge the local general equilibrium impact of

[3] See also Guiso, Sapienza and Zingales (2004) who use survey information on whether households applied and were accepted for loans to construct a local indicator of financial development across Italian provinces.

banks' lending techniques, which we would miss if only focusing on borrowing firms. Second, we rely on survey data both for firms and banks. While firm-level survey data have been widely used in the recent literature, there may be concerns about measurement error in firms' responses to questions about why they do not apply for a loan or that rejection might simply reflect the lack of investment opportunities with positive NPV. We offer several robustness tests with different definitions and alternative measures of firms' financing constraints. Critically, the use of firm-level survey data allows us to capture a part of the enterprise population for which detailed balance sheet and income statement information is rarely available. And while bank-level survey responses to questions on lending techniques might suffer from some measurement error, there is no reason to believe that it biases our findings in a particular way. In addition, we offer alternative ways to compute the importance of relationship vs. transaction lending. Finally, our identification strategy relies on the location of banks and enterprises being independent of each other. We offer ample evidence in the paper that supports this assumption. Testing the differential effect of relationship lending across firms with different characteristics and regions that suffered from the crisis to a different extent provides additional possibilities to address the possible endogenous matching of firms and banks.

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 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, the persistently high credit growth rates witnessed in the region tumbled dramatically (Figure 1). While year-on-year credit growth amounted to between 35 and 40 percent per year over the period 2005-07, credit growth decelerated markedly in 2008 and even turned negative in 2009. Nominal credit growth then stabilized at a rate of around just 5 percent 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 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. SMEs have been hit especially hard by the global financial crisis and this holds across both Europe and the U.S. A recent policy report points to the lack of information about SMEs as well as banks' disinvestments in front-end staff that interface directly with borrowers as reasons why banks are currently reluctant to lend to SMEs (IIF, 2013). This finding is in line with the idea that relationship lending might be a way to alleviate lending constraints during a downturn.

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. The data on firms' real performance will be introduced in Section 5.6.

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 Central and 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 determine 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 main 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 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. This allows us to directly compare the parameter estimates generated by regression models that use the two samples.

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

By combining answers to various questions, we first distinguish between firms with and without 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 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 as they were approved for a loan, while we classify firms as credit constrained if they either answered "*Yes*" to K18a (i.e. were rejected) 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 firms that did not apply because they were discouraged (but actually needed a loan).

The summary statistics in Table 1 indicate that 70 percent of all sample firms in 2005 needed a loan, while 62 percent did in 2008-09. Thirty-four percent of firms were financially constrained in 2005, while 40 percent were constrained in 2008-09, pointing to a substantial tightening of financing constraints in 2008-09. Given that demand declined and constraints increased between 2005 and 2008-09, it is important to differentiate between both. Behind these averages lies substantial variation across and within countries (Table 2). While 12 percent of firms in Slovenia were financially constrained in 2005 and 17 percent in 2008-09, 64 percent of firms in Azerbaijan were financially constrained in 2005 and 78 percent 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 percent between 2005 and 2008-09, it increased from 28 to 50 percent in Latvia.

[Insert Tables 1 and 2 here]

We next use the BEEPS survey to create firm-level control variables that we use throughout our 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. Following the financing constraint literature, we expect that larger, publicly listed, and audited firms—all transparency proxies that should be inversely related to information asymmetries—face fewer credit constraints. Table 1 provides summary statistics of all variables and Appendix Table A1 gives their definitions and sources. In 2005, a bit more than half of the firms were small and a bit less than half were audited. Only few firms (2 percent) were publicly listed while 27 percent exported.

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.

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. Information was subsequently double-checked with the bank as well as with the (more limited) information available in the SNL Financial database. We focus on branches that provide funding to SMEs, excluding those that only lend to households or large corporates.[5] 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

[5] Banks were asked to provide information on which of their branches engage in SME lending.

(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.

In total our dataset contains the geo-coordinates of 38,310 bank branches operated by 422 banks (see Figure A1 in the Appendix). These banks represent 96.8 percent of all bank assets in these 21 countries.[6] 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 to determine whether a bank is foreign or domestic owned. A bank is classified as foreign owned if at least half of its equity is in foreign hands. 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.[7] The assumption is that a firm has access to all branches in the locality where it is based. 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 all branches inside that circle.[8] 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

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

[7] 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.

[8] 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 (1.6 miles) from the lending bank's branch. In the U.S. data sets of Petersen and Rajan (2002) and Agarwal and Hauswald (2010) this median distance amounted to 3.7 kilometers (2.3 miles) and 4.2 kilometers (2.6 miles), respectively.

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 our results are very similar 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 weighted by the number of branches that a bank operates in the locality.

The main variable of this type, *Share relationship banks*, measures the share of bank branches in a locality that are owned by relationship banks as opposed to transaction banks. To create this variable we turn to the second Banking Environment and Performance Survey (BEPS II), jointly undertaken by the EBRD and Tilburg University.[9] As part of BEPS II a common questionnaire in either English or the local language was administered during a face-to-face interview with 397 CEOs of 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 percent 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 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 percent of the banks in the sample find building a

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

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.

Question Q6 does not refer to a specific date. However, Fahlenbrach, Prilmeier and Stulz (2012) have shown that bank business models hardly change over time. Indeed, when we enquired with a set of CEOs they confirmed that "these things do not change".[10] Also, due to technological developments, such as small business credit-scoring, that make it easier for banks to process hard information on small firms, any gradual change in bank lending techniques has likely been in the direction of transactions-based lending (Berger, Frame, and Miller, 2005; Berger and Udell, 2006). This would bias our results against finding a mitigating effect of relationship lending, as it makes it more likely that even though we now code a bank as a transaction lender it might have used more relationship lending techniques in the recent past. To more formally address this issue, we perform a robustness test (discussed in Section 5.2), where we limit our analysis to banks that were not involved in a merger or acquisition—events that may impact lending techniques—and show that our results continue to hold.

Interestingly, relationship banking is prevalent among both domestic and foreign banks. Indeed, while 51 percent of the domestic banks identify themselves as relationship banks, this percentage is even higher among foreign banks (64 percent). 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.

