Shadow seniority? lending relationships and borrowers' selective default*

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Abstract

This paper analyzes how lending relationships affect the incentives of borrowers to default using loan-level data in Spain. We provide new evidence showing that firms first default on loans from non-main banks. This effect is stronger in small firms and in banks with lower solvency. Our results suggest that firms have lower incentives to default to their most important banks to preserve the most valuable lending relationships. Our findings also indicate that banks internalize this borrower behavior in their credit risk management because most important banks within the borrower's set of lending relationships recognize lower discretionary loan impairments. The results are robust to alternative specifications and control for potential bank forbearance, loan characteristics, and a variety of time-varying bank and firm fixed effects.

JEL Codes : G21, G28

Keywords: lending relationships, loan default, non-performing loans, loan-loss recognition, forbearance.

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1. Introduction

The estimation of default probabilities is one of the key elements in credit risk models in banking and attracts the attention of bank managers, academics, and authorities. Literature focuses on the relevance of loan, firm, and macroeconomic variables as determinants of loan default probability and credit risk in banks (Altman, 1968; Bonfim, 2009). The influence of lending relationships on loan default rates has received less attention, and the scarce empirical evidence focuses on how better screening and monitoring by relationship banks may reduce loan default rates (Jimenez and Saurina, 2004; Puri et al., 2017). However, to our knowledge, there are no papers analyzing the influence of lending relationships on the incentives of borrowers to default depending on the importance of the bank within the firm's set of lending relationships. In this paper, we use a loan-level database from the Spanish Credit Registry to provide direct evidence on how lending relationships shape borrower's incentives to default and on the recognition of loan losses by banks.

The lack of empirical evidence on the effect of lending relationships on borrowers' incentives to prioritize debt repayment is surprising because banking literature has extensively analyzed its role showing that lending relationships increase bank financing not only in large firms (Slovin et al., 1993) but specially in young and small firms during normal times (Petersen and Rajan, 1995; Berger and Udell, 1995). Previous empirical evidence also shows that relationship banks reduce the cost of financial distress for borrowing firms and allow them to get new funding (Gilson et al., 1990; Hoshi et al., 1991). Better information in relationship banks about the viability of the firm and/or the bank's benefit from preserving relationship rents explain the benefits provided by relationship banks to borrowers in financial distress (Petersen and Rajan, 1995; Berger and Udell, 1995; Bharath et al. 2007). We now hypothesize that the benefits of relationship lending for financially distressed borrowers documented in the literature may provide them with incentives to prioritize debt repayment to their main or most important banks with the aim of preserving the most valuable relationships.

Our paper provides direct evidence on these borrower incentives and aims to respond to the following main questions. First, whether firms prioritize debt repayment to their relationship banks. Second, if the eventual priority on debt repayment aims at preserving the most valuable relationships. Third, if any firm or bank characteristics shape the influence of lending relationship on the incentives of borrowers to repay debt. And,

finally, whether banks internalize borrowers' incentives to default in their recognition of discretionary loan impairments.

Empirical identification of borrowers' incentives to repay debt in a context of multiple lending relationships is challenging for two reasons. The first difficulty is the availability of data on debt repayment or on default. The second is distinguishing the influence of the importance of the lending relationship from that of other variables on debt repayment, such as specific loan characteristics, unobservable bank's internal mechanisms to identify the lack of borrower payment, unobservable borrower quality, or other bank-firm characteristics.

To overcome these difficulties, we use a loan level database on defaulted loans from the Spanish Credit Register that allows us to disentangle the borrower's incentives to default from the bank's discretion in the recognition of defaulted loans. Our database distinguishes between two types of defaulted loans: delinquent, and unlikely to be paid (UTP). Delinquent loans refer to defaulted loans that have outstanding principal, interest or expenses that are overdue by more than 90 days, and also to any loan granted to a firm by a bank where the proportion of the outstanding debt of that borrower that is delinquent exceeds 25 %. Banks are obliged to classify these loans as defaulted, and their recognition is the consequence of the lack of payment by the borrower. UTP loans are loans classified by the banks as defaulted following the EBA Guidelines and not having overdue principal or interest amounts for 90 days or more. The regulation establishes both general and specific rules for recognizing losses associated with UTP loans, but it is in the recognition of these losses where banks retain some discretion.[1]

We use the recognition of delinquent loans by banks to identify how firms prioritize debt repayment to banks depending on the importance of the lending relationship. Our empirical strategy focuses on loans to firms that had no defaulted loans at the beginning of our analysis period (May 2016) but had some loans that became defaulted or were

[1] Circular 4/2017 of the Banco de España regulates the recognition of UTP loans following the definition of default under the Article 178 of EU Regulation Nº 575/2013 and the EBA Guidelines (EBA/GL/2016/07). This guidance establishes some mandatory recognition of UTP such as those loans from borrowers with some delinquent loan even if the proportion of the outstanding debt of that borrower that is delinquent is below 25%. However, the guidance leaves wide discretion to the bank for the recognition of UTPs by establishing that a UTP loan must be recognized when there is a decrease in the credit quality of the obligation. Some examples of bank discretion indicated in the regulation for credit quality refer to a significant decrease in turnover or, in general, cash flows ; the existence of a significantly inadequate economic or financial structure or the existence of insufficient cash flows to pay off debts.

restructured or refinanced due to financial difficulties over our analysis period (2016Q3-2019Q4). We follow these loans until the quarter before they were classified as delinquent. Then, we drop the delinquent loan from the sample, and it only returns to it if it becomes performing again at a later date. This empirical strategy allows us to identify the loans and banks to which the borrower defaults first. Therefore, we can estimate how the probability that a performing loan will become delinquent depends on the importance of the bank within the borrower's set of lending relationships. We apply several sample refinements to ensure that only delinquent loans (objective lack of debt payment by the borrower) are included to analyze the borrower's incentives to default.

We use three proxies to measure the importance of a bank within a firm's set of lending relationships: 1) the ratio of the amount of the outstanding loans of each particular bank over total bank debt in the firm; 2) a dummy variable identifying the main bank of each firm; and 3) the position of the bank, within the particular firm's set of lending banks, based on the amount of credit granted.

A second difficulty to identify the importance of the lending relationship for the borrower's incentives to repay debt is to adequately control for the effect of loan, bank, firm, and other specific bank-firm characteristics affecting the recognition of delinquent loans. We use quarterly data at loan level to make loan controls possible and rely on firms that borrow from at least two banks to include both bank-quarter and firm-quarter fixed effects. The availability of a loan-level database allows us to control for loan characteristics (e.g. loan size, collateral, maturity, and the type of the loan) that influence borrowers' incentives to repay while isolating the effect of the importance of the bank within the firm's set of lending banks.[2]

To ensure that delinquent loans are associated with borrower incentives to repay we need to control for any bank-driven effect on the recognition of delinquent loans. For instance, we need to control for differences among banks using automatic or manual procedures for identifying loan default, applying the internal ratings-based (IRB) or the standardized approaches for credit risk, differences in the internal control mechanisms applied to identify the lack of borrower payment, differences in the probability that a bank will go to court to recover its debts or even differences in bank incentives to adequately recognize

[2] Borrowers may find it difficult to repay larger loans, which are precisely those that are granted by their most important banks. Collateral increases recovery rates by the bank and may provide borrowers with more incentives to repay, and shorter maturity may also be associated with higher delinquent rates (Jimenez and Saurina, 2004).

loan default associated with a lack of payment by borrowers. Bank-quarter fixed effects are helpful in mitigating these bank-driven confounding effects as identification comes from exploiting variations in delinquent loans of different borrowers to the same bank in a given quarter.

Firm-quarter fixed effects mitigate other potential borrower-driven confounding effects. For instance, differences in firm quality may affect the number of banks that a firm can default to in a given quarter. Differences in firms' investment opportunities and credit demand may also affect firm incentives to default. Firm-quarter fixed effects allow us to compare delinquent loans for the same firm across different banks in a given quarter and, therefore, control for unobservable and observable firm characteristics related to borrowers' quality and credit demand. Additionally, we saturate our specifications with additional bank-firm fixed effects to control for endogenous matching of banks and firms.

Our paper provides novel results. We find that loans from the main and most important banks have lower probability of becoming delinquent than other loans from less important banks after controlling for loan, firm, bank, and other bank-firm characteristics. This suggests that firms prioritize debt repayment to the main or most important banks in their lending relationships. This result still holds after excluding all bank-firm relationships affected by loan refinancing or restructuring.[3] In this way, we ensure that any potential forbearance practices by banks do not prevent us from adequately identifying borrower incentives to repay. The results do not depend on whether we include bank-firm fixed effects or not. The economic effects are relevant because one standard deviation increase in the firm's share of outstanding debt with a particular bank reduces the probability of default with the bank from a mean value of 2.5% to 1.8% (a relative decrease of about one-quarter).

