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How does relationship banking influence credit financing? Evidence from the financial crisis

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ifo Working Papers

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Evidence from the financial crisis

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How does relationship banking influence credit financing? Evidence from the financial crisis*

Abstract

During the financial crisis asymmetric information in credit markets became more severe. Did relationship banking help firms to avoid impaired credit financing and which credit financing problems did relationship banking help to circumvent? We use survey data for 1,139 German firms to analyze how relationship banking works. We find that it lowers the probability of higher information requirements from banks. It does not, however, help to avoid constrained availability of bank credit. If credit is granted, relationship banking makes deteriorated non-price contract terms (i.e. collateral and maturity) less likely. Its impact on interest rates is ambiguous.

JEL Code: G21, G01, G28.

Keywords: Credit financing, relationship banking, financial crisis, access to credit.

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1. Introduction

Firms' access to credit financing is a driving factor of economic growth¹, but it is impeded by asymmetric information. Banks face significant problems of adverse selection and moral hazard when they lend to firms. These problems were aggravated by the recent economic crisis accompanying the financial crisis because firms operated under higher uncertainty. In some countries, this arguably contributed to a severe credit crunch.² The question arises whether relationship banking has facilitated firms' credit financing during the financial crisis. In particular, we seek to identify which of the following problems could be avoided by relationship banking: constrained credit availability, increased interest rates, deteriorated non-price terms, as well as higher information requirements by banks. To this end we try to shed light on how relationship banking works.

For our analysis, we use data from the Ifo "Financing of the German Economy" survey, which encompasses 1,139 firms from the German manufacturing sector. Using German data is beneficial for this analysis because relationship banking is widespread among German firms, and the German manufacturing sector relies heavily on funding from banks. In the survey, each firm reports whether it saw its credit financing impaired by the financial crisis between 2007 and 2009, and which kinds of impairment it faced. We link this information to a firm's number of main banks as a measure for relationship banking. This allows us to comprehensively identify which credit financing problems can be avoided thanks to relationship banking, and which cannot.

Our analysis yields the following main results. We first show that firms implementing relationship banking by having only one main bank are less likely to face credit financing

¹For empirical evidence, see King and Levine (1993), Rajan and Zingales (1998), Beck et al. (2000), and Beck et al. (2005).

²For empirical analyses of banks' credit supply during the financial crisis, see, for example, Popov and Udell (2012), Ivashina and Scharfstein (2010), Puri et al. (2011), deYoung et al. (2012), and Jimenez et al. (2012).

being impaired by the financial crisis. When analysing how relationship banking unfolds this positive impact, we find that it lowers the probability of higher information requirements by banks and the deterioration of non-price terms (i.e. maturities and collateral). The effect of relationship banking on the likelihood of increased interest rates is ambiguous. Finally, relationship banking does not lower the probability of a firm facing constrained credit availability due to the financial crisis.

Different measures of relationship banking are used to analyse the impact of relationship banking on credit availability, interest rates and collateral, in the empirical literature on this topic. Several studies use the length of a relationship,³ others use the scope of products that the firm receives from a bank⁴ to measure relationship banking. In addition, Cole (1998) and Bharath et al. (2011) use a dummy variable indicating a pre-existing business relationship and Lehmann and Neuberger (2001) use bank-level data to identify relationship banking by asking the bank whether it considers itself the main bank of a firm. Overall, however, these studies do not show a clear effect of relationship banking on credit financing. Such measures of relationship banking focus on features of an individual bank relationship. Instead, we use a firm's whole portfolio of bank relationships, which gives us a broader measure of a firm's attitude towards relationship banking.

Our analysis is most closely related to studies using the number of bank relationships as a measure of relationship banking. Petersen and Rajan (1994) use US data from the 1987 National Survey of Small Business Finances (NSSBF). In line with our results, they find that a large number of bank relationships increases quoted interest rates. Harhoff and Koerting (1998) run a survey similar to the NSSBF among German firms in 1997. They do not find that the number of bank relationships has an impact on interest rates,

³Petersen and Rajan (1994); Berger and Udell (1995); Harhoff and Koerting (1998); Cole (1998); Degryse and van Cayseele (2000); Lehmann and Neuberger (2001); Santikian (2011); Bharath et al. (2011)

⁴Petersen and Rajan (1994); Harhoff and Koerting (1998); Degryse and van Cayseele (2000); Cole et al. (2004); Santikian (2011)

but provide evidence that a larger number of bank relationships increases the probability that a firm has to pledge collateral, which is also in line with our findings. Petersen and Rajan (1994) and Harhoff and Koerting (1998) both find that the availability of credit is improved if a firm maintains a smaller number of bank relationships. They measure credit availability indirectly using late payments of trade credit (Petersen and Rajan, 1994) and fast payment discounts not taken (Harhoff and Koerting, 1998), arguing that trade credit, the most expensive source of finance for a firm, will only be used if no other source (i.e. bank credit) is accessible. Cole (1998) and Cole et al. (2004) both use the 1993 NSSBF to show that a large number of bank relationships lowers the probability that credit is granted by a bank, which constitutes a more direct measure of credit availability.

The impact of a small number of bank relationships on credit availability is not confirmed by our analysis. This difference could be explained by altered decision making processes within banks between the sample periods of these studies and the recent financial crisis. In the years prior to the financial crisis, technological change and bank regulation induced banks to base their lending decisions primarily on credit scores. Since these scores are mostly derived from hard information, this could explain why relationship banking no longer affects credit availability in our sample period.⁵ If credit is granted, however, the negotiation of terms and conditions is still affected by the soft information provided through relationship banking.

We deviate from the papers referred to above in important ways to better identify the effects of relationship banking on credit financing. Firstly, we use a perception-based approach to measure a firm's problems concerning credit financing, following Kaplan and Zingales (1997) and Beck et al. (2006). This allows us to analyse the effects of relationship banking on different aspects of credit financing within one study. Approaches

⁵Using NSSBF data from different years, Durguner (2012) show that relationship banking became less important in credit financing of small businesses in the US in 2003 compared to 1993 and 1987.

that concentrate on terms and conditions of loans only consider situations in which a loan contract is completed, which inhibits the analysis of credit availability. Studies using dummy variables for credit approval by the bank still require that a firm must apply for credit. This approach does not account for discouraged borrowers that do not apply for credit in the first place (e.g. because they expect a rejection by the bank). Our perception-based approach is not affected by these issues, meaning that we can, within one study, look at whether relationship banking helps to avoid constrained credit availability, increased interest rates, deteriorated non-price terms, as well as higher information requirements by banks due to the financial crisis. The last aspect has not been analysed in previous studies, although the provision of information to banks allows to see most directly whether relationship banking influences the flow of information between a firm and its banks.