While on average 64 percent of all foreign banks are relationship banks, there is variation between and within multinational banking groups in the lending techniques of their subsidiaries. For instance, only one in three subsidiaries of one of the large Italian banks in our dataset is a

[10] 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.

relationship bank. In contrast, around 75 to 90 percent of the subsidiaries of some Austrian and French banking groups are relationship banks. Notwithstanding this specialization of multinational banks in the lending techniques they employ abroad, we do not observe any large banking groups that exclusively rely on either relationship or transaction lending throughout their whole subsidiary network.[11]

When we compare balance sheet and branching characteristics of relationship and transaction banks we do not find systematic significant differences (Table 3). Within the group of domestic banks, those with above-median levels of wholesale funding are less likely to be relationship banks (p-value: 0.11). In line with the theoretical model by Bolton et al. (2013), relationship banks are also somewhat overrepresented among better-capitalized banks (p-value: 0.12).

[Insert Table 3 here]

Banks with more extensive branch networks are somewhat more likely to be relationship lenders (p-value: 0.06), 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). Overall, we thus find no strong relationship between banks' size and their focus on relationship versus transaction lending. This is in line with the findings of Berger, Goulding and Rice (2014) who show that small opaque U.S. firms are as likely to have a large, multimarket bank as their relationship bank as a small, local bank. We come back to the role of bank size in Section 5.2. We also find no clear differences in terms of other funding indicators, the proportion of branches outside a country's main cities, the average distance between branches and their headquarters, or the number of hierarchical levels involved in SME credit approval decisions.[12]

[11] While it is likely that lending techniques vary across subsidiaries of multi-national banks, it is much less likely that lending techniques vary within a subsidiary, as screening and approval methodologies are typically set centrally.

[12] The incentives of local officers may be less aligned with those of the headquarters if the within-bank distance is longer, thus exacerbating internal agency problems (Scharfstein and Stein, 2000). Liberti and Mian (2009) find that

After having identified relationship lenders, we create a variable that equals the share of relationship banks in the locality of each firm, weighted by the number of branches each bank has in the locality. 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 cyclical downturn?

The summary statistics in Table 1 show that, on average, the share of relationship-based banks was 53 percent in 2005 and 50 percent in 2008-09. This share, however, varies significantly across countries, from 90 percent in the Czech Republic to 19 percent in Georgia (Table 2, 2008-09). Even more important for our identification purposes is that there is substantial variation in relationship banking *within* countries.[13]

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 a cyclical downturn.

[Insert Figure 2 here]

Analogously to our definition of the locality-level relationship banking variable (*Share relationship banks),* we also construct a rich set of control variables that measure other aspects of the local banking landscape. In particular, we measure for each firm the average Tier 1 ratio of

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when the hierarchical distance between the information-collecting officer and the manager that approves a loan is large, less soft and more hard information is used.

[13] This variation is largely unrelated to the local presence of foreign banks. For instance, while foreign banks own about 25 percent of the branches in the Moldovan cities of Orhei and Ceadir-Lunga, the share of relationship banks in Orhei is relatively low at 40 percent whereas it amounts to 100 percent in Ceadir-Lunga.

the surrounding banks (*Tier 1*, as in Popov and Udell, 2012), the average use of wholesale funding by 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 versus transaction lending has often been equated with the dichotomy of domestic versus 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 use 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 credit cycle. We hypothesize that relationship banks were particularly helpful once the cycle had turned in 2008. Consider the model:

$$Y_{ijkl} = \beta_1 X_{ijkl} + \beta_2 L_{jk} + \beta_3 Share\ relationship\ banks_{jk} + \beta_4 C_k + \beta_5 I_{l+} + \varepsilon_{ijkl} \qquad (1)$$

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 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 factors.

Our main independent variable of interest is *Share relationship banks*$_{jk}$, 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.[14] 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.

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

5. Empirical results

5.1. Baseline results

We start our empirical analysis by summarizing in Table 4 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.[15] Importantly, we find no relationship, neither in 2005 nor in 2008-09, between our local bank-structure variable and the demand for credit (either at the level of the firm locality or at the 5 (10) km circle around the firm). This gives us confidence that *Share relationship banks* is not endogenous to local demand conditions and hence a good candidate to subsequently identify shifts in the supply of credit.

[Insert Table 4 here]

Next, in Table 5 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 three probit regressions (at the locality level and with different sets of control variables) and then three 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.

[15] When we include both variables in the subsequent estimation of Equation 1, they are—as expected—not correlated with firms' access to credit in either 2005 or 2008-09. In other words, they act solely as demand shifters.

[Insert Table 5 here]

The results in Table 5 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 banks were less constrained than observationally similar firms in localities with few relationship banks. The economic magnitude of this effect is substantial: moving from a locality with 20 percent relationship banks to one with 80 percent relationship banks reduces the probability of being credit constrained in 2008-09 by 26 percentage points (column 10). These findings are large given that 40 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.[16]

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

[16] 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. As these data are not available for all the countries in our sample, we control for local economic development through capital and city dummies.

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 percent 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 4-6 and 10-12) the inverse Mills' ratio does not enter significantly, indicating that selection bias does not distort our probit results.

5.2. Robustness tests

Tables 6 and 7 present various tests to gauge the robustness of our core results as presented in columns 4 and 10 of Table 5. We first examine the sensitivity of our results to various permutations in variable definitions in Table 6. Columns 1 to 6 show the results of regressions where we use alternative indicators of relationship lending. In the first two columns 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: *Relationship banks (continuous)*. The average score was relatively stable between 2005 and 2008-09 at 3.39 and 3.38, respectively. Our findings are confirmed: the share of relationship banks enters negatively and significantly in 2008-09 but positively and insignificantly in 2005.

In columns 3 and 4, we then 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: *Relationship Banks (relative to other lending techniques)*. 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.