Moreover, we find that microenterprises prioritize debt repayment to their most important banks more than larger firms. This result is consistent with extensive evidence indicating that greater information asymmetries in small firms increase the benefits of lending relationship in these firms (Petersen and Rajan, 1995; Berger and Udell, 1995). Our results also show that firms prioritize debt repayment to their most important banks, the lower the bank solvency. This result suggests that borrowers perceive greater benefits of preserving their lending relationships with the main or most important banks when

[3] Loans are excluded from the sample since the quarter prior to being classified as refinanced or restructured.

diminishes the solvency of these banks. The influence of bank solvency is confirmed when we additionally apply a difference-in-difference analysis to check the effect of the disclosure of stress testing results by the European Banking Authority. We find that borrowers increase repayment priority to their main or most important banks after these banks receive a worse result in the stress test. In particular, banks with one standard deviation higher capital ratio will have a 2.6 percentage points increase in the probability of default in response to one percentage point increase in the ratio of firm's outstanding debt granted by the bank.

The above findings highlight a new benefit of relationship lending for banks in terms of lower default rates associated with lower incentives of the borrower to default to its main or most important banks. Moreover, banks enjoy this benefit most when they need it most or when their solvency is lowest.

Additionally, we find that banks internalize the incentives of borrowers to default in the recognition of discretionary loan impairments. In this analysis, we focus on discretionary UTP loans by excluding those loans whose recognition is obligatory for the bank.[4] Our results show that the main bank recognizes lower discretionary loan impairments than other less important banks after controlling for loan, bank, firm, and other bank-firm characteristics. We also find that the lower recognition of discretionary loan impairments by main banks is greater for small and young firms, but we do not find any significant effect for bank solvency. This suggests that banks internalize in their risk models the repayment priority applied by borrowers. Based on private information about the borrower's repayment history, most important banks may anticipate that firms, especially smaller and younger ones, prioritize debt repayment to them in case of financial distress. Consistently, most important banks recognize lower discretionary losses on their loans before the firm defaults to any bank.

The rest of the paper is organized as follows. The next section provides the theoretical background and defines our main hypotheses. Section 3 describes the data and our identification strategy. Section 4 presents our empirical results and, finally, Section 5 concludes.

[4] In particular, we analyze loans classified by the banks as defaulted but not having overdue principal or interest amounts for 90 days or more (i.e. they are not still delinquent loans) and, additionally, we sequentially exclude: (i) all loans belonging to a firm since the quarter before the firm has a loan default of any type with any bank; and (ii) all loans belonging to a firm since the quarter prior to any refinancing or restructuring with any bank.

2. Theoretical background and hypotheses

2.1. Theoretical background

Our paper relates to several strands of the literature. First, it relates to the literature analyzing the determinants of corporate credit default and bank credit risk. It is well-known that credit risk modelling and an accurate measure of credit risk is crucial for bank capital requirements and bank supervision. Previous literature highlights the relevance of both idiosyncratic and systematic factors to explain why a firm defaults on its credit liabilities (Crouhy et al., 2000; Bonfim, 2009). Since the pioneering work of Altman (1968), based on firm's accounting variables, credit risk models have added new explanations based on market information (Shumway, 2001; Saunders and Allen, 2002; Duffie and Singleton, 2003; Gersbach and Lipponer, 2003) or on macroeconomic variables or variables considering correlation default issues (Bonfim, 2009).

Focusing on macroeconomic variables, evidence shows that banks build up their credit risk during upturns as a consequence of applying looser credit standards whereas downturns only materialize risks previously undertaken (Pederzoli and Torricelli, 2005; Jiménez and Saurina, 2006). The literature also confirms the relevance of loan characteristics. For instance, Jimenez and Saurina (2004) show that loans with collateral are associated with a higher default probability and suggest that banks demand collateral from riskier borrowers and/or that collateral reduces screening efforts by banks. We contribute to this literature by highlighting that not only loan, firm, and macroeconomic variables, but also the characteristics of the bank-firm relationship influence the incentives of the borrower to prioritize debt repayment in case of financial difficulties and are therefore important determinants of loan default rates.

Second, the paper relates to the literature analyzing the benefits and costs of lending relationships. Extensive literature shows that relationship lending mitigates moral hazard and adverse selection, which provides benefits for both the borrower and the lender (Ongena and Smith, 1998; Boot, 2000; Bharath et al., 2007). Documented benefits for borrowers are an increase in credit availability (Petersen and Rajan, 1995; Cole 1998), lower collateral requirements (Berger and Udell, 1995), and lower interest rates (Bharath et al., 2011). These benefits are higher for small and young firms with less established repayment histories and/or borrowers with poor credit ratings because they suffer from severe information asymmetries (Diamond, 1991; Petersen and Rajan, 1995; Bharath et

al., 2007). Better screening and monitoring by a relationship bank also reduce the cost of financial distress for borrowing firms by providing more credit to viable firms during crisis periods (Hoshi et al. 1991; Bolton et al., 2016) and facilitating debt renegotiation outside bankruptcy proceedings (Gilson et al., 1990; Demiroglu and James, 2015). Lending relationships are additionally associated with less underpricing in firms' IPOs (Schenone, 2005) and lower underwriter fees for issuers (Drucker and Puri, 2005).

The literature also highlights negative consequences of lending relationships reducing their net benefits for borrowers. First, a close lending relationship may impose hold-up costs on borrowers that they can mitigate by increasing the number of lenders (Detragiache et al., 2000; Farinha and Santos, 2002; Gopalan et al., 2011). Second, lending relationships increase the negative impact of banking crises on the credit channel when information frictions make it costly for debtors to switch from a financially distressed relationship bank (Bae et al., 2002; Khwaja and Mian, 2008; Chava and Purnanandam, 2011; Carvalho et al., 2015). Third, recent literature on loan evergreening and zombie lending shows that the main bank is more active in refinancing loans to financially distressed firms (Peek and Rosengren, 2005; Álvarez et al., 2023).

Lending relationships not only provide benefits for borrowers but are also valuable for lenders. Better information on debtor quality allows relationship banks to charge more risk-adjusted interest rates over time (Berger and Udell, 1992; Boot, 2000; Bolton et al., 2016). Prior lending relationships also increase the probability of securing future lending and investment banking business (Bharath et al., 2007) and are significantly associated with a higher probability of winning debt underwriting business (Yasuda, 2005; Ljungqvist et al., 2006).

Empirical evidence on the effects of relationship lending on default rates is very scarce and focuses on screening and monitoring as the channels through which relationship lending influences corporate default. Puri et al. (2017) show that prior relationships, even non-credit relationships, with retail customers allow saving banks in Germany to perform better screening and subsequent monitoring to reduce loan defaults. Jimenez and Saurina (2004) show that loans granted to Spanish firms with multiple lending relationships have lower default rates. They associate this result with multiple lending relationships increasing banks' incentives to perform better screening.

We contribute to this literature by providing direct evidence on a different channel through which lending relationships may affect loan default rates, that is, different borrower's incentives to default depending on the importance of the bank within the firm's set of lending relationships. Moreover, we analyze if banks internalize borrower incentives to repay debt depending on the bank's importance for the borrower in the recognition of their discretionary loan impairments.

2.2. Hypotheses

We argue in this paper that firms may prioritize debt repayment to their main or most important banks to preserve the value of their main lending relationships. Gilson et al. (1990) and Hoshi et al. (1991) were pioneers in showing with data from Japanese firms that a relationship bank reduces the cost of financial distress for borrowing firms. In particular, firms in financial groups perform better than nongroup firms after the onset of a crisis. Better screening and monitoring provide more information and allow the main bank to better identify viable firms and continue to provide them with funding. Bolton et al. (2016) demonstrate that the information advantage allows relationship banks to provide loans to viable firms during a crisis. While relationship banks charge higher intermediation spreads in normal times, they offer continuation lending on more favorable terms than transaction banks to viable firms in a crisis.