Secondly, our data set contains detailed information on each firm's demand for new bank credit since 2007. By controlling for credit demand, we reduce the omitted variables bias. Thirdly, we link the perception-based information about a firm's credit financing to the number of main bank relationships it maintains. This is a more comprehensive measure of relationship banking than the number of business relationships to banks because main bank relationships constitute closer relationships.

Our paper is organized as follows. In Section 2 we derive four testable predictions about how relationship banking could affect a firm's credit financing from theoretical models. Section 3 provides information about the data set, our measure of relationship banking and credit financing problems. We show estimation results and robustness checks in Section 4, and discuss the representativity of our sample in Section 6, before presenting our conclusions in Section 7.

2. Hypotheses

Based on different theoretical models, we derive four hypotheses about how relationship banking could affect a firm's credit financing. For the design of policy measures, it is important to figure out what sort of credit financing problems firms could be facing and whether relationship banking alleviates these. Therefore, we build hypotheses for the impact of relationship banking on four problems concerning credit financing: higher information requirements by banks, constrained credit availability, increased interest rates and deteriorated non-price terms.

Firstly, we expect that banks are less likely to require further information when a firm implements relationship banking. During *ex ante* screening and interim monitoring, banks often require firms to provide information, which induces costs. For example, the provision of financial statements and business plans to a bank is highly burdensome for a firm. The theoretical literature argues that a flow of information about the firm is adjunct to loan contracts (Fama (1985), Sharpe (1990)) and more generally to all kinds of interactions. If this is the case, and if such information helps a bank to monitor the firm, relationship banking should lead to the provision of information, thereby lowering the probability of further information requirements by banks. During the financial crisis in particular, banks required more information as uncertainty increased considerably.

- Hypothesis 1: relationship banking lowers the probability of higher information requirements by banks due to the financial crisis.

Secondly, we expect relationship banking to improve a firm's access to credit. Stiglitz and Weiss (1981) present a theoretical model in which asymmetric information can lead to credit rationing. Consequently, the resolution of asymmetric information through relationship banking should improve a firm's access to funding from banks. Thakor (1996) argues that approaching a large number of banks for credit leads to ambiguous

effects on overall credit availability. Although the likelihood that at least one bank will grant credit is higher when many banks are approached, each bank's expected profit from screening declines. Therefore, each bank, knowing a firm's optimal application strategy, is more likely to save the screening effort and ration credit when a firm approaches a large number of banks. During the financial crisis we expect another effect to be prevalent: banks with constrained lending capacities might first lend to firms about which they are best informed. Not lending to a firm with which a relationship is established may end the relationship and destroy "informational capital" accumulated by the bank over the course of the relationship.

- Hypothesis 2: relationship banking lowers the probability that the availability of bank credit is constrained due to the financial crisis.

With respect to interest rates, the predictions for the impact of relationship banking are somewhat ambiguous because hold-up problems may outweigh the benefits of relationship banking. Boot and Thakor (1994) argue that interest rates decrease over time as banks learn about the quality of a firm and can commit to grant lower rates. According to Sharpe (1990) and Petersen and Rajan (1995), however, banks grant lower rates to young firms, and later in the course of the relationship, they extract the informational rent from proprietary information. Thereby, loan contracts do not necessarily break even in every period, because both parties agree on (implicit) long-term contracts. The extraction of rents, for example by charging higher interest rates, due to an informational advantage against competitors - from the exclusive access to soft information about the firm - is commonly referred to as the hold-up problem of relationship banking.

- Hypothesis 3: relationship banking lowers the probability that interest rates increase due to the financial crisis.

The opposing effects of relationship banking and information advantage issues might also affect non-price terms of credit contracts, although these differ in nature from the interest rate. The interest rate induces a pecuniary transfer from the borrower to the bank. In contrast, non-price terms (like maturity and collateral requirements) influence the risk sharing between the contract parties.

The fact that a bank gains proprietary information from relationship banking should render the non-price terms less stringent for the firm. With respect to collateral, Inderst and Mueller (2007) obtain this result in a model in which a local relationship lender has an informational advantage versus transaction lenders. They show that this advantage lowers the collateral requirements. Another aspect of collateral is that it can only fulfill its role of mitigating moral hazard and adverse selection problems if the value of the collateral can be observed by the bank (Rajan and Winton, 1995). Relationship banking leads to proximity between a bank and the firm, which improves the bank's ability to assess the value of the collateral (Boot, 2000). Less uncertainty about the collateral value could lower the overall requirement.

- Hypothesis 4: relationship banking lowers the probability that the non-price terms of the credit contracts are impaired by the financial crisis.

3. Data

3.1. Ifo "Financing of the German Economy" survey

To analyse how relationship banking affects credit financing, we use data from the Ifo "Financing of the German Economy" survey. The survey was based on a written questionnaire, which was sent to the CFOs of German manufacturing firms in September 2011. All firms are part of the address database for the Ifo Investment Survey. This guarantees the representativity of the sample of addressees. In total, 1,139 firms participated in the survey. The response rate was close to 25 percent, leading to a sample in

which small firms (less than 50 employees), medium firms (50-249 employees) and large firms (more than 249 employees) are evenly represented. The focus on the manufacturing sector gives us the opportunity to assess the situation of firms that are highly dependent on bank funding. This is supported by the fact that 72.9 percent of the firms reported that they had bank credit in their portfolio of financing instruments.

The questionnaire was designed to give a complete picture of a firm's bank financing. It featured questions about each firm's portfolio of bank relationships, its credit financing situation during the financial crisis, as well as a set of firm characteristics that indicate a firm's creditworthiness and are also potential determinants of its attitude towards relationship banking. These firm characteristics served as control variables in our empirical analysis. All relevant variables are summarized in Table A1 in the Appendix.

During the six months prior to the survey, we scheduled several personal meetings with executives to run pre-tests in order to ensure that our survey design was not subject to potential problems arising from response behaviour. We also used the pre-test talks to ensure that the possible answers listed in the questionnaire captured the firms' reality.

3.2. Credit financing impairments by the financial crisis

To analyse how relationship banking affects firms' credit financing, we use a perception-based measure derived from asking recipients of our survey directly: "*Was the credit financing of your firm impaired by the financial crisis between 2007 and 2009?*". The dummy variable *Impaired* indicates that the question was answered with "Yes". The descriptive statistics in Table 1 show that about 22 percent of the firms in our sample saw their credit financing impaired by the financial crisis.