In columns 5 and 6, we now define *Relationship banks (relative to retail borrowers)* as the share of branches in a locality that are owned by banks for whom relationship lending is a very important technique when lending to SMEs but not for retail borrowers. In this way we focus on banks that find relationship lending especially important for the types of borrowers in our

sample. Our results continue to hold when using this alternative definition. Lastly, in two additional unreported robustness tests we measure the local importance of relationship lending either as a dummy variable that is "1" if at least one relationship bank is present in a locality or, alternatively, as the number (rather than the share) of relationship banks. In both cases our results continue to go through.

[Insert Table 6 here]

In columns 7 and 8, we take a different approach and construct the variable *Share transaction banks*. This is the percentage of branches in a locality that are owned by banks for whom fundamental analysis and cash-flow based lending is a "very important" lending technique and for whom relationship lending is *not* "very important". While the local presence of transaction banks did not matter before the crisis, we find that a larger presence of these banks led to *more* intense credit constraints during the downturn. This mirrors, and hence corroborates, our findings on the beneficial impact of banks that consider themselves relationship lenders.

In columns 9 and 10, we use a narrower definition of credit constraints where we do not consider firms that are discouraged due to high interest rates to be constrained.[17] We again find the same results. Lastly, in columns 11 and 12, we use an alternative (and inverse) credit-constrained variable which measures the percentage of a firm's fixed assets financed through bank credit. As expected, we find that in 2008-09 firms in localities with more relationship lenders have a higher proportion of assets funded through bank loans. This supports our baseline finding that these firms were less credit constrained. In 2005 this effect is negative at the 10 percent significance level, suggesting that firms in localities with many transaction banks had easier access to credit during the boom period. This is in line with the positive (but imprecisely estimated) impact of relationship lending on our baseline credit-constrained measure in 2005.

[17] Firms that complain about too high interest rates might simply not have projects with a sufficiently high return on investment.

In Table 7 we then subject our main results to a battery of robustness tests related to our empirical specification or the composition of our sample. In the first two columns we re-estimate these base specifications while 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. Overall, country-level clustering is therefore the more conservative approach. In columns 3 and 4 we report the results of a linear probability (OLS) model so that we can calculate standard errors using the conservative wild cluster bootstrap-t procedure (Cameron, Gelbach, and Miller, 2008) to explicitly take into account our relatively small number of clusters. Our results continue to hold at the same significance level if we use these bootstrapped standard errors.

In columns 5 to 10 we then add additional locality-level banking variables. Theory posits that relationship lenders rely on market power and are more likely to flourish in concentrated markets (Petersen and Rajan, 1995) while other papers have explored the relationship between market structure, competition, and firms' financing constraints (e.g., Beck, Demirguc-Kunt and Makisimovic, 2004; Love and Martinez Peria, 2015). We therefore control for several measures of market structure and market power. The first two 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 banks.

In columns 9 and 10 we control for the share of branches owned by small banks, here defined as banks with a balance sheet of less than EUR 1 billion (as in Berger, Cerqueiro and Penas, 2014). To the extent that small banks are better able to overcome information asymmetries vis-à-vis small and medium-sized businesses (Berger, Klapper, and Udell, 2001; Berger, Miller, Petersen, Rajan and Stein, 2005) we expect a negative impact on credit constraints, in particular during crisis times. We indeed find a negative but imprecisely estimated coefficient. Importantly,

controlling for local bank size (in addition to controlling for local bank ownership and funding structure) does not affect our baseline results on the importance of relationship lending. Finally, 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 11, we pool the 2005 and 2008-09 observations and include an interaction term between the share of relationship banks and a 2008-09 dummy. We now test directly whether the impact of relationship lending increases significantly during a cyclical downturn. The insignificant coefficient on the share of relationship banks and the statistically significant negative coefficient for the interaction term confirm that the impact of the local presence of relationship banks is indeed limited to the downturn.[18]

[Insert Table 7 here]

In columns 12 and 13 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.[19] In unreported regressions, we also split the sample between European Union and non-European Union 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 banks 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 14-15, we exclude banks that experienced an ownership change during our sample period when computing *Share relationship banks*. We confirm our findings for this

[18] 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.

[19] Similarly, our results hold when we exclude Poland – another large country – or the three relatively peripheral countries Armenia, Azerbaijan and Georgia.

group of banks whose lending techniques have arguably 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 banks in the loan demand regressions of Table 4 is reassuring. It suggests that relationship banks 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 selected into localities with a higher share of relationship banks to secure funding throughout the credit cycle. We therefore re-run our regressions dropping firms that were established either less than five years ago or less than 12 years ago (the median firm age in our sample). Columns 1 to 4 of Table 8 report our results. Our findings are confirmed, with the share of relationship banks entering positively and insignificantly for the 2005 regressions and negatively and significantly for the 2008-09 ones.

The regressions in columns 5 to 8 show the robustness of our findings by replacing the *current* branch-weighted share of relationship banks with the *historical* branch-weighted share of relationship banks in either 1995 or 2000. Using the lagged value of relationship banks in a locality reduces the risk that our findings are driven by relationship banks 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 robustness tests, we instrument the shares of relationship banks in 2005 and 2008 with the share of relationship banks in 1995 and again confirm our findings.

[Insert Table 8 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 fixed effects and control for industry composition. If the local presence of relationship banks 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 banks, 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 banks. We find only one marginally significant positive relationship, at the 10 percent level, between the share of publicly listed firms and the share of relationship banks. 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 banks (p-value: 0.25). We conclude that the presence of relationship banks 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 assess 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 more confidently interpret 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 banks, 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 5, respectively.[20] The negative sign indicates that the coefficient for the share of relationship banks actually slightly *increases* when we add covariates, suggesting that our estimates somewhat underestimate the true causal effect. We conclude that it is unlikely that unobserved heterogeneity can explain away the protective impact of local relationship lending that we document.

5.4. Firm heterogeneity

Theory predicts that relationship lending is especially important for small and relatively opaque firms. However, it is a priori not clear whether relationship banks will continue lending to such firms during a credit downturn or focus on larger and less opaque firms. In Table 9 we therefore present regressions to estimate how the impact of the local presence of relationship banks on access to credit varies across different firm types. We interact the share of relationship banks 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.[21] 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

[20] When we re-estimate the model with linear probability OLS, the Altonji ratio even amounts to -51, indicating that the parameter stability is independent of the estimation method used. By way of comparison, Altonji, Elder and Taber (2005) estimate a ratio of 3.55 which they interpret as evidence that unobservables are unlikely to explain the entire effect they document.