Moreover, most important banks may have more incentives to provide new funding to firms becoming financially distressed to preserve relationship rents. These rents include a higher increase in the probability of securing future lending and investment banking business (Bharath et al., 2007) and a higher probability of winning debt underwriting business (Yasuda, 2005; Ljungqvist et al., 2006). Additionally, Hu and Varas (2021) theoretically show that the main bank may have incentives to provide zombie lending to sufficiently reputable firms to avoid losses caused by liquidation of the firm if it can be refinanced with the market in the future to reduce loan losses. Recent empirical evidence suggests that main banks are more active in providing new credit to zombie firms (Álvarez et al., 2023).

We therefore predict that if firms with financial difficulties anticipate a higher probability of getting credit from the main bank, for any of the above reasons, they will have greater incentives to prioritize debt repayment to their main or most important banks to preserve their most valuable lending relationships. The consequence is that, once the firm is on the

verge of defaulting on its obligations, the main or most important banks will have fewer delinquent loans than other less important banks within the firm's lending relationships. Our first hypothesis is:

> *Hypothesis 1 (H1). The main or most important banks in lending relationships have lower loan delinquency rates than less important banks because firms prioritize debt repayment to them.*

Moreover, how firms prioritize debt repayment within their bank lending relationships may vary across firms because banking literature suggests that the benefits of lending relationships are higher for small and young firms with greater information asymmetries (Boot, 2000; Petersen and Rajan, 1995; Berger and Udell, 1995). For this reason, we expect small and young firms to prioritize to a greater extent debt repayment to their main banks in case of financial difficulties.

The value of the lending relationships also relates to the number of such relationships. Farinha and Santos (2002), Detragiache et al. (2000) and Gopalan et al. (2011) consider the endogeneity of this variable and show that firms choose the number of lending relationships to expand their access to credit and capital market services and reduce hold-up costs. A higher number of banking relationships diminishes ties between the borrower and the main bank, making the borrower less dependent on the main bank and reducing the value of the lending relationship. Therefore, a higher number of relationship banks diminishing the value of the lending relationship with the main bank also reduces the borrower's incentives to preserve the relationship. Therefore, we predict that a greater number of bank lending relationships will reduce the priority with which firms repay debt to their main or most important banks. Following the above arguments, our second hypothesis is:

> *Hypothesis 2 (H2). The priority of debt repayment to the main or most important banks is greater in small and young firms, and the lower the number of bank lending relationships.*

Lending relationships may affect not only the incentives of borrowers to repay debt, but also the discretionary recognition of loan losses by banks when they classify a loan as UTP. Main or most important banks may use their information on the borrower's repayment history to anticipate that the borrower will prioritize repayment to them in case of financial difficulties, generating lower credit risk, and justifying a lower recognition

of discretionary loan impairments before default than in other less important banks in the borrower's relationships. Moreover, if small and young firms, which obtain greater benefits from lending relationships, are the firms that place greatest priority on repayment to their most important banks, we would also expect lower recognition of discretionary loan impairments before default by the most important banks to be more intense for such firms. Therefore, our third hypothesis is:

> *Hypothesis 3 (H3). The main or most important banks in a borrower's lending relationships recognize lower discretionary loan impairments (discretionary UTP loans) because of the higher priority given by the borrower to repayment. This effect is stronger for small and young firms.*

3. Database, sample, and variables

We focus on Spanish non-financial firms that exhibited financial difficulties over the 2016Q3-2019Q4 period and use quarterly loan-level data at the firm-bank level. In particular, we analyze firms that did not have loans classified as defaulted, restructured or refinanced at the end of May 2016, but defaulted on some of their loans over the subsequent analysis period (until 2019Q4). Moreover, we follow recent and extensive empirical evidence based on firms that borrow from at least two banks to control for observed and unobserved firm heterogeneity (Gan, 2007; Khwaja and Mian, 2008).[5]

We combine three main databases from the Banco de España: 1) the Credit Register Database (CIR); 2) the Central Balance Sheet Data Office (CBSDO), and 3) the Bank Supervisory Database (BSD) containing balance sheet and income statement information of banks. The CIR contains monthly information on business loans granted by all banks operating in Spain and its reporting threshold since May 2016 is €3,000, which allows us to cover thoroughly the universe of business loans.[6] The CIR allows us to identify the borrower and the lender and provides information about maturity, type of the loan (commercial loan, leasing, credit line, and term loan), collateral, past due days, and the restructured or refinanced status of each loan. The CIR also provides some borrower-related information, such as firm size classification following the European Commission

[5] Multi-bank firms represent the 59.70% of the total firms and the 78,53% of the total credit included in our initial database at the end of 2016.

[6] The reporting threshold before May 2016 was €6,000 and, therefore, the use of the new CIR over all our analysis period allows us to improve the coverage of microenterprises and include virtually all loans to firms of all sizes.

Recommendation 2003/361/CE (large, medium, small, or micro enterprises). We collapse the CIR information at the quarterly level. This is particularly justified because a loan is considered delinquent when it has 90 days past due and, by definition of delinquency, a performing loan at month t will not be delinquent the next month.

We use this database to compute the number of bank lending relationships of each firm and the three proxies used to capture the importance of each bank within the firm's lending relationships. These three variables are: 1) the percentage of the amount of the outstanding loans of each bank over total bank debt in the firm (*Share*); 2) a dummy variable identifying the main bank providing the largest amount of credit to each firm (*Main*); and 3) the position of each bank within the set of lending banks of a given firm, based on the volume of credit granted (*Rank*). We apply an ascending order. For example, if a firm has loans with 5 banks, *Rank* takes the value of 5 for the main bank, 4 for the bank with the second largest credit volume granted to firm f, and so on. We divide this variable by the number of banks with which the firm has loans to normalize it between 0 and 1. The CBSDO provides information on firm age, and the BSD provides information on bank-level variables. Whenever they are available, we use consolidated bank balance-sheet and income-statement data.

Our analysis considers the existing banking groups in each quarter and excludes loans granted by foreign branches operating in Spain. Therefore, bank mergers and acquisitions reducing the number of banks also reduce the number of lenders over time and may change the values of our variables capturing the importance of the lending relationship between the bank and the firm. For instance, after the absorption of Banco Popular by Banco Santander, Banco Popular is no longer considered a bank in our sample and its loans increase the relationship of the borrower with Banco Santander. There were two significant bank mergers and acquisitions over our analysis period (Banco Popular-Banco Santander and BMN-Bankia).

We match each loan to firm age and to bank selected variables (assets, capital, risk-weighted assets, ROA, loan provisions, total loans). Our final sample includes a maximum of 2,991,552 observations coming from 745,193 loans granted to 53,569 firms

by 79 banking groups. Table 1 reports the main descriptive statistics of loan, firm, bank, and relationship characteristics.[7]

Figure 1 shows the percentage of relationships with a delinquent loan over our analysis period separately for relationships with the main bank and with the rest of banks. It also compares the mean of delinquency ratios between relationships with the main bank and relationships with the rest of banks. The figure in Panel A includes only microenterprises while the figure in Panel B includes the rest of firms (large, medium, and small).[8] Both figures show a lower percentage of relationships with a delinquent loan and a lower average delinquency ratio for main banks compared to the rest of non-main banks. It suggests that borrowers may have incentives to prioritize debt repayment to their main banks. A higher difference in the sub-sample of microenterprises (Panel A) is consistent with a higher value of lending relationships for these firms, because of their more severe information asymmetries. This explains greater incentives in microenterprises to prioritize debt repayment to their main banks. This descriptive analysis does not control for loan, bank, firm, and other relationship characteristics, but motivates our study and the subsequent empirical analysis.

TABLE 1

FIGURE 1

4. Identification strategy

We now describe our baseline model and how our set of fixed-effect estimators mitigates confounding effects in order to analyze the incentives of borrowers to prioritize their debt repayment depending on the importance of the bank within the firm's lending relationships.

[7] The CBSDO does not provide information for all the firms included in the CIR and this slightly reduces the number of observations when we include age in our regressions.

[8] We use the firm size categories defined by the European Commission Recommendation 2003/361/EC. Microenterprises are defined as those that employ fewer than 10 persons and whose annual turnover or annual balance sheet total does not exceed EUR 2 million. Small enterprises are those that employ fewer than 50 persons and whose annual turnover or annual balance sheet total does not exceed EUR 10 million. Medium-sized enterprises are those that employ fewer than 250 persons and either have an annual turnover that does not exceed EUR 50 million, or an annual balance sheet not exceeding EUR 43 million. Large enterprises are those that employ more than 250 persons.