Table 1

To shed light on the question of how relationship banking works, firms with impaired credit financing were asked what kinds of impairment they experienced. The possible

answers are listed in the lower part of Table 1. Over 14 percent of the firms reported that they faced higher information requirements by banks due to the financial crisis, which makes this the most frequent of all impairments. Since information provision to banks induces costs for the firm, we used the variable *Information* to analyse whether relationship banking helps to avoid higher information requirements by banks (Hypothesis 1). The reduction of existing lines of credit (reported by 7 percent of firms) and the constrained availability of new loans or lines of credit (almost 11 percent) indicate bank credit constraints. The dummy variables *Reduction* and *Availability* allowed us to test Hypothesis 2. To assess the potential effects of relationship banking on interest rates (Hypothesis 3), firms could report an increase in the interest rate for an existing loan or line of credit during the financial crisis. For almost 11 percent the indicator variable *Interest* equals one. Regarding Hypothesis 4, the effects of relationship banking on non-price terms and the conditions of bank credit, we allowed firms to report that banks offered credit only for shorter maturities (only less than 3 percent of the firms reported this impairment) and whether banks' requested more collateral, which was reported by almost 10 percent of the firms.

3.3. *Measuring relationship banking*

Providing a theoretical foundation, Boot (2000) defines two conditions for relationship banking to be present:

1. Multiple interactions between a bank and its customer over time or across products, through which the bank gathers soft information about the customer.
2. The information gathered is non-public and remains proprietary to the bank.

Based on this definition, we use a firm's number of main bank relationships to measure the extent to which it follows the concept of relationship banking. We argue that a firm with one main bank does so in the narrowest sense. Having a larger number of main

banks, however, violates the conditions above in the following two ways. Firstly, a large number of main banks indicates that a firm spreads its business among many banks. Each single bank runs less business with the firm and therefore learns less about it, which violates Condition 1. Secondly, if there is a large number of banks gathering information from business relationships with the firm, this information can no longer be considered proprietary to each bank, which contradicts Condition 2. Therefore, firms with a large number of main banks do not follow relationship banking as defined by Boot (2000).

In line with these points, Petersen and Rajan (1994), Harhoff and Koerting (1998), Cole (1998), and Cole et al. (2004) use the number of banks from which a firm receives financial services as a measure for relationship banking. Our focus on main bank relationships amends their approach because main bank relationships are a much clearer signal for relationship banking than business relationships to banks in general. The number of main banks therefore gives us a much more stringent view of a firm's attitude towards relationship banking. In addition, some previous studies ask the bank whether it considers itself as the main bank of a firm (e.g. Elsas (2005) and Lehmann and Neuberger (2001)). Our assessment comes directly from the firm and therefore gives a better insight into the firm's attitude towards relationship banking.

To gain an impression of what exactly a main bank is for a firm, our survey asks whether certain features characterize the two most important bank relationships and whether the respective bank is a main bank. This leads to a sample of over 1,600 main bank relationships for which features are listed in Panel A of Table 2. The most important criteria for main banks are the long duration of a relationship, personal support by the bank and the short distance between the headquarter of the firm and the bank. Only 32 percent of the firms report that the main bank is the most important creditor.

Panel B of Table 2 shows the distribution of the number of main banks in our sample. The greatest share of firms (41 percent) follows the principle of relationship banking by

having only one main bank, which underlines that the use of German data serves the purpose of this study because of the importance the main bank concept for German firms. 37 percent of the firms have two main banks and about 17 percent reported that they have more than two.

Table 2

We relate credit financing impairments due to the financial crisis to the number of main bank relationships. The fraction of firms whose credit financing was impaired by the financial crisis is lowest among those that implement relationship banking by having only one main bank (17 percent). Firms without a main bank at all (21 percent) and those with a second main bank face a higher risk of impairment (22 percent). Impaired credit financing is by far the most likely for firms with more than two main banks (35 percent). The probability of higher information requirements by banks is smallest for firms that follow relationship banking. For the reduction of existing lines of credit, however, the differences between firms with different numbers of main bank relationships are much smaller. Increased interest rates are least likely for firms with two main banks while the likelihood of deteriorated non-price terms is lowest for firms with one main bank.

These descriptive findings can be taken as initial evidence for the hypothesis that, in general, the gains from relationship banking seem to outweigh the benefits from creating a competitive situation between two main banks. The probabilities of different problems concerning credit financing, however, are not equally affected by relationship banking.

3.4. Control variables

To rule out that the descriptive statistics for the effect of relationship banking on credit financing are driven by hitherto unobserved factors, we draw a set of control variables from the survey data. We expect these to determine both a firm's creditworthiness and its attitude towards relationship banking. Their omission thus leads to biased estimation

results. All variables are listed and summarized in Table 3.

Table 3

First of all, it is reasonable to assume that firms with demand for new bank credit are more likely to maintain a large number of main bank relationships in order to increase the probability that at least one bank grants credit. On the other hand, if banks face higher asymmetric information due to the financial crisis, they may respond by rationing the amount of credit supplied, or lend at less favourable terms. They are more likely to show such reactions through credit relationships that arise from new demand for bank credit than through existing credit contracts. Therefore, firms with demand for new bank credit are also more likely to report impaired credit financing, which could explain our previous findings on the connection between relationship banking and impaired credit financing during the financial crisis.

The variable *Demand* equals one if the firm has negotiated a loan or a line of credit after the break-out of the financial crisis in 2007. It also equals one if the firm did not negotiate with a bank, and reported that it did not do so because it expected negotiations not to be successful or because the entrepreneur raised bank credit for the firm on private accounts. Such firms are referred to as “discouraged borrowers”. They are typically not accounted for in studies based on terms and conditions of granted credit or rejected credit applications.

Firm age is also considered to facilitate access to bank credit, since older firms have a track record of repaid debt indicating their creditworthiness. Older firms are therefore less likely to report impaired credit financing. They are also more likely to have established long-term relationships with banks than young firms. Omitting firm age could therefore affect the results of our empirical analysis. We trim one percent of the observations at the top to rule out the effect of extreme values in firm age, and also because the information

about the year of foundation might be imprecise for very old firms.