[21] *Asset tangibility* indicates whether the firm is part of an industry that is characterized by relatively high (above median) levels of tangible assets (properties, plants and equipment). See Table 1 for descriptive statistics.

relationship between relationship lending and credit constraints during a crisis 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 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. These results expand on previous findings, however, by confirming that relationship lenders do not shy away from such firms during a credit downturn.

In unreported specifications, we also include locality fixed effects (but drop industry effects). While the *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 8 (with *Employees*, *External funding* and *Publicly listed* statistically different from zero). Note that these regressions also allow us to absorb any unobserved locality-level variation.

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 banks but only 20 percentage points higher in a locality where at least half of all branches are operated by relationship banks.

[Insert Table 9 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 banks are few and far between. We note that the significant interaction effects in 2008-09 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 may not only vary across firms with different characteristics but also with the macroeconomic environment in which they operate. In Table 10 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.[22]

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 elsewhere. The local GDP data are consistently measured at the most disaggregated administrative level (typically states or provinces) available from local sources or, alternatively, at the lowest statistical division level, such as Eurostat's NUTS level.

The results in Table 10 confirm that the protective effect of the local presence of relationship banks 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 banks with economic growth enter positively and significantly, suggesting that firms in areas with stronger negative growth benefited more in terms of fewer financing constraints if the share of relationship banks was higher in 2008. Relationship lending is thus especially important in more adverse macroeconomic environments.

[Insert Table 10 here]

[22] Regional GDP growth data were not available for Albania, Azerbaijan, Belarus, Moldova and Serbia. See Gennaioli, La Porta, Lopez de Silanes and Shleifer (2014) for more details on the regional data.

5.6. Real-economic impact

Our analysis so far shows that a greater local presence of relationship banks is associated with fewer credit constraints among firms during an economic downturn. This begs the question whether the presence of relationship lending helps sound firms to bridge difficult times (as in Chemmanur and Fulghieri, 1994) and to recover more quickly or, in contrast, whether it reflects 'evergreening' as banks roll over loans to underperforming borrowers (as in Caballero, Hoshi and Kashyap, 2008). Do our findings point to a helping hand or to zombie lending? While previous research has shown that Japanese banks tended towards evergreening during the banking crisis of the 1990s, this issue has again become critical in the Eurozone crisis. We assess the real-economic repercussions of relationship lending for emerging Europe.

To answer this question, we need more detailed information on our BEEPS sample regarding real-economic variables at the firm level. We therefore merge our sample with additional data on these firms from Bureau Van Dijk's Orbis database. We match on both firm and locality name. An algorithm identified perfect matches based on both names as well as near-matches.[23] The latter were then manually checked for possible matches. For Armenia, Azerbaijan and Georgia matching was impossible due to limited coverage in Orbis. For all other countries we matched 2,966 BEEPS firms—almost 50 percent—to their Orbis counterpart. The success rate varied from 20 percent in Romania to 77 percent in Slovenia.

Data coverage in Orbis varies across variables and years and we therefore focus on three basic firm-growth indicators that are well covered: the (log) change in total assets, the (log) change in operating revenues (sales or turnover), and the (log) change in the number of employees. We measure these changes over the period 2005-07 as well as 2008-10. Table 1 provides descriptive statistics and Appendix Table A1 the exact definitions and sources. Previous contributions show that credit constraints can have large negative effects on firm growth (Beck, Demirgüc-Kunt and Maksimovic, 2005), sales growth (Minetti and Chun Zhu, 2011) and

[23] In many cases the BEEPS firm name did not correspond exactly to its legal name in Orbis, which often includes legal designations such as "Ltd." and "Inc.".

investments (Campello, Graham and Harvey, 2010). Credit constraints can also constrict local employment as firms decrease their payroll to levels commensurate with internal funding sources (Chodorow-Reich, 2014).

Our matched data now contain information on firms' credit constraints in 2008-09 (taken from BEEPS) and information on their subsequent (2008-10) and prior (2005-07) growth performance (taken from Orbis). We use these matched data to estimate a two-stage least squares (2SLS) model to assess the real effects of having relationship banks in the vicinity during a downturn. Specifically, we instrument the 2008-09 binary variable *Credit constrained* by *Share relationship banks* (while also including our standard set of covariates) to extract the exogenous element of credit constraints as determined by the local share of relationship banks. This first-stage regression thus equals our earlier baseline specification (Table 5, column 8). Our identifying assumption is that the local banking structure in terms of lending techniques only affects firm growth through its impact on firms' ability to access credit.[24]

In the second stage, presented in Table 11, we use the predicted credit constraints to explain growth in total assets (column 1), operating revenues (column 4), and number of employees (column 7) in 2008-2010. The results suggest that where a high presence of relationship banks reduces credit constraints in a locality, this is associated with higher subsequent firm growth. In statistical terms this impact is strongest for the growth in firm assets and operating revenues and somewhat less strong (10 percent level) for the growth in employees. This likely reflects that hiring and firing decisions are taken irregularly as firms try to smooth employment fluctuations. In economic terms the effects are substantial too. A credit-constrained firm contracted its assets and operating revenues by 1.1 and 3.2 times more over the subsequent two years compared with an unconstrained firm, all else equal. Credit-constrained firms also reduced their number of employees by 1.3 times more over that period (see Table 1 for summary statistics).

[24] We have firm balance sheet information available for this matched dataset. Our results remain robust when replacing our firm size dummy variables with total assets as well as including other commonly used accounting variables such as the current ratio, solvability ratio, and liquidity ratio.

In line with our discussion in previous sections, *Share relationship banks* reduces credit constraints significantly in the first stage, suggesting that this variable is a strong instrument. The first-stage R^2 is reasonable too. However, the F-statistic based on the first-stage regressions lies between 3 and 5, below the often used rule-of-thumb of 10. This indicates that there are limits to the strength of our instrument. We therefore interpret the 2SLS results mainly as suggestive evidence of positive real impacts due to local relationship lending. However, they are clearly at odds with a more negative 'evergreening' interpretation of our core results.