As indicated above, we focus on firms without defaulted or refinanced and restructured loans at the end of May 2016, but which have some loans that become defaulted over the subsequent period. Our empirical strategy focuses on the first quarter in which a loan is classified as delinquent once it became overdue by more than 90 days to identify the loans and banks to which the borrower defaults first. We drop the loan from the sample once it is classified as delinquent and only return it to the sample if it becomes performing again. The basic model, which applies OLS as a linear probability model to analyze the probability that a loan becomes delinquent in the next quarter depending on the importance of the lending relationship, is the following:

$$Delinquent_{lbft+1} = \alpha_{bt} + \alpha_{ft} + \alpha_{bf} + \beta_1 Relationship_{lbft} + \beta_2 X_{lbft} + \varepsilon_{lfbt} \quad [1]$$

Where l refers to loans, b refers to banks, f refers to firms, and t refers to quarters. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t becomes delinquent (overdue by more than 90 days) in the next quarter and 0 otherwise. *Relationship* is the set of three alternative variables capturing the importance of bank b for firm f in quarter t (*Share*, *Main*, and *Rank*).

We saturate our specifications with several fixed effects to isolate confounding effects. First, we include bank-quarter fixed effects (α_{bt}) to ensure that the relationship between loan delinquency and the bank's importance for the borrower is driven by the borrower side. These fixed effects allow us to compare the same bank with several firms and, therefore, absorb unobservable and observable bank-specific characteristic related to the recognition of delinquent loans. For instance, bank-quarter fixed effects allow us to control for differences among banks using automatic or manual procedures for identifying loan default, applying an internal rating based (IRB) or the standardized approaches for credit risk, differences in the internal control mechanisms applied to identify the lack of borrower payment, differences in the probability that a bank will go to court to recover its debts or even differences in bank incentives to adequately recognize the compulsory loan default associated with lack of payment by borrowers.[9]

[9] These controls are even more important when we analyze the recognition of discretionary loan impairments by banks because the literature suggests that less capitalized banks have greater incentives to delay the recognition of loan losses (Gunther and Moore, 2003; Bischof et al., 2021) and implement a forbearance policy to financially distressed firms to avoid insolvency problems (Bergant and Kockerols, 2020; Dassati et al., 2021; Schivardi et al., 2022).

Second, the inclusion of firm-quarter fixed effects (α_{ft}) in our sample allows us to control for unobserved firm heterogeneity caused by specific time-varying firm characteristics that could also affect borrower's incentive to repay. Thus, we compare how the loan delinquency of a particular firm in one bank changes relative to another relationship bank. To the extent that the within comparison fully absorbs firm-specific changes, the estimated difference in the recognition of delinquent loans can be plausibly attributed to differences in the priority given by the firm to repaying debt to one bank rather than another. For instance, firm-fixed effects are important in our analysis to control for differences in firm quality and credit demand affecting the number of banks in which a firm is going to default.

We further saturate the regressions with bank-firm fixed effects to control for endogenous matching of banks and firms. In this case, variation in the recognition of loan losses comes from differences in loan loss recognition for the same bank-firm pair across different quarters with different importance in the firm's lending relationship. We test the robustness of the results by running the most saturated specification with every combination of the rest of the controls. We report results without and with these bank-firm fixed effects.

Finally, all regressions include additional controls at loan level (X_{lbft}). For instance, it is important to control for the loan amount because this affects the importance of the bank-firm relationship, but also the difficulty of loan repayment since larger loans are more difficult for borrowers to repay regardless of the value of lending relationship. Borrowers may also have more incentives to repay loans with collateral because banks could more easily force recovery of the loan. If the most important banks are also the ones that have granted a higher percentage of loans with collateral, a higher priority in debt repayment to the most important banks could be caused by the collateral and not by the borrower's incentive to prioritize debt repayment to its most important banks to preserve the value of the lending relationship. In particular, we include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; 5) a dummy to identify if the loan was refinanced or restructured when

we do not exclude these loans from the sample; and 6) the natural logarithm of the loan amount. We cluster standard errors at the bank level and check that the results do not change when standard errors are clustered at bank-quarter or bank-firm levels.

We additionally estimate our basic model in different subsamples to control for a potential influence of bank forbearance in the loan delinquency data used in the paper. In particular, we check that the results still hold when we exclude loans belonging to a particular bank-firm relationship affected by pre-existing loan restructuring or refinancing. This exclusion aims to control for potential differences in restructuring and refinancing practices between the main bank and other relationship banks. Such practices are associated with a bank's behavior and excluding them allows us to associate differences in loan delinquency among banks from a specific firm with the firm's payment behavior. [10]

5. Empirical results

5.1. Lending relationships and loan delinquency

We now report in Table 2 the regression estimates of model [1] analyzing how borrowers prioritize the repayment of their loans to banks depending on the importance of the bank within the firm's set of lending relationships. The coefficients of our three proxies for the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*) in columns (1), (4), and (7) are negative and statistically significant at the one percent level. The negative coefficients remain in columns (2), (5), and (8) when we additionally include bank-firm fixed effects in the regressions to control for endogenous matching between banks and firms. These results indicate that the likelihood of non-debt payment is smaller for firms where the bank is more important within the firm's set of bank lending relationships. The negative coefficients of *Share*, *Main*, and *Rank* also remain in columns (3), (6), and (9) when we exclude all the loans in a bank-firm relationship since the quarter prior to the occurrence of any restructuring or refinancing operation. This last result confirms that our results are not driven by potential differences in forbearance between the main bank or most important banks and the rest of the banks.

[10] Hu and Varas (2021) theoretically justify more forbearance by the main bank and empirical literature on loan evergreening and zombie lending indicates that main banks are more active in refinancing loans to financially distressed firms (Peek and Rosengren, 2005; Álvarez et al., 2023).

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These results suggest that borrowers prioritize debt repayment to the main or most important banks in their lending relationships. The economic effects are also relevant. For instance, the results in column (3) imply that a one standard deviation increase in the firm's share of outstanding debt with a particular bank (0.2793) reduces the probability of default with the bank from a mean value of 2.5% to 1.8%.

TABLE 2

Table 3 reports additional robustness checks analyzing different loan sub-samples. Although results in Table 3 control for loan characteristics, we check that the results remain when we exclude loans with collateral in column (1), when we exclude loans with maturity within the next quarter in column (2), or when we analyze separately each loan class (commercial loans, leasing, credit lines, and term loans) in columns (3)-(6). The coefficients of *Share*, *Main*, and *Rank* remain negative in all the estimations. The significant negative coefficients in the subsample of loans without collateral rule out that our results are driven by borrowers having more incentives to repay loans with collateral and by main banks having a greater proportion of this type of loans. Moreover, the significant negative coefficients in column (2) of all the panels suggest that our results are not driven by differences across banks in the percentage of loans with the shortest maturity. Only the coefficients of *Main* and *Rank* in the subsample of leasing operations are not statistically significant at conventional levels.[11] Therefore, our results are robust for all loan classes and after controlling for collateral and maturity.

TABLE 3

5.2 Firm heterogeneity: size, age, and the number of lending relationships

We now analyze whether small and young firms prioritize debt repayment to a greater extent to their most important banks, given that more severe information asymmetries may make it more valuable for them to preserve the most important lending relationships. We also analyze the influence of the number of the firm's lending relationships to test if a greater number of lending relationships reduces the value of its relationship with the most important banks and, therefore, the priority it gives to repaying debt to its most important banks. We analyze simultaneously the influence of firm size, age, and the

[11] Leasing is the less frequent type of credit in our sample because represents a 12% versus the 38% of term loans, the 36% of credit lines, and the 14% of commercial loans.

number of relationships to consider a potential positive relationship between these variables.

Table 4 reports the results using the subsample of loans in bank-firm lending relationships not affected by restructuring or refinancing practices and using different variables to capture the influence of borrower's size. *Relationship* refers, respectively, to *Share*, *Main*, and *Rank*. First, we use four dummy variables for each of the size categories defined by the European Commission Recommendation 2003/361/EC (*Large*, *Medium*, *Small*, and *Micro*). We omit *Large* in our estimations and, therefore, the coefficients of the other three dummy variables capture differences between each size category and the group of large firms. The results indicate that smaller firms place greater priority on debt repayment to their main or most important banks. In particular, the negative and significant coefficients of *Relationship* and *Relationship x Micro* in column (1) indicate that microenterprises prioritize debt repayment to their most important banks more than large, medium, and small firms do. The significant and negative coefficient of *Relationship x Micro* remains in columns (4) and (7) when we use respectively *Main* and *Rank* as proxies for the importance of each bank within the firm's lending relationships. We compare microenterprises with the rest of firms in columns (2), (5), and (8). The significant negative coefficients of *Relationship* and *Relationship x Micro* in all the estimations indicate that, on average, large, medium, and small firms prioritize debt repayment to their most important banks once they become distressed but that microenterprises prioritize debt repayment to their most important banks to a greater extent. These results are consistent with a higher value of lending relationships for the smallest firms, which provides them with greater incentives to prioritize debt repayment to their most important banks.