The legal status of a firm plays an important role because it defines the liability rules for owners in case of a default. If a firm is registered as a sole proprietorship, a KG or a GmbH & Co. KG⁶, then the owners are completely liable in case of default. If a firm is incorporated (i.e. GmbH or an AG), then the liabilities of the owners are limited to the contributed capital. This makes it more difficult for the bank to assert its claims in case of a default. We would therefore expect that firms with limited liabilities are more likely to see their credit financing impaired by the financial crisis. Since the legal status determines transparency regulations, it could also affect a firm's attitude towards relationship banking. For example, a firm listed on a stock exchange faces many publication rules. The provision of soft information through relationship banking may be less beneficial for such firms.

Firm size also matters for access to credit. Large firms tend to have credit demand in order to finance large scale projects. On the one hand, access to large amounts of credit may be difficult when banks are short of lending capacities and want to diversify their risk exposure across several firms rather than clustering risks by granting large loans to few firms. On the other hand, asymmetric information might be lower for large firms because they are usually more transparent than SMEs. The transparency, however, may also lower the likelihood that a firm will pursue relationship banking compared to smaller and more opaque firms. Both aspects combined could lead to a bias in the effects of relationship banking on credit financing.

The return on sales is our most direct measure of a firm's performance. It is an important criterion for a bank's decision about the provision of credit to a firm and the determination of terms of credit. Firms with a low profitability are more likely to see

⁶A GmbH & Co. KG is a construction in which the owner of the firm is a GmbH, which is fully liable. For the owners of this GmbH, however, liability is limited to the contributed capital.

credit financing impaired by the financial crisis. Firms in the loss zone, however, also have a higher need for bank funding because they cannot finance themselves from retained earnings. Through the higher need for bank funding, a firm’s profitability might affect its attitude towards relationship banking as well. We focus on the return on sales in 2008. We do so firstly because the returns on sales in 2009 and 2010 were unknown at the times when the impairment of credit financing occurred, and secondly because the returns on sales in 2007 and 2008 are highly correlated in our sample, meaning that the use of the 2007 data would not add much information.

Finally, we use export activities as a control variable because exporting firms are more exposed to the negative effects of the economic crisis than firms focusing on the domestic market. We expect exporting firms to be more likely to see their credit financing impaired by the financial crisis. They may also maintain more bank relationships because export activities change the demand for financial products and thus increase the likelihood that close ties are maintained with different banks with different specializations. We also control for 2-digit WZ code industries because the likelihood of impaired credit financing might be influenced by sector-specific factors.

4. Results

4.1. *Effects of relationship banking on credit financing during the financial crisis*

To investigate whether relationship banking has an effect on the likelihood of experiencing impaired credit financing, we first run a binary probit estimation in which the dependent variable is the dummy variable *Impaired* defined as described in Table 1. The model is defined as:

$$Impaired_i = \alpha + \beta B_i + \gamma D_i + \delta X_i + \eta I_i + \epsilon_i \quad (1)$$

where B_i is a set of dummy variables indicating the number of main bank relationships,

D_i indicates demand for new bank credit. X_i contains a set of firm characteristics and I_i is the vector of industry dummies. Table 4 shows the marginal effects.

Table 4

The complete setup in Estimation (4) offers results for the effect of the number of main bank relationships on the likelihood of impaired credit financing, controlling for *Demand*, as well as firm characteristics and industry dummies. We find that firms implementing relationship banking by focusing on one main bank relationship have a seven percentage points lower probability of impaired credit financing. The marginal effect is significant at the five percent level. Having no main bank relationship at all is not significantly different from having three or more main banks in that respect and neither is the maintenance of two main bank relationships.

As expected, we find a large and significant marginal effect for *Demand* in Estimations (2) and (4). The marginal effects of having one or two main banks are significantly reduced compared to Estimation (1). This underlines the significance of the bias from omitting demand for new bank credit, which is widely neglected in previous empirical studies.

The marginal effects of the firm characteristics show the expected signs, except that we do not find a significant age effect. This might be caused by the structure of our sample in which older firms are more prevalent than young firms. Considering the size of the marginal effects, we can conclude that firm characteristics are a driving force of credit financing impairment, which was to be expected. Like demand for new credit in Estimation (2), controlling for firm characteristics has an impact on the marginal effects of the numbers of main bank relationships, which indicates that Estimation (1) suffers from omitted variables bias.

The result suggests that firms that follow the idea of relationship banking are less likely to experience problems with credit financing due to the financial crisis. The comparison

of the four different specifications underlines the importance of controlling for a firm's fundamentals. An important source of omitted variables bias also appears to stem from the variable indicating demand for new bank credit.

4.2. How does relationship banking affect credit financing?

In the next step we present results of binary probit estimations to draw conclusions as to whether or not firms engaged in relationship banking have a lower likelihood of facing the different problems listed in Table 1 in Section 3.2. In all estimations, we control for *Demand*, the set of firm characteristics and industry dummy variables to rule out omitted variables bias. Table 5 presents the marginal effects of all estimations.

Table 5

The first problem is captured by the dependent variable indicating “More information required by banks”. Testing Hypothesis 1, we find that the focus on one main bank relationship reduces the probability of this problem by 8.6 percent compared to having three or more main banks. The effect is highly statistically significant. There is no such effect found for firms without a main bank, or for firms with two main banks. We take this as strong evidence that information provision through relationship banking reduces asymmetric information. This facilitates the bank's screening process and interim monitoring, which reduces the necessity to require more information from the firm.

We test the effect of relationship banking on the availability of bank credit (see Hypothesis 2) using Estimations (2) and (3). Dummy variables indicating the impairments “Existing line of credit reduced” and “Constrained availability of new loans/lines of credit” are used as dependent variables. Surprisingly, the number of main banks does not have a significant effect on either of the two sorts of impairment. This suggests that relationship banking does not affect the quantity of credit available to the firm. A potential explanation for this phenomenon could be that the decision over a reduction of a

credit line or the granting of new bank credit may be primarily driven by hard information about the firm, which is used in the credit risk models. Since these models do not account for soft information, it is reasonable that we do not find a statistically significant effect for relationship banking in this concern.

In Estimation (4) we find that the focus on one main bank relationship lowers the likelihood of an increased interest rate for an existing loan or line of credit due to the financial crisis by almost four percent compared to having three or more main bank relationships. Not having a main bank at all, however, has a negative marginal effect of over four percent that is statistically significant at an even higher level. The same is the case for firms that have two main banks. These results do not unambiguously support Hypothesis 3. This could be explained by the fact that interest rates are determined in a bargaining process between the bank and the firm. Having a second main bank may improve the firm's bargaining position and prevent hold-up problems faced by firms with only one main bank. Since interest rates are a pecuniary transfer from the firm to the bank, competition between banks might play a more important role in interest rate determination than in the determination of other terms and conditions.