A comparison of the 2SLS results with OLS estimations (presented in columns 2, 5, and 8) shows that without instrumenting credit constraints, we do not detect a significant effect of constraints on subsequent firm performance.[25] Biases in the OLS regressions, however, may mask the causal impact of credit constraints on firm performance. For example, being credit constrained may be correlated with firm characteristics that are unobservable to us but were observable to loan officers. Badly managed firms may have been rationed more and such firms may also have been more negatively impacted during the economic downturn.

Finally, we present 2SLS regressions in columns 3, 6 and 9 where we measure firm growth variables over the period 2005-07 instead of 2008-10. In essence this amounts to a placebo test to assess whether firm-level credit constraints in 2008 also 'caused' higher firm growth in the *preceding* years 2005-2007. The absence of any impact here gives us further confidence that our results for 2008-10 (in columns 1, 4, and 7) indeed reflect a causal effect of credit constraints on firm performance and not merely a selection effect. After all, if relationship banks would have targeted firms that were already performing relatively well before the crisis (or if such banks would have been based in localities with many of such fast growing firms) then these placebo regressions should pick up such a selection effect. We also find no negative impact on 2005-07 firm growth. This is reassuring too as such a negative effect could have reflected that 'evergreening' relationship banks were mainly selecting underperforming firms.

[25] Both a Durbin test and a Wu-Watson test indicate that our variable *Credit constrained* cannot be treated as exogenous and that 2SLS is therefore the preferred estimation method.

[Insert Table 11 here]

6. Conclusions

We collect information from 21 countries on the bank branches active in the direct vicinity of a large sample of surveyed firms. 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 banks. 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 over the credit cycle. While transaction and relationship lending are 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 easing effect of relationship banks on credit constraints is especially prominent in adverse macroeconomic environments and holds across countries at different stages of economic development. It holds when we control for various other local banking characteristics, such as bank size, ownership, and funding structure.

Our results are in line with relationship banks smoothing the negative impact of credit cycle downturns after having acquired sufficient information about their borrowers during good times. This enables them to continue to provide loans during economic downturns when transaction banks seem to withdraw. Our evidence suggests that such different lending behavior during downturns also has real consequences for local firm growth. That is, the extent to which local bank branches rely on transactional as opposed to relationship lending techniques exacerbates the procyclical impact of local bank lending.

Recently, several commentators have urged banks to go "back to basics" and to put more emphasis on relationship lending as this may insure firms against unexpected economic shocks.[26]

[26] 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).

Some bankers also concede that the screening of loan applicants became more challenging when the credit cycle turned. Loan officers can now rely less on collateral and hard information and instead need to take a deeper look at 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). Our results concur with this anecdotal evidence as we find that not all banks are equally equipped to produce such judgments during a cyclical downturn.

Our results have important policy implications. While the recent literature has clearly pointed to the benefits of diverse lending techniques within a banking system, relationship lending appears to have a more prominent role to play during economic downturns. 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 more capital.

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 (Karapetyan and Stacescu, 2014). Relatedly, our results also warn against an excessive short-term focus by 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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Table 1
Summary Statistics

This table shows summary statistics for all variables used in the empirical analysis. Sd: standard deviation. *Growth total assets*, *Growth operational revenues*, and *Growth employees* are measured over the period 2005-2007 (left side of the table) and 2008-2010 (right side of the table). 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
Growth total assets (log diff.)	1,338	0.35	0.27	0.63	-5.48	5.73	1,519	-0.03	-0.02	0.52	-8.34	5.35
Growth operational revenue (log diff.)	1,454	0.33	0.28	0.67	-4.55	5.14	1,686	-0.31	-0.21	0.77	-6.77	3.95
Growth employees (lof diff.)	1,301	0.16	0.06	0.63	-6.13	5.31	1,615	-0.19	-0.08	0.57	-4.96	4.87
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
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
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 transaction banks	6,706	0.36	0.34	0.26	0	1	7,025	0.39	0.39	0.25	0	1
Share relationship banks (1995)	6,000	0.58	0.62	0.31	0	1	5,987	0.53	0.50	0.32	0	1
Share relationship banks (2000)	6,133	0.55	0.55	0.29	0	1	6,318	0.48	0.49	0.30	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	2008-09	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
Comparing Relationship with Non-Relationship Banks

This table compares relationship with non-relationship banks along a number of characteristics. Columns [1]-[3] refer to the full sample while columns [4]-[6] and [7]-[9] analyse domestic and foreign banks, respectively. In each of these three sets of columns, the first two columns indicate the percentage of all banks with a below-median value (odd column) and an above-median value (even column) *and* that is a relationship bank. For instance, of all banks with a below (above) median number of branches in a country 59 (56) per cent is a relationship bank. A formal t-test indicates that these shares do not differ significantly. *Average branch size* is the ratio between total bank assets and the number of branches. *Local distance* is the average km distance (log) between the branches in a locality and their domestic HQ. *Hierarchical distance* is the number of hierarchical layers within the bank that is involved in the approval of SME loans. *Share localities with branch* is the number of localities in which a bank has a branch as a proportion of all localities in a country with at least one branch. *Share branches outside main cities* is the share of a bank's branches located in cities with less than one million inhabitants. All other variables are defined in Appendix Table A1.