We additionally analyze in columns (3), (6), and (9) the influence of firm age and the number of the firm's lending relationships. The significant negative coefficients of *Relationship x Micro* remain in all the estimations, and we do not find significant coefficients for firm age or the number of lending relationships after controlling for firm size.

TABLE 4

5.3. Debt repayment by borrowers and bank solvency

We now analyze if the incentives of borrowers to prioritize debt repayment to their main or most important banks vary depending on bank solvency. Schwert (2018) is an exception in the scarce evidence analyzing how firms choose to borrow from one bank instead of another. He shows endogenous matching between firms and banks in which bank-dependent borrowers borrow from well-capitalized banks while firms with access to the bond market borrow from banks with less capital. His finding suggests that more bank-dependent borrowers, with a lower capacity to offset a reduction in bank credit supply, choose banks with the aim of guaranteeing a continued relationship over time. Similarly, once a borrower has established a relationship with a main bank, it might have different incentives to prioritize debt repayment depending on the solvency of the main bank if bank solvency affects the benefits of preserving the relationship. For instance, the literature suggests that lower capitalized banks have greater incentives to grant new credit to financially distressed firms (Bergant and Kockerols, 2020; Dassati et al., 2021; Schivardi et al., 2022), specially to firms in which they are the main banks (Peek and Rosengren, 2005). In this case, the borrower may place greater priority on debt repayment to its most important banks, the lower the bank solvency to keep the higher expected benefits of preserving the lending relationship.

We analyze this potential behavior including interaction terms between our proxies for the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*) and three proxies for bank solvency. Table 5 reports the results using the ratio of capital to total bank assets (*Capital ratio*), the return on assets (*ROA*), and the ratio of provisions to total defaulted or non-performing loans (*NPL coverage*) as indicators of the solidity of a bank's financial situation. All regressions control for bank size including the interaction of our relationship variables with the natural logarithm of total bank assets. As in the previous section, we exclude since the previous quarter any loans affected by restructuring or refinancing practices to mitigate confounding effects associated with bank behavior and ensure that loan delinquency only reflects the borrower's payment decision.

Share and *Rank* keep their negative and significant coefficients in all the estimations while the coefficients of the interaction terms with the proxies for bank solvency are mostly positive and significant. Only the coefficients of *Relationship x Capital ratio* and *Relationship x ROA* are not significant at conventional levels when we use *Rank* in

columns (9) and (10) as a proxy for the importance of the bank within the firm's lending relationships. The economic effect is also relevant. For instance, using the coefficients in column (1), banks with one standard deviation higher capital ratio (0.0208) will have a 2.6 percentage points increase in the probability of default in response to one percentage point increase in the ratio of firm's outstanding debt belonging to the bank.

These results suggest that firms place greater priority on debt repayment to the most important banks, the lower the solvency of such banks compared to others. This result is consistent with borrowers expecting higher benefits of preserving their most important lending relationships with less solvent banks. This may be associated both with less solvent banks being more willing to provide credit to firms in financial difficulties and/or with a greater reduction in the bank's credit supply to the firm once it defaults with a less solvent bank. It suggests not only that main banks reduce the cost of financial distress for borrowers, as previous empirical evidence shows (Gilson et al., 1990; Hoshi et al., 1991), but also that borrowers reduce the cost of financial distress for the weaker main banks in their lending relationships.

TABLE 5

Table 6 reports the results analyzing if the influence of bank solvency on how firm prioritize their debt repayments is higher in microenterprises. As lending relationships provide more benefits to such firms, they should be more interested in the continuation of the lending relationship. Consistent with results in Table 4, the results in Table 6 show mostly significant negative coefficients for the interaction term of *Relationship x Micro* and only the coefficient in column (4) is not statistically significant at conventional levels. Moreover, the coefficients of the interactions with the proxies for bank solvency (*Relationship x Bank solvency* or *Relationship x Bank solvency x Micro*) are mostly positive and significant. We do not find significant coefficients for any of these interaction terms in columns (4) and (7). The positive coefficients of *Relationship x Bank solvency* suggest that greater bank solvency reduces the incentives of borrowers to prioritize debt repayment to their most important banks, and the positive coefficients of *Relationship x Bank solvency x Micro* indicate that the effect of bank solvency is greater in microenterprises.

TABLE 6

5.4. A DID analysis of the stress tests and bank solvency

We now consider the disclosure of the outcomes of the banking stress tests by the European Banking Authority in November 2018 to provide additional evidence on the role of bank solvency. These stress tests were carried out on 48 banks in the European Union and Norway with assets of more than 30 billion euros and included the four largest Spanish banks (Banco Santander, BBVA, CaixaBank, and Banco Sabadell). We apply a triple difference-in-difference estimation to check if there was a change in how firms prioritized debt repayment to their most important banks after the disclosure of the stress testing results. In particular, we analyze if a worse result in the stress test for a main or an important bank in the borrower's lending relationships increases the priority of debt repayment by the borrower. We use loans granted by banks not included in the stress test as the control group. We analyze three quarters around the date of the outcome disclosure, and our baseline specification is:

$$Delinquent_{lbft+1} = \alpha_{bt} + \alpha_{ft} + \alpha_{bf} + \beta_1 Relationship_{lbft} + \beta_2 Relationship_{lbft} * Post_t + \beta_3 Relationship_{lbft} * ST_{bt} + \beta_4 Relationship_{lbft} * STscore_{bt} + \beta_5 Relationship_{lbft} * Post_t * ST_{bt} + \beta_6 Relationship_{lbft} * Post_t * STscore_{bt} + \beta_7 X_{lbft} + \varepsilon_{lbft} \quad [2]$$

where *Delinquent* and *Relationship* are defined as in model [1]. *Post* takes the value of one in the three quarters after the disclosure of the results (2018:Q4 to 2019:Q2) and 0 in the three quarters prior to the result disclosure (2018:Q1 to 2018:Q3). *ST* identifies the four stress-tested banks taking the value of one in these banks and 0 otherwise. As these four banks are the largest in Spain, their loans in our sample represent 60% of the whole sample. *STscore* identifies the stress testing results using two alternative proxies. First, we use the negative value of the capital ratio in the adverse stress scenario, where a higher value indicates that the bank solvency would be more negatively affected in the adverse scenario (*Capital deficit*) and, second, we use a variable that takes values between 1 and 4 to order the banks based on the capital ratio in the adverse stress scenario (*STrank*). This variable takes the value of 1 for the bank with the best result in the stress test (Banco Santander) and the value of 4 for the bank with the worst result (Banco Sabadell). Under these specifications, a negative (positive) value of β_5 would indicate that firms place more (less) priority on debt repayment to their most important banks after a more negative or less positive stress testing result.

Table 7 reports the results. We obtain negative and significant coefficients for *Relationship x Post* in all the estimations and negative and significant coefficients for *Relationship x STscore x Post* when we use *Share* and *Main* to measure the importance of the bank in the firm's lending relationships. These negative coefficients suggest that firms place greater priority on debt repayment to their most important banks after the disclosure of the stress testing results, the worse the result of the bank in the stress test. The coefficients of the triple interaction term are non-statistically significant at conventional levels using *Rank* as the measure of the bank's importance.

TABLE 7

5.5. Lending relationships and discretionary loan loss by banks

Previous sections show that borrower's incentives to repay debt to a particular bank increase with the importance of the bank within the borrower's lending relationships. We now analyze if banks internalize this borrower behavior in their credit risk models. To do this, we study if recognition of discretionary loan impairments by banks also depends on the relative importance of the bank for the borrower. Main and most important banks may use their information on the borrower's repayment history to anticipate that the borrower will prioritize debt repayment to them in case of financial difficulties. In this case, we should observe not only lower delinquent loans in main and most important banks but also less recognition of discretionary loan impairments, before loan delinquency, after controlling for the borrower's quality. Moreover, if small and young firms, which obtain greater benefits from lending relationships, are the borrowers that place greater priority on repayment to their most important banks, we would also expect that lower recognition of discretionary loan impairments, before delinquency, by the most important banks to be more intense for such borrowers.