Finally, we assess how impairments of non-price terms of loans or lines of credit are affected by relationship banking. Estimation (5) uses the dummy variable indicating "Banks offered credit only at shorter maturities" as the dependent variable. The focus on one main bank has a significantly negative marginal effect of two percent. When looking at higher collateral requirements in Estimation (6) the picture is the same, but the marginal effect of maintaining only one main bank relationship on collateral is higher at 4.5 percent. In contrast to interest rate payments, collateral is not a pecuniary transfer and does not immediately affect the profits of the bank. Instead, it is part of the risk-sharing process between the bank and the firm. Our results suggest that hold-up problems and their resolution through competition between banks do not affect this risk-sharing

process. One could also argue that information plays a larger role in the risk-sharing process than in bargaining about interest rates. Therefore, relationship banking lowers the probability of deteriorated non-price terms due to the financial crisis.

To sum up, firms that implement relationship banking have a lower probability of facing higher information requirements and deteriorated non-price terms. Banks' decisions about credit availability are not affected by relationship banking. For interest rates, we find a positive effect of focusing on one main bank, but evidence also suggests that having a second main bank can be advantageous compared to having three or more main banks.

5. Robustness

5.1. Reverse causality

From the results in the previous sections, we have concluded that relationship banking lowers the likelihood of experiencing credit financing impairments due to the financial crisis. One could, however, argue that the results only show that firms that have problems with getting credit from banks have reacted by setting up further bank relationships. From this perspective, our estimation could be taken as evidence that firms with a high probability of impaired credit financing maintain more bank relationships, instead of vice versa.

Firstly, an argument against reverse causality can be derived from the characteristics of main bank relationships. As Panel A of Table 2 shows, a long duration of the bank relationship is a key criterion for a firm to refer to the respective bank as a main bank. Even if firms had added business relationship to banks when experiencing impaired credit financing, these would not constitute long-term relationships. Therefore, it is unlikely that the added banks are referred to as main banks in our survey.

Secondly, we test for reverse causality by dropping firms with potential dynamics in the number of main banks from our sample and re-running the previous estimations. In

the Ifo “Financing of the German Economy” survey, firms report the durations of the two most important bank relationships. We therefore know whether these were established during the financial crisis, or if they were established before. This allows us to identify firms that had dynamics in the structure of their bank relationships, which may have been caused by the financial crisis and its impact on a firm’s credit financing.

For 63 firms, the most important bank relationship was established in 2007 or later. This is the case for the second most important bank relationships of 117 firms. In total, 115 firms are dropped from the sample due to potential dynamics in the number of main bank relationships. If reverse causality would drive our results, dropping these firms should weaken the effects of relationship banking on the probability of impaired credit financing in our estimations. The comparison of the results in Table A2 in the Appendix to Table 4 shows that this is not the case. The marginal effect of having only one main bank relationship is still slightly above seven percent.

We follow the same procedure to estimate the impact of relationship banking on the different kinds of impairments by the financial crisis. The results are presented in Table A3 in the Appendix and are directly comparable to Table 5. Again, the general picture does not change. For the 761 firms left in the sample, we find that relationship banking affects credit financing by lowering the probability of higher information requirements and the deterioration of non-price terms of credit. We do not find any effects of relationship banking on availability of credit; and the ambiguous results for the interest rate increases do not change compared to Table 5 either. The regression analysis without firms with young important bank relationships allows us to rule out that our findings are significantly driven by reverse causality.

5.2. Bank-side effects

Empirical research has shown that the bank balance sheet channels are an important determinant of firms’ access to credit (for example, Popov and Udell (2012), Ivashina

and Scharfstein (2010), deYoung et al. (2012) and Jimenez et al. (2012)). To test the robustness of our results with respect to bank-side effects, we identify to which class of banks within the German banking systems the two most important banks of each firm in our sample belong. We already saw in Section 3.3 that the vast majority of firms in our sample have one or two main banks. It is therefore not far-fetched to assume that for many firms, credit financing is to a large extent determined by the two most important banks.

Ivashina and Scharfstein (2010) find that, in response to the financial crisis, banks that were largely equity-financed reduced lending to firms more drastically than banks that were deposit-financed. German banks are classified into three different classes (see Hackethal (2004) for a detailed description), which typically differ in their financing structure and whose lending behaviour was differently affected by the financial crisis. The first is commercial banks, which are universal banks engaged in both corporate banking and investment banking. They are privately owned and, to a large extent, equity-financed. The second pillar of the German banking system is the savings bank class. Savings banks in Germany are publicly owned by municipalities and serve public interest by taking in deposits and providing credit to local borrowers. Each savings bank's business is restricted to its region. Landesbanks work as central banks to the large number of savings banks. They are owned by federal states, other Landesbanks and the regional savings banks associations. They provide services to federal states, but also offer large scale funding to large companies, which cannot be offered by small savings banks. The third class of banks is cooperative banks. Like savings banks, they only operate within their region and are largely deposit-financed. Cooperative banks are owned by their members whose interest they serve. Comparable to Landesbanks, the DZ Bank and the WGZ Bank serve as central banks for the large number of small cooperative banks.

According to the results of Ivashina and Scharfstein (2010), we would expect deposit-

financed savings banks and cooperative banks to cause fewer problems to firms' credit financing than largely equity-financed commercial banks. Landesbanks were also seriously affected by the financial crisis and can be expected to cause credit financing impairments (see Puri et al. (2011)). In Table 6, we find that the fraction of firms reporting impaired credit financing is lower when they have a cooperative bank or a savings bank among their two most important banks. The involvement of a commercial bank or a Landesbank seems to increase the risk of impaired credit financing.

Table 6

Table 6 also shows that firms that have a commercial bank or a Landesbank among the two most important banks are less likely to implement relationship banking by having only one main bank. Our previous results could therefore be driven by the fact that classes of banks that are less likely to cause impaired credit financing appear to be more likely to be important banks for firms that follow relationship banking. According to the theoretical model of Detragiache et al. (2000), firms with only one bank relationship face the risk of adverse selection if the relationship bank cannot roll over loans due to liquidity constraints and the firm has to address a bank that has not learned about the firm's credit quality. Establishing multiple bank relationships reduces the risk of having to borrow outside a relationship. In line with our data, this model would predict that firms that rely on Landesbanks and commercial banks maintain more bank relationships because they anticipate difficulties in getting credit from these classes of banks.