	All banks			**Domestic banks**			**Foreign banks**		
	Share relationship banks < median	Share relationship banks > median	t-test of equal shares (p-value)	Share relationship banks < median	Share relationship banks > median	t-test of equal shares (p-value)	Share relationship banks < median	Share relationship banks > median	t-test of equal shares (p-value)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Number of branches	0.59	0.56	0.54	0.48	0.42	0.57	0.65	0.61	0.57
Total assets	0.57	0.57	0.95	0.42	0.53	0.30	0.67	0.59	0.22
Average branch size	0.58	0.56	0.69	0.51	0.42	0.40	0.60	0.65	0.51
Loan-to-assets ratio	0.59	0.55	0.53	0.47	0.44	0.84	0.67	0.59	0.25
Wholesale funding	0.56	0.58	0.73	0.51	0.32	0.11	0.60	0.63	0.70
Wholesale funding (parent)	0.59	0.55	0.57	n.a.	n.a.	n.a.	0.69	0.60	0.27
Tier 1 ratio	0.52	0.63	0.12	0.44	0.57	0.31	0.56	0.66	0.26
Tier 1 ratio (parent)	0.60	0.58	0.78	n.a.	n.a.	n.a.	0.62	0.63	0.89
Local distance	0.55	0.59	0.45	0.51	0.39	0.23	0.57	0.67	0.12
Hierarchical distance	0.57	0.59	0.66	0.46	0.44	0.81	0.61	0.67	0.37
Share localities with branch	0.53	0.63	0.06	0.40	0.52	0.22	0.58	0.67	0.20
Share branches outside main cities	0.57	0.58	0.77	0.45	0.46	0.90	0.62	0.64	0.77

Table 4
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 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 considering 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 5
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) six columns show 2005 (2008-09) estimates. Columns [1]-[3] and [7]-[9] 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]-[4] and [7]-[10] are defined at the level of the locality where the firm is based whereas those used in columns [5],[6] and [11],[12] 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

	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]	[11]	[12]
Share relationship banks	0.081	0.017	0.191	0.169	0.240	0.159	-0.407***	-0.431***	-0.470***	-0.439***	-0.427***	-0.403**
	(0.241)	(0.246)	(0.270)	(0.244)	(0.200)	(0.202)	(0.127)	(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	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,690	4,610	4,527	4,527	4,693	4,651	4,235	4,105	4,077	4,085	4,121	4,208
Pseudo R2	0.05	0.13	0.13	0.13	0.13	0.13	0.05	0.10	0.10	0.10	0.10	0.10

Table 6
Relationship Banking and Credit Constraints: Robustness Tests (I)

This table shows various robustness tests of our baseline results in Table 5. In all regressions except those in columns [11] and [12] 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. In columns [1]-[2] 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 [3]-[4] 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. In columns [5]-[6] the main independent variable is the number of branches of banks for whom relationship lending is a "Very important" lending technique for SMEs but not for retail clients/total no. of branches in the locality. In columns [7]-[8] the main independent variable is the number of branches of transaction banks/total no. bank branches in the locality. Transaction banks are those for whom fundamental/cash-flow-based lending is a "Very important" lending technique while relationship lending is not a very important lending technique. Columns [9]-[10] show regressions for a more narrowly defined credit-constrained variable. Columns [11]-[12] use the percentage of fixed assets funded through bank credit as an alternative dependent variable. Unreported covariates are the same as in Table 5. Robust standard errors are clustered by country shown in parentheses. ***, **, * correspond to the 1%, 5%, and 10% level of significance, respectively. Table A1 in the Appendix contains all variable definitions.

	Relationship banks (continuous)		**Relationship banks (relative to other lending techniques)**		**Relationship banks (relative to retail borrowers)**		**Share transaction banks**		**Narrow constrained**		**Bank-funded fixed assets**	
	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]
Share relationship banks	0.089	-0.233**	-0.115	-0.520*	0.209	-0.455**	-0.203	0.413**	0.078	-0.293*	-9.228*	11.387**
	(0.153)	(0.116)	(0.268)	(0.279)	(0.242)	(0.219)	(0.256)	(0.192)	(0.173)	(0.167)	(4.746)	(4.855)
Firm controls	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
Country FE	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
Number of obs.	4,527	4,085	4,527	4,085	4,527	4,083	4,527	4,085	4,527	4,085	4,798	4,012
Pseudo R2	0.131	0.098	0.131	0.098	0.132	0.099	0.132	0.099	0.092	0.049	0.059	0.035

Table 7
Relationship Banking and Credit Constraints: Robustness Tests (II)

This table shows various robustness tests of our baseline results in Table 5. 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 5. Robust standard errors are clustered by locality in columns [1]-[2] and by country in all other columns and shown in parentheses. Standard errors in columns [3]-[4] are Wild cluster bootstrapped. Columns [5]-[6] include a locality-level and branch-weighted Herfindahl Hirschman Index (HHI) that measures local credit-market concentration. Columns [7]-[8] include a locality-level and branch-weighted Lerner index to measure local credit-market competition. Columns [9]-[10] include the local branch-weighted market share of small banks (assets <1 billion euro). Column [11] is estimated for a pooled 2005-08/09 sample. Columns [12]-[13] exclude all Ukrainian observations. Columns [14]-[15] exclude banks with ownership change in computing *Share relationship*

	Clustering at locality level		**Linear probability model, wild cluster bootstrapped s.e.**		**Additional controls local credit markets**						**Pooled sample**	**Excluding Ukraine**		**Excl. 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
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Share relationship banks	0.169	-0.439***	0.067	-0.152***	0.182	-0.421***	0.182	-0.436***	0.169	-0.425***	0.174	0.258	-0.471***	0.327*	-0.313*
	(0.212)	(0.155)	(0.084)	(0.054)	(0.259)	(0.149)	(0.263)	(0.157)	(0.247)	(0.153)	(0.252)	(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 small banks									-0.072	-0.100					
									(0.404)	(0.165)					
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
Locality controls	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
Industry FE	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	4,527	4,085	4,519	4,084	4,525	4,083	8,612	4,138	3,545	4,527	4,085
Pseudo R2	0.132	0.099	0.146	0.118	0.132	0.100	0.132	0.099	0.132	0.099	0.119	0.136	0.098	0.132	0.099

Table 8
Relationship Banking and Credit Constraints: Endogeneity

This table shows alternative specifications of our baseline regressions in Table 5 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 5. Robust standard errors are clustered by country and shown in parentheses. Columns [1]-[2] and [3-4] are based on samples that exclude firms younger than 5 and 12 years, respectively (12 years is the median firm age in the total sample). In columns [5]-[6] and [7]-[8] 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