We estimate model [1] but using as the dependent variable a dummy (*Discretionary UTP*) that takes the value of 1 if loan l granted by bank b to firm f in quarter t is classified as unlikely to be repaid in the next quarter but delays payment by less than 90 days. Otherwise, *Discretionary UTP* takes the value of 0.[12] We apply several filters in our sample to focus on discretionary loan impairments by banks and rule out the recognition of non-discretionary loan impairments or compulsory recognition of defaulted loans

[12] UTP loans are loans classified by the banks as defaulted following the EBA Guidelines and not having overdue principal or interest amounts for 90 days or more.

following EBA guidelines. First, we exclude all the loans belonging to a firm since the quarter before the firm has a delinquent loan (more than 90 days past due) with any bank. Second, we exclude all the loans belonging to a firm, not only loans from a particular bank-firm relationship, since the quarter prior to any restructuring or refinancing with any bank. Finally, we control in the regressions for the days past due for each of the loans by including the variable *ln (1+ number of days of delay)*.

Table 8 reports the main results. The coefficients of *Relationship* are negative and significant in all the estimations. They are negative in columns (1), (3), and (5), when we exclude all the loans belonging to a firm since the quarter before the firm has a delinquent loan with any bank. They are also negative in columns (2), (4), and (6) when we additionally exclude all loans belonging to the firm since the quarter prior to any refinancing or restructuring with any bank. These results indicate that the most important banks in the borrower's lending relationship recognize lower discretionary loan impairments than less important banks in the borrower's lending relationship before the firm experiences any loan delinquency or any loan restructuring and refinancing.

TABLE 8

We also analyze if the different recognition of discretionary loan losses by the most important banks in the firm's lending relationships varies across firms in a way that is consistent with their observed debt repayment. If the smallest firms place greater priority on debt repayment to their most important bank because the value of the lending relationship is greater in these firms, we also expect that the most important banks would recognize lower discretionary loan impairments in the smallest firms. Table 9 reports the results analyzing differences across firms depending on their size, age, and number of lending relationships. The significant negative coefficients of *Relationship x Micro* and the significant positive coefficients of *Relationship x log(1+age)* in all the estimations indicate that lower recognition of discretionary loan impairments by the most important banks is more intense for, respectively, smaller and younger firms. These results are consistent with the greater priority given by microenterprises in their debt repayment to the most important banks reported in Table 4 and with a higher value of the most important lending relationships for these firms.

TABLE 9

6. Conclusions

We show in this paper that borrowers' incentives to repay debt depend on bank importance within the firm's set of lending relationships. We find that borrowers prioritize debt repayment to their most important banks to preserve the most valuable bank relationships. This behavior is more pronounced for microenterprises and the lower the bank solvency. The greater benefit of lending relationships for smaller borrowers provides them with more incentives to prioritize debt payment to their most important banks. Lower bank solvency also increases borrowers' incentives to repay debt since continuity of the relationship, and the granting of new credit by the bank, depend to a greater extent on repayment of the debt by the borrower. We also show that banks internalize borrowers' debt repayment and recognize lower discretionary loan impairments in firms where the bank is one of the most important lenders.

Our results are robust to alternative specifications and control for loan characteristics and potential bank forbearance. Moreover, we use bank-quarter, firm-quarter, and bank-firm fixed effects to also control for observable and unobservable time-varying firm and bank characteristics and to isolate the incentives of borrowers to repay debt.

Our findings suggest a new channel through which relationship lending can help reduce loan default rates and bank credit risk. Relationship lending not only improve screening and monitoring by banks, as already suggest the literature, but also increase the incentives of borrowers to preserve the most valuable lending relationships. We therefore document a new benefit of relationship lending for banks.

In terms of regulatory implications, our results suggest the advisability of incorporating the importance of the bank-firm relationship for the borrower to improve bank risk measurement. Current regulation focuses on loan, firm, and macroeconomic variables to measure credit risk but does not consider borrower incentives to default. Our paper suggests that a greater importance of the bank within the firm's set of lending relationships reduces the borrower's incentives to default and diminishes credit risk.

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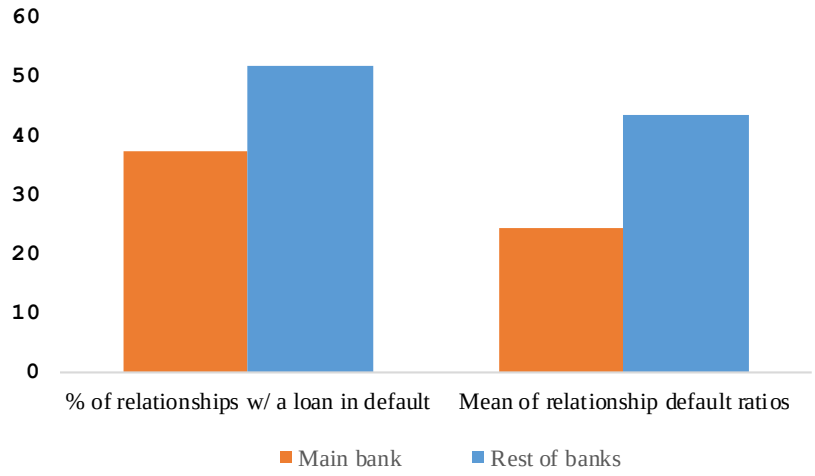
Figure 1

Loan delinquency: Differences between the main bank and the rest of the banks

The figure shows the percentage of relationships with a delinquent loan over our analysis period (2016:Q3-2019:Q4) separately for relationships with the main bank and with the rest of the banks. The main bank is identified as the bank with the largest amount of loans provided to the firm. Panel A shows the results for the sub-sample of microenterprises and Panel B shows the results for the rest of the firms (large, medium and small).

Panel A. Microenterprises



Panel B: Rest of firms (excluding microenterprises)

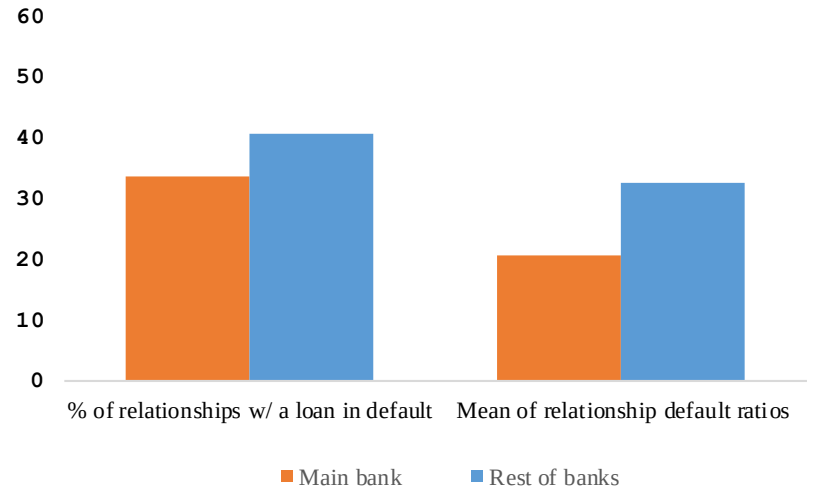


Table 1. Summary statistics

This table reports descriptive statistics of loan, firm, bank, and relationship characteristics. *Delinquent* is a dummy variable that takes the value of 1 if the loan of a bank with a particular firm in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. *Discretionary UTP* is a dummy variable that takes the value of 1 if the loan of a bank with a particular firm in quarter t is considered UTP in the next quarter following bank discretion and 0 otherwise. *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 for the main bank of each firm. *Rank* is the position of each bank within the set of lending banks of the firm based on the volume of credit granted and applying an ascending order. *Large*, *Medium*, *Small*, and *Micro* are four dummy variables identifying each of the firm size categories defined by the European Commission 2003/361/CE. *Age* is the number of years since the firm's creation. *Number of relationships* measures the number of lending relationships for each firm. *Log (Bank assets)* is the natural logarithm of total bank assets. *Capital ratio* is the ratio of the capital book value over total bank assets. *ROA* is the bank return on assets. *NPL coverage* is the ratio of loan loss provisions over total non-performing loans. *Collateral* is a dummy variable that takes the value of 1 for loans with collateral. *Maturity<3 months* is a dummy variable that takes the value of 1 if the loan expires the next quarter and 0 otherwise. *Commercial loans*, *Leasing*, *Credit lines*, *Term loans* are a set of four dummy variables to identify the type of loan. They take the value of 1 when the loan is, respectively, a commercial loan, a leasing, a credit line, or a term loan. *Absorbed bank* is a dummy variable to identify if the loan was granted by an absorbed bank. Main bank in the banking group is a dummy to identify if the loan belongs to the main bank in the banking group. *Ln (loan amount)* is the natural logarithm of the loan amount. *Ln (1 + number of days of delay)* is the natural logarithm of one plus the number of days of delay in UTP loans. All the variables are quarterly measured unless firm age which is annually measured.