To control for bias from bank balance sheet channels, we probit estimations as in Section 4 and control for dummy variables indicating that a bank of a certain class within the German banking system is among the two most important banks of a firm. As shown in Table A4 in the Appendix, the coefficients for the bank class dummies, with cooperative banks being the baseline category, are not significant. The effect of

following relationship banking by having only one main bank is only weakly affected by the inclusion of these variables. In the complete setup in Estimation (4), the effect is at 6.9 percentage points; and is therefore only slightly smaller than in Table 4.

Table A5 in the Appendix shows that the analysis of the marginal effects of relationship banking on different kinds of problems concerning credit financing are also not affected by including the bank class dummies. We still find that relationship banking helps to circumvent higher information requirements and the deterioration of non-price terms. The effect on the probability of increased interest rates is again ambiguous; and credit availability is unaffected by relationship banking. We can therefore conclude that relationship banking has an effect on credit financing impairment by the financial crisis even after we rule out bias from different lending behaviour between the classes of the two most important banks .

6. Sample representativity

As our study is based on survey data, we are confronted with sample selection issues stemming from the response behaviour. Firms with impaired credit financing could be overrepresented in our sample since the topic of the questionnaire was the firm’s financing situation. One could argue that firms that did not need credit financing and those that did not experience problems with credit financing were less likely to participate in the survey because they would not be interested in the topic or because they did not consider themselves to have anything to contribute to the survey.

To check whether the firms with impaired credit financing are overrepresented in our sample, we compare firms responding to the Ifo “Financing of the German Economy” survey (in the following referred to as “response” firms) to those who did not respond (in the following referred to as “non-response” firms) in terms of the information we get about both groups from the Ifo Investment Survey. Since both surveys are based on the

same address database, there is a significant overlap between the data sets. One could argue that firms with impaired credit financing are also overrepresented in the sample of the Ifo Investment Survey, but this is unlikely because the main topic of the survey is the development and the structure of firms' investment activities. The motivation to take part in this survey should therefore not be driven or hampered by the firm's credit financing situation during the financial crisis, and particularly not in the 2007 survey.

Table 7

The first two columns of Table 7 show that response firms are slightly larger than non-response firms in terms of employment and turnover in 2010, but the differences are statistically insignificant. Since size is expected to be an important factor of the probability of impaired credit financing, this is comforting with respect to sample selection issues. Even stronger arguments in favour of sample representativity can be found in the lower part of Table 7. Every year, firms participating in the Ifo Investment Survey are asked to assess how the financing situation affects their investment in the current year. The answers range from 1 ("strong animation") to 5 ("strong slowdown"). If firms that see credit financing impaired by the financial crisis were to be more likely to respond to the Ifo "Financing of the German Economy" survey, we would expect the according answers in the Ifo Investment Survey to differ significantly between response and non-response firms. Table 7, however, shows no difference in the influence of financing on investment between the two groups.

7. Conclusion

We started this paper by raising the question of whether relationship banking has facilitated credit financing during the financial crisis and, if so, how. Our results show that firms that implement relationship banking are less likely to see their credit financing

impaired by the financial crisis. In particular, they are less likely to report that banks require more information. This is probably the most direct evidence that banks gather information about firms from a bank-firm relationship. However, relationship banking does not significantly affect the availability of credit. This might be due to the fact that banks use hard rather than soft information in their credit risk models on which they base their decision about granting a loan. For the interest rate, our results are ambiguous. It seems that a firm benefits from relationship banking, but having a second bank can also be advantageous because it resolves the hold-up problem. The additional information and the bank's information advantage over its competitors influence the bargaining positions of the parties negotiating interest rates. In contrast, for non-price terms (maturity and collateral) relationship banking translates into a lower probability of impairments.

The divergent results for price and non-price terms might be due to the influence that they have on the bank's profit function. While interest payments influence a bank's profit directly, collateral requirements and the maturity of a loan determine the allocation of risk between the bank and the firm. It seems that the relationship bank (if anything) exploits its information advantage when the interest rates are set, rather than when negotiating maturity or collateralization.

For a long time, relationship banking was a prominent feature in many economies, particularly in Germany and other countries in continental Europe. With the widespread use of new information technologies, however, credit risk models became popular and the process of information processing changed significantly. This change manifests itself in banking regulation, which places greater emphasis on the use of credit risk models that are based on hard information. The concept of relationship banking was perceived as somewhat superseded. Our results, however, demonstrate that relationship banking was beneficial for firms (and thereby for the whole economy) during the financial crisis. In times of uncertainty, firms should care about their bank relationships. Many magazines

and guidebooks for practitioners also picked up on this topic. For example, a report by Deloitte & Touche GmbH (2012) comes to the conclusion that: “the quality of the relationship of medium-sized firms and their banks is often underrated and thereby neglected. In particular during a crisis, a long-term and positive relationship is of utmost importance.” The crisis can therefore be said to have led to revived interest in relationship banking.

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Tables

Table 1: Descriptive statistics: Impaired credit financing

Variable	N	Mean	Std.Dev.	Min	Max
<i>Impaired</i>	1062	0.2212	0.4153	0	1
<i>Information</i>	1046	0.1463	0.3535	0	1
<i>Reduction</i>	1046	0.0717	0.2581	0	1
<i>Availability</i>	1046	0.1090	0.3118	0	1
<i>Interest</i>	1046	0.1071	0.3094	0	1
<i>Maturities</i>	1046	0.0258	0.1587	0	1
<i>Collateral</i>	1046	0.0985	0.2981	0	1

Note: *Impaired* equals one if a firm answered the following question with yes: “*Was the credit financing of your firm impaired by the financial crisis between 2007 and 2009?*”, and zero if a firm answered the question with no. All other variables equal one if a firm has reported the respective impairment and zero if not. Firms could report more than one impairment.

Table 2: Descriptive statistics: Main bank relationships

Panel A: Features of main bank relationships

	N	Freq	Perc
Long duration	1610	1374	85.34%
Personal support	1610	1067	66.27%
Short distance	1610	845	52.48%
Company knowledge	1610	694	43.11%
Difficult times	1610	591	36.71%
Important creditor	1610	514	31.93%
Others	1610	39	2.42%

Note: For the two most important bank relationships, firms reported whether or not the different features characterize the bank relationship and whether the bank is a main bank. Here, a data set of main bank relationships is constructed. The dummy variables equal one if the respective feature is reported for the respective main bank relationship.