	Firms 5 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
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Share relationship banks	0.125	-0.478***	0.147	-0.464**	0.044	-0.346***	0.178	-0.299**
	(0.237)	(0.157)	(0.262)	(0.212)	(0.211)	(0.073)	(0.146)	(0.128)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	4,174	3,738	2,153	2,525	4,063	3,537	4,137	3,683
Pseudo R2	0.134	0.103	0.158	0.111	0.134	0.099	0.134	0.100

Table 9
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 *	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**
Firm type	(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 10
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 2008-09 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

Table 11
The Real Effects of Relationship Banking

This table shows OLS and two-stage least squares (2SLS) regressions to estimate the impact of firm-level credit constraints in 2008 on firms' asset growth (columns [1]-[3]), growth in operational revenues (columns [4]-[6]), and growth in the number of employees (columns [7]-[9]). In the 2SLS regressions the first-stage instrument is *Share relationship banks* as measured at the locality level. 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 5.

	Growth total assets			**Growth operating revenues**			**Growth number of employees**		
	2008-2010		**2005-2007**	**2008-2010**		**2005-2007**	**2008-2010**		**2005-2007**
	2SLS	OLS	2SLS	2SLS	OLS	2SLS	2SLS	OLS	2SLS
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Credit constrained 2008	-1.149**	-0.039	0.036	-3.202**	-0.061	-1.058	-1.322*	-0.076	-0.348
	(0.525)	(0.038)	(0.420)	(1.564)	(0.059)	(1.056)	(0.746)	(0.059)	(0.733)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat	4.74	-	5.17	3.13	-	1.66	3.32	-	2.78
P-value F-stat	0.046	-	0.037	0.095	-	0.216	0.088	-	0.114
R2 (first stage)	0.110	-	0.122	0.118	-	0.135	0.117	-	0.132
Share relationship banks	-0.215**	-	-0.211**	-0.162*	-	-0.133	-0.162*	-	-0.181*
(first-stage)	(0.096)	-	(0.090)	(0.089)	-	(0.101)	(0.087)	-	(0.106)
Number of obs.	877	886	759	967	977	822	765	938	765
Pseudo R2	-	0.023	-	-	0.031	-	-	0.026	-

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.

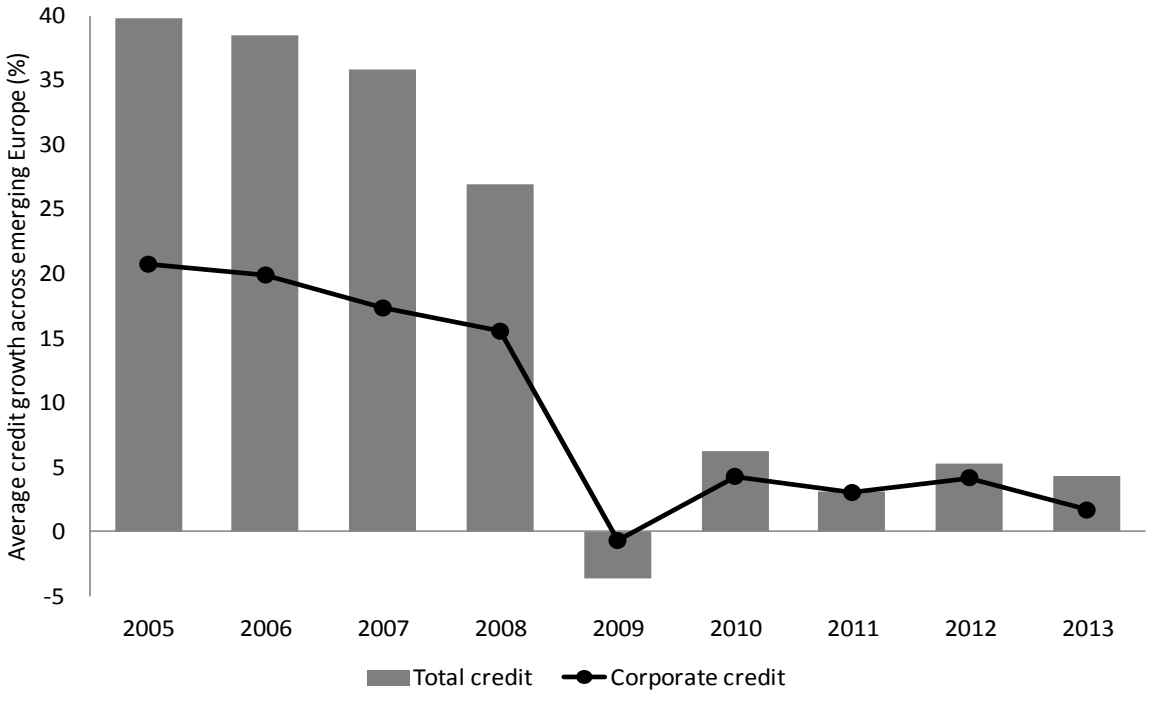


Figure 2
Regional Variation in Relationship Banking

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. Relationship banks are defined as banks whose CEO mentioned that relationship lending was a "Very important" technique when lending to SMEs.