Variable	N	Mean	SD	Minimum	Median	Maximum
Delinquent	2,991,552	0.0252	0.1568	0	0	1
Discretionary UTPs	2,144,459	0.0057	0.0755	0	0	1
Relationship Variables						
Share	2,991,552	0.3665	0.2793	$1.11e^{-08}$	0.2964	0.9999
Main	2,991,552	0.4228	0.4940	0	0	1
Rank	2,991,552	0.7604	0.2538	0.0227	0.8125	1
Firm variables						
Large	2,991,552	0.1072	0.3094	0	0	1
Medium	2,991,552	0.1446	0.3517	0	0	1
Small	2,991,552	0.3037	0.4598	0	0	1
Micro	2,991,552	0.4444	0.4969	0	0	1
Log (1+age)	2,862,812	2.6473	0.7828	0	2.7726	4.7707
Number of relationships	2,991,552	5.2122	3.6089	2	4	44
Bank variables						
Log (Bank assets)	2,991,552	18.9823	1.7749	10.7329	19.1985	21.1305
Capital ratio	2,991,552	0.0756	0.0208	0.0045	0.0736	0.6808
ROA	2,991,552	0.5148	0.5239	-5.7159	0.5609	3.8096
NPL coverage	2,991,552	0.4355	0.0844	0	0.4235	1
Loan variables						
Collateral	2,991,552	0.1114	0.3146	0	0	1
Maturity<3 months	2,991,552	0.0329	0.1784	0	0	1
Commercial loans	2,991,552	0.1405	0.3476	0	0	1
Leasing	2,991,552	0.1200	0.3249	0	0	1
Credit lines	2,991,552	0.3596	0.4799	0	0	1
Term loans	2,991,552	0.3799	0.4854	0	0	1
Absorbed bank	2,991,552	0.0472	0.2121	0	0	1
Main bank in the banking group	2,991,552	0.8628	0.3440	0	1	1
Ln (loan amount)	2,991,552	9.2857	2.4956	0.6931	9.7665	20.9615
Ln (1+number of days of delay)	2,144,459	0.1989	0.7917	0	0	4.5109

Table 2
Lending relationship and loan delinquency

This table reports the regression estimates of model [1]. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; 5) a dummy to identify if the loan was restructured or refinanced when we do not exclude these loans from the sample; and 6) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Without restructured or refinanced loans			Without restructured or refinanced loans			Without restructured or refinanced loans		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share	-0.024***	-0.023***	-0.022***						
	(0.002)	(0.001)	(0.001)						
Main				-0.006***	-0.002***	-0.002***			
				(0.001)	(0.000)	(0.000)			
Rank							-0.014***	-0.009***	-0.008***
							(0.001)	(0.001)	(0.001)
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Firm FE	N	Y	Y	N	Y	Y	N	Y	Y
R^2	0.5862	0.76691	0.6844	0.5858	0.6691	0.6843	0.5859	0.6691	0.6843
Obs.	3,250,063	3,232,612	2,991,552	3,250,063	3,232,612	2,991,552	3,250,063	3,232,612	2,991,552

Table 3

Robustness checks in alternative sub-samples

This table reports the regression estimates of model [1] in alternative sub-samples: loans without collateral, loans with maturity greater than one quarter, commercial loans, leasing, credit lines, and term loans. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. Panels A, B, and C report the results for each of the variables measuring the importance of the bank within the firm's lending relationships. *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm (Panel A); *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise (Panel B); and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order (Panel C). *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; 5) a dummy to identify if the loan was refinanced or restructured when we do not exclude these loans from the sample; and 6) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Panel A - Relationship: Share						
	Without collateral	Maturity>3 months	Commercial loans	Leasing	Credit lines	Term loans
	(1)	(2)	(3)	(4)	(5)	(6)
Share	-0.0220***	-0.0205***	-0.0117***	-0.0080**	-0.0354***	-0.0114***
	(0.0010)	(0.0010)	(0.0025)	(0.0038)	(0.0025)	(0.0028)
Loan controls	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y
R^2	0.6948	0.7036	0.7561	0.8228	0.7404	0.7716
Obs.	2,625,712	2,887,123	350,778	301,412	945,236	1,011,251
Panel B - Relationship: Main						
	Without collateral	Maturity>3 months	Commercial loans	Leasing	Credit lines	Term loans
	(1)	(2)	(3)	(4)	(5)	(6)
Main	-0.0024***	-0.0022***	-0.0021***	-0.0011	-0.0042***	-0.0007**
	(0.0003)	(0.0003)	(0.0006)	(0.0009)	(0.0006)	(0.0003)
Loan controls	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y
R^2	0.6947	0.7036	0.7561	0.8228	0.7403	0.7715
Obs.	2,625,712	2,887,123	350,778	301,412	945,236	1,011,251
Panel C - Relationship: Rank						
	Without collateral	Maturity>3 months	Commercial loans	Leasing	Credit lines	Term loans
	(1)	(2)	(3)	(4)	(5)	(6)
Rank	-0.0081***	-0.0075***	-0.0063***	-0.0014	-0.0145***	-0.0032**
	(0.0007)	(0.0006)	(0.0013)	(0.0018)	(0.0014)	(0.0013)
Loan controls	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y
R^2	0.6947	0.7036	0.7561	0.8228	0.7404	0.7715
Obs.	2,625,712	2,887,123	350,778	301,412	945,236	1,011,251

Table 4

Lending relationship and loan delinquency. Firm heterogeneity

This table reports the regression estimates of model [1] incorporating the effects of firm size, age, and the number of the firm's lending relationships. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. Loans affected by refinancing or restructuring practices are excluded from the quarter prior to refinancing or restructuring. *Relationship* refers to the variable measuring the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*). *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. *Large*, *Medium*, *Small*, and *Micro* are four dummy variables identifying each of the firm size categories defined by the European Commission 2003/361/CE. *Large* is omitted in the estimations. *Age* is the number of years since the firm's creation. *Number of relationships* measures the number of lending relationships for each firm in each quarter. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; and 5) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Share			Main			Rank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Relationship	-0.008***	-0.010***	-0.010**	-0.001*	-0.001***	-0.001	0.001	-0.003***	-0.005
	(0.003)	(0.001)	(0.004)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.003)
Relationship × Medium	-0.001			-0.001			-0.005**		
	(0.003)			(0.001)			(0.002)		
Relationship × Small	-0.003			-0.000			-0.005***		
	(0.003)			(0.001)			(0.002)		
Relationship x Micro	-0.026***	-0.024***	-0.023***	-0.002***	-0.002***	-0.002***	-0.015***	-0.011***	-0.010***
	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Relationship x log (1+age)			0.000			-0.000			0.001
			(0.002)			(0.001)			(0.001)
Relationship x Number of relationships			-0.000			-0.000			-0.000
			(0.000)			(0.000)			(0.000)
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.6844	0.6844	0.6784	0.6843	0.6843	0.6783	0.6843	0.6843	0.6783
Obs.	2,991,552	2,991,552	2,862,808	2,991,552	2,991,552	2,862,808	2,991,552	2,991,552	2,862,808

Table 5. Debt repayment by borrowers and bank solvency

This table reports the regression estimates of model [1] incorporating the effect of bank solvency. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. Loans affected by refinancing or restructuring practices are excluded from the quarter prior to refinancing or restructuring. *Relationship* refers to the variable measuring the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*). *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. *Log (Bank assets)* is the natural logarithm of total bank assets. *Capital ratio* is the ratio of the capital book value over total bank assets. *ROA* is the bank return on assets. *NPL coverage* is the ratio of loan loss provisions over total non-performing loans. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; and 5) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Share				Main				Rank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Relationship	-0.013***	-0.022***	-0.021***	-0.012**	0.000	-0.001	-0.001	0.001	-0.007***	-0.008***	-0.008***	-0.008***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Relationship × Log (Bank assets)	0.002	0.000	0.000	0.001	-0.000	-0.001	-0.001	-0.001	0.001	0.000	0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Relationship × Capital ratio	0.031***			0.026***	0.006*			0.003	0.005			-0.001
	(0.008)			(0.010)	(0.003)			(0.004)	(0.005)			(0.006)
Relationship × ROA		0.002*		0.002		0.001**		0.001*		0.002*		0.002*
		(0.001)		(0.002)		(0.000)		(0.001)		(0.001)		(0.001)
Relationship × NPL coverage			0.014***	0.014***			0.004***	0.004***			0.009***	0.009***
			(0.003)	(0.003)			(0.001)	(0.001)			(0.002)	(0.002)
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684
Obs.	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552