Panel B: Number of main banks and impaired credit financing

	<i>No main bank</i>	<i>One main bank</i>	<i>Two main banks</i>	<i>More than two main banks</i>
N	1130	1130	1130	1130
Freq	54	463	417	196
Perc	4.78%	40.97%	36.90%	17.35%
<i>Impaired</i>	20.75%	17.06%	21.99%	34.95%
<i>Information</i>	11.76%	9.03%	15.28%	27.17%
<i>Reduction</i>	5.88%	5.94%	8.03%	8.70%
<i>Availability</i>	7.84%	8.08%	11.92%	16.30%
<i>Interest</i>	9.80%	8.55%	8.29%	21.20%
<i>Maturities</i>	5.88%	0.95%	2.85%	4.89%
<i>Collateral</i>	5.88%	6.65%	11.40%	15.22%
<i>Others</i>	7.84%	3.33%	4.66%	7.61%

Table 3: Descriptive statistics: Control variables

Variable	N	Mean	Std.Dev.
<i>Demand</i>	938	0.6599	0.4740
<i>Size</i>	938	819.82	3320.65
<i>Age</i>	938	77.81	51.24
<i>Return (0%)</i>	938	0.1269	0.3330
<i>Return (0% to <3%)</i>	938	0.2900	0.4540
<i>Return (3% to <7%)</i>	938	0.3316	0.4710
<i>Return (7% to <10%)</i>	938	0.1535	0.3607
<i>Return (10% +)</i>	938	0.0980	0.2976
<i>Non-incorporated</i>	938	0.3646	0.4816
<i>Incorporated</i>	938	0.6247	0.4845
<i>Export</i>	938	0.8721	0.3342

Note: For the description of all variables, see Table A1. Minimum and maximum values are not reported for confidentiality reasons.

Table 4: Estimations: Impaired credit financing due to the financial crisis

	(1) <i>Impaired</i>	(2) <i>Impaired</i>	(3) <i>Impaired</i>	(4) <i>Impaired</i>
<i>No main bank</i>	-0.0936* (0.05)	-0.0368 (0.07)	-0.0896* (0.05)	-0.0393 (0.07)
<i>One main bank</i>	-0.1539*** (0.03)	-0.1063*** (0.03)	-0.1087*** (0.04)	-0.0706** (0.04)
<i>Two main banks</i>	-0.1117*** (0.04)	-0.0695** (0.03)	-0.0573 (0.04)	-0.0300 (0.04)
<i>Demand</i>		0.2393*** (0.02)		0.2234*** (0.02)
<i>log(Age)</i>			0.0065 (0.02)	0.0035 (0.02)
<i>Incorporated</i>			0.0850*** (0.03)	0.0850*** (0.03)
<i>log(Employees)</i>			0.0257** (0.01)	0.0197* (0.01)
<i>Return (0%)</i>			0.3732*** (0.08)	0.3066*** (0.09)
<i>Return (0% to <3%)</i>			0.2204*** (0.06)	0.1500** (0.06)
<i>Return (3% to <7%)</i>			0.0358 (0.06)	-0.0155 (0.05)
<i>Return (7% to <10%)</i>			0.0462 (0.07)	0.0006 (0.06)
<i>Export</i>			0.0862** (0.04)	0.0687* (0.04)
Industry dummies	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0417	0.1196	0.1239	0.1945
N	880	880	880	880

Note: Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. Baseline category for the return variables is *Return (10% +)*. *Demand*, *Incorporated* and *Export* are included as dummy variables.

Table 5: Estimations: Different kinds of credit financing impairment

	(1) <i>Information</i>	(2) <i>Reduction</i>	(3) <i>Availability</i>
<i>No main bank</i>	-0.0241 (0.05)	0.0002 (0.03)	-0.0157 (0.04)
<i>One main bank</i>	-0.0860*** (0.03)	0.0131 (0.02)	-0.0259 (0.02)
<i>Two main banks</i>	-0.0341 (0.03)	0.0293 (0.02)	-0.0018 (0.02)
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1450	0.1631	0.1182
N	872	872	872
	(4) <i>Interest</i>	(5) <i>Maturities</i>	(6) <i>Collateral</i>
<i>No main bank</i>	-0.0472** (0.02)	0.0139 (0.02)	-0.0255 (0.03)
<i>One main bank</i>	-0.0373* (0.02)	-0.0208** (0.01)	-0.0450** (0.02)
<i>Two main banks</i>	-0.0464** (0.02)	-0.0086 (0.01)	-0.0171 (0.02)
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1686	0.1177	0.1225
N	872	872	872

Note: Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. Baseline category for the return variables is *Return (10% +)*. *Demand*, *Incorporated* and *Export* are included as dummy variables.

Table 6: Classes of banks, impaired credit financing and relationship banking

	<i>Commercial</i>	<i>Savings bank</i>	<i>Landesbank</i>	<i>Cooperative</i>	<i>Others</i>
N	1049	1049	1049	1049	1049
Freq	660	553	124	310	170
Perc	62.92%	52.72%	11.82%	29.55%	16.21%
<i>Impaired</i>	23.18%	20.43%	29.84%	19.03%	21.76%
<i>No main bank</i>	78.43%	27.45%	3.92%	3.92%	35.29%
<i>One main bank</i>	59.20%	51.42%	8.73%	33.49%	16.51%
<i>Two main banks</i>	58.46%	61.54%	10.77%	34.62%	13.33%
<i>More than two main banks</i>	76.63%	44.02%	23.37%	16.85%	16.30%

Note: *Commercial*, *Savings bank*, *Landesbank*, *Cooperative* and *Others* equal one if a firm reports that at least one of its two most important banks belongs to the respective class of banks.

Table 7: Analysis of response behaviour based on data from the Ifo Investment Survey

	Non-response	Response	p-value
<i>Turnover (2010, in m Euro)</i>	265.68	398.94	0.2811
N	1118	591	
<i>Employment (2010)</i>	808.49	1050.32	0.3881
N	1118	591	
<i>Influence Finance 2007</i>	2.96	2.93	0.4737
N	809	444	
<i>Influence Finance 2008</i>	3.05	3.03	0.5120
N	859	468	
<i>Influence Finance 2009</i>	3.38	3.41	0.4632
N	922	500	

Note: "Response" indicates that the firm participated in the Ifo "Financing of the German Economy" survey; "Non-response" indicates that it did not do so. p-values are drawn from standard t-test for the difference in means. All variables used to compare the two groups are drawn from the Ifo Investment Survey. Employment is measured in heads. *Influence Finance*: assessment of the influence of the financing situation on investment in the current year; 1 Strong animation, 2 Little animation, 3 No influence, 4 Little slowdown, 5 Strong slowdown.