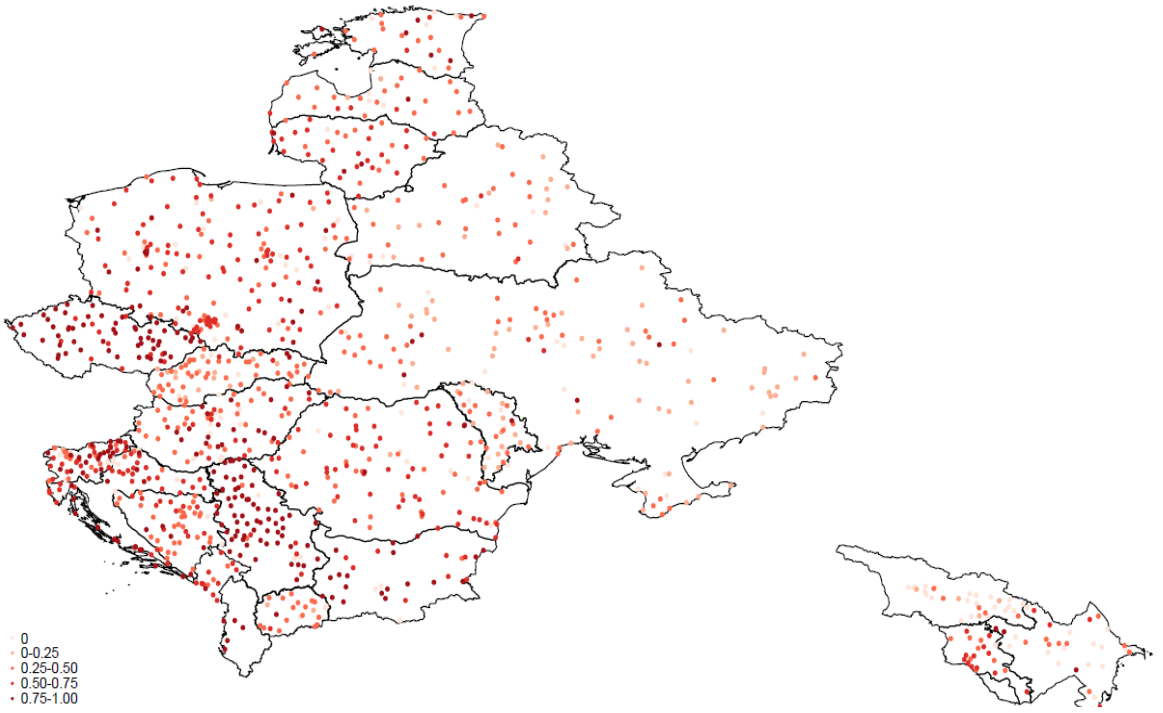


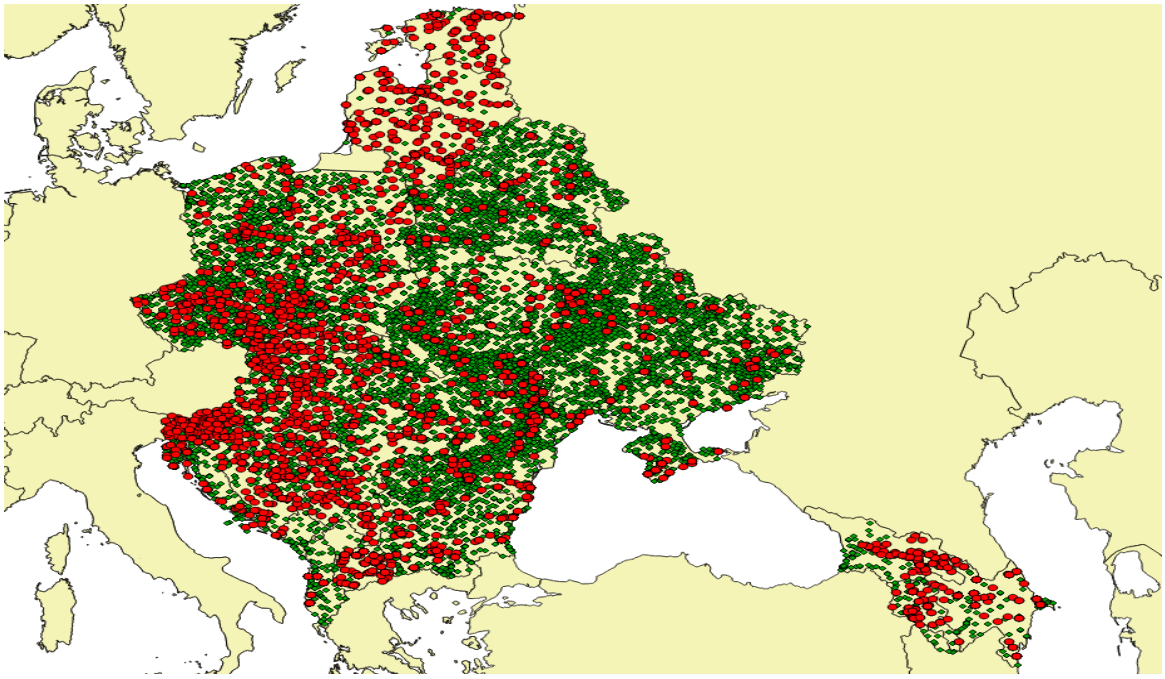
Table A1
Variable Definitions and Sources

This table shows variables definitions and data sources for 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
Narrow constrained	Dummy=1 if firm needs a loan but was discouraged from applying or rejected when it applied (except for firms that were discouraged due to high interest rates); 0 otherwise	BEEPS	0/1
Bank-funded fixed assets	Percentage of firm's fixed assets funded through bank credit	BEEPS	%
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 enterprise 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	BEEPS	0/1
Competition	Dummy=1 if firm judges competitive pressure to be fairly severe, severe, 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 Kharroubi (2013)	0/1
Growth total assets	Growth of a firm's total assets (log difference)	Orbis	%
Growth operating revenues	Growth of a firm's annual operational revenues (log difference)	Orbis	%
Growth number of employees	Growth of a firm's total number of employees (log difference)	Orbis	%
Share relationship banks	No. branches of relationship banks/total no. bank branches in the locality. Relationship banks are those banks for	BEPS	Share
Share foreign banks	No. branches of foreign-owned banks/total no. bank branches in the locality	BEPS	Share
Share small banks	No. branches of banks with less than EUR 1 billion in assets/total no. bank branches in the locality	BankScope/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 GDP growth 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
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
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
Relationship banks (relative to other lending techniques)	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
Relationship banks (relative to retail borrowers)	No. branches of banks for whom relationship lending is "Very important" for SME but not for retail lending/total no. bank branches in the locality.	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
Share transaction banks	No. branches of transaction banks/total no. bank branches in the locality. Transaction banks are those for whom fundamental/cash-flow-based lending is a "Very important" lending technique while relationship lending is not a "Very important" lending technique.	BEPS	Share

Figure A1
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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