Appendix

Table A1: Variable descriptions

Variable	Description
<i>Impaired</i>	Firm answered the following question with yes: “Was the credit financing of your firm impaired by the financial crisis between 2007 and 2009?”
<i>Information Reduction Availability</i>	Higher information requirements from banks Reduction of existing lines of credit Constrained availability of new loans or lines of credit
<i>Interest</i>	Increase of interest rates for existing loans or lines of credit
<i>Maturities Collateral</i>	Bank credit was offered only at shorter maturities Banks required more collateral
<i>Main bank</i>	Number of main banks
<i>Demand</i>	Firm had new demand for a bank loan or a line of credit since 2007
<i>Size Age</i>	Number of employees (in heads) at the end of 2010 Measured in September 2011 based on the year of foundation of the firm
<i>Return</i>	Earnings after tax/Sales in 2008
<i>Non-incorporated</i>	By legal status of the firm, the owner is completely liable for the firm
<i>Incorporated</i>	By legal status of the firm, the owner’s liability for the firm is capped
<i>Export</i>	Firm generates turnover abroad

Table A2: Reverse causality: Impaired credit financing due to the financial crisis

	(1)	(2)	(3)	(4)
	<i>Impaired</i>	<i>Impaired</i>	<i>Impaired</i>	<i>Impaired</i>
<i>No main bank</i>	-0.0832 (0.06)	-0.0287 (0.07)	-0.0747 (0.06)	-0.0252 (0.07)
<i>One main bank</i>	-0.1600*** (0.04)	-0.1133*** (0.03)	-0.1080*** (0.04)	-0.0720* (0.04)
<i>Two main banks</i>	-0.1148*** (0.04)	-0.0727** (0.03)	-0.0593 (0.04)	-0.0318 (0.04)
Demand	No	Yes	No	Yes
Firm Char.	No	No	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0382	0.1112	0.1146	0.1802
N	765	765	765	765

Note: Firms with important bank relationships younger than 5 years dropped. Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. Baseline category for the return variables is *Return (10% +)*. *Demand*, *Incorporated* and *Export* are included as dummy variables.

Table A3: Reverse causality: Different kinds of credit financing impairment

	(1) <i>Information</i>	(2) <i>Reduction</i>	(3) <i>Availability</i>
<i>No main bank</i>	-0.0296 (0.05)	-0.0102 (0.02)	-0.0235 (0.04)
<i>One main bank</i>	-0.0843*** (0.03)	0.0089 (0.02)	-0.0201 (0.02)
<i>Two main banks</i>	-0.0331 (0.03)	0.0182 (0.02)	-0.0019 (0.02)
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1523	0.1577	0.1243
N	761	761	761
	(4) <i>Interest</i>	(5) <i>Maturities</i>	(6) <i>Collateral</i>
<i>No main bank</i>	-0.0549*** (0.02)	0.0123 (0.02)	-0.0222 (0.04)
<i>One main bank</i>	-0.0488** (0.02)	-0.0219** (0.01)	-0.0421* (0.02)
<i>Two main banks</i>	-0.0505** (0.02)	-0.0147 (0.01)	-0.0191 (0.02)
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1667	0.1350	0.1148
N	761	761	761

Note: Firms with important bank relationships younger than 5 years dropped. Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. Baseline category for the return variables is *Return (10% +)*. *Demand*, *Incorporated* and *Export* are included as dummy variables.

Table A4: Bank-side effects: Impaired credit financing due to the financial crisis

	(1)	(2)	(3)	(4)
	<i>Impaired</i>	<i>Impaired</i>	<i>Impaired</i>	<i>Impaired</i>
<i>No main bank</i>	-0.0981* (0.05)	-0.0473 (0.06)	-0.0918* (0.05)	-0.0485 (0.06)
<i>One main bank</i>	-0.1496*** (0.04)	-0.0992*** (0.03)	-0.1081*** (0.04)	-0.0693* (0.04)
<i>Two main banks</i>	-0.1049*** (0.04)	-0.0577* (0.03)	-0.0561 (0.04)	-0.0264 (0.04)
<i>Commercial</i>	0.0255 (0.04)	0.0231 (0.03)	0.0101 (0.04)	0.0093 (0.03)
<i>Savings bank</i>	0.0012 (0.03)	-0.0014 (0.03)	0.0062 (0.03)	0.0043 (0.03)
<i>Landesbank</i>	0.0754 (0.05)	0.0944* (0.05)	0.0385 (0.05)	0.0530 (0.05)
<i>Others</i>	-0.0119 (0.04)	0.0164 (0.04)	-0.0490 (0.04)	-0.0182 (0.04)
Demand	No	Yes	No	Yes
Firm Char.	No	No	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Pseudo R-squared	0.0468	0.1277	0.1288	0.2000
N	873	873	873	873

Note: Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. *Commercial*, *Savings bank*, *Landesbank*, *Cooperative* and *Others* equal one if a firm reports that at least one of its two most important banks belongs to the respective class of banks.

Table A5: Bank-side effects: Different kinds of credit financing impairment

	(1) <i>Information</i>	(2) <i>Reduction</i>	(3) <i>Availability</i>
<i>No main bank</i>	-0.0141 (0.05)	0.0074 (0.03)	-0.0167 (0.04)
<i>One main bank</i>	-0.0880*** (0.03)	0.0154 (0.02)	-0.0304 (0.02)
<i>Two main banks</i>	-0.0337 (0.03)	0.0304 (0.02)	-0.0043 (0.02)
Classes of banks	Yes	Yes	Yes
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1480	0.1738	0.1265
N	865	865	865
	(4) <i>Interest</i>	(5) <i>Maturities</i>	(6) <i>Collateral</i>
<i>No main bank</i>	-0.0430* (0.02)	0.0267 (0.03)	-0.0271 (0.03)
<i>One main bank</i>	-0.0376* (0.02)	-0.0169* (0.01)	-0.0517** (0.02)
<i>Two main banks</i>	-0.0448** (0.02)	-0.0066 (0.01)	-0.0192 (0.02)
Classes of banks	Yes	Yes	Yes
Demand	Yes	Yes	Yes
Firm Char.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.1762	0.1473	0.1312
N	865	865	865

Note: Binary probit marginal effects estimated at the mean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Baseline category for the main bank relationship dummy variables is “Three or more main banks”. Dummy variables for classes of banks (*Commercial*, *Savings bank*, *Landesbank*, *Cooperative* and *Others*) equal one if a firm reports that at least one of its two most important banks belongs to the respective class of banks.

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