Table 6. Heterogenous effects across bank solvency in microenterprises

This table reports the regression estimates of model [1] incorporating the effect of bank solvency and using the sub-sample of microenterprises. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. Loans affected by refinancing or restructuring practices are excluded from the quarter prior to refinancing or restructuring. *Relationship* refers to the variable measuring the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*). *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. *Log (Bank assets)* is the natural logarithm of total bank assets. *Capital ratio* is the ratio of the capital book value over total bank assets. *ROA* is the bank return on assets. *NPL coverage* is the ratio of loan loss provisions over total non-performing loans. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank, 4) a dummy to identify if the loan belongs to the main bank in the banking group, and 5) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Share			Main			Rank		
	Capital ratio	ROA	NPL coverage	Capital ratio	ROA	NPL coverage	Capital ratio	ROA	NPL coverage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Relationship	-0.005	-0.009*	-0.008	0.000	-0.000	0.000	-0.004*	-0.004*	-0.004*
	(0.004)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Relationship x Log (Bank assets)	0.001	-0.001	-0.001	-0.000	-0.001	0.001	0.001	0.000	0.001
	(0,002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Relationship x Micro	-0.013**	-0.024**	-0.023***	0.000	-0.002***	-0.002***	-0.008**	-0.011***	-0.010**
	(0.005)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)
Relationship x Bank solvency	0.016**	0.001	0.014***	0.003	0.000	0.005***	0.003	0.001*	0.009***
	(0.008)	(0.001)	(0.003)	(0.002)	(0.000)	(0.001)	(0.004)	(0.001)	(0.002)
Relationship x Micro x Bank solvency	0.026*	0.003**	0.002	0.005	0.002**	-0.002	0.005	0.000	-0.001
	(0.013)	(0.001)	(0.003)	(0.005)	(0.001)	(0.001)	(0.007)	(0.002)	(0.004)
Micro x Bank solvency	-0.002	-0.002*	-0.004**	0.005	-0.001	-0.002	0.003	-0.000	-0.002
	(0.007)	(0.001)	(0.002)	(0.006)	(0.001)	(0.002)	(0.008)	(0.001)	(0.003)
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684
Obs.	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552	2,991,552

Table 7

Effect of the disclosure of stress testing results: a DID analysis.

This table reports the regression estimates of model [2]. The dependent variable $Delinquent_{lbft+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is overdue by more than 90 days in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. Loans affected by refinancing or restructuring practices are excluded from the quarter prior to refinancing or restructuring. *Relationship* refers to the variable measuring the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*). *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. *Post* takes the value of one in the three quarters after disclosure of the results (2018:Q4 to 2019:Q2) and 0 in the three quarters prior to disclosure (2018:Q1 to 2018:Q3). *ST* identifies the four stress-tested banks taking the value of one in these banks and 0 otherwise. *STscore* identifies the stress testing results using two alternative proxies: *Capital deficit* is the capital that would be needed to reach the minimum required in the adverse scenario, and *STrank* that takes values between 1 and 4 to order the banks based on the stress testing results. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; and 5) the natural logarithm of firm's outstanding debt. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	STscore= Capital deficit			STscore=STrank		
	Share	Main	Rank	Share	Main	Rank
	(1)	(2)	(3)	(4)	(5)	(6)
Relationship	-0.007*	-0.000	-0.001	-0.007*	-0.000	-0.001
	(0.005)	(0.001)	(0.002)	(0.004)	(0.001)	(0.002)
Relationship x Post	-0.018***	-0.005***	-0.014***	-0.018***	-0.005***	-0.014***
	(0.003)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)
Relationship x ST	-0.007	0.038***	0.023	-0.005	-0.003	0.001
	(0.056)	(0.014)	(0.024)	(0.007)	(0.002)	(0.005)
Relationship x STscore	0.000	0.004**	0.002	-0.001	0.002**	0.001
	(0,006)	(0.002)	(0.003)	(0,002)	(0.001)	(0.001)
Relationship x ST x Post	-0.099***	-0.049**	0.041	0.014***	0.006**	-0.000
	(0.033)	(0.019)	(0.028)	(0.005)	(0.003)	(0.004)
Relationship x STscore x Post	-0.011***	-0.005*	0.004	-0.005***	-0.003***	0.002
	(0.004)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)
Loan controls	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y
R^2	0.715	0.715	0.715	0.715	0.715	0.715
Obs.	1,336,816	1,336,816	1,336,816	1,336,816	1,336,816	1,336,816

Table 8

Discretionary loan impairments and lending relationships

This table reports the regression estimates of model [1] using as the dependent variable the discretionary bank decision classifying a loan as impaired. The dependent variable $UTP_{lbflt+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is classified as impaired in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. In columns (1), (3), and (5), we exclude all the loans belonging to a firm since the quarter before the firm has a loan default with any bank. In columns (2), (4), and (6), we also exclude all the loans belonging to a firm, not only those from a particular bank-firm relationship, since the quarter prior to any refinancing or restructuring with any bank. All the regressions include the variable *ln (1+ number of days of delay)* as additional control variable. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy if the loan belongs to the main bank in the banking group; 5) a dummy to identify if the loan was refinanced or restructured when we do not exclude these loans from the sample; and 6) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Share		Main		Rank	
	(1)	(2)	(3)	(4)	(5)	(6)
Relationship	-0.0050***	-0.0053***	-0.0011***	-0.0011***	-0.0024***	-0.0026***
	(0.0008)	(0.0007)	(0.0002)	(0.0002	(0.0005)	(0.0006)
Loan controls	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y
R^2	0.5978	0.6181	0.5978	0.6181	0.5978	0.6181
Obs	2,602,966	2,144,459	2,602,966	2,144,459	2,602,966	2,144,459

Table 9

Discretionary loan impairments and lending relationships. Differences across firms

This table reports the regression estimates of model [1] using as the dependent variable the discretionary bank decision classifying a loan as impaired. The dependent variable $UTP_{lbflt+1}$ takes the value of 1 if loan l of bank b with firm f in quarter t is classified as impaired in the next quarter and 0 otherwise. Once the loan takes the value of 1 in quarter t, it is dropped from the sample in the following quarters. *Relationship* refers to the variable measuring the importance of the bank within the firm's lending relationships (*Share*, *Main*, and *Rank*). *Share* is the ratio of the amount of outstanding loans of a particular bank over total bank debt in the firm; *Main* is a dummy variable that takes the value of 1 if bank b is the main bank of firm f in quarter t and 0 otherwise; and *Rank* is the position of the bank b within the set of lending banks of firm f based on the volume of credit granted and applying an ascending order. We exclude all the loans belonging to a firm since the quarter before the firm has a loan default with any bank and we also exclude all the loans belonging to a firm, and not only loans from a particular bank-firm relationship, since the quarter prior to any refinancing or restructuring with any bank. *Large*, *Medium*, *Small*, and *Micro* are four dummy variables identifying each of the firm size categories defined by the European Commission 2003/361/CE. *Large* is omitted in the estimations. *Age* is the number of years since the firm's creation. *Number of relationships* measures the number of lending relationships for each firm in each quarter. All the regressions include the variable *ln (1+ number of days of delay)* as additional control variable. *Loan controls* include: 1) a set of fixed effects for eight types of loans depending on whether the loan belongs to one of the following four classes (commercial loans, leasing, credit lines, and term loans) and whether it has collateral or not; 2) a dummy that takes the value of 1 if the loan expires the next quarter and 0 otherwise to control for loan maturity; 3) a dummy to identify if the loan was granted by an absorbed bank; 4) a dummy to identify if the loan belongs to the main bank in the banking group; and 5) the natural logarithm of the loan amount. Standard errors clustered at the bank level are reported in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

	Share			Main			Rank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Relationship	0.003	-0.001	-0.012***	0.001	-0.000	-0.0040***	-0.000	-0.001	-0.007***
	(0.003)	(0.001)	(0.003)	(0.000)	(0.000)	(0.0013)	(0.001)	(0.001)	(0.002)
Relationship × Medium	-0.006**			-0.001*			-0.001		
	(0.003)			(0.001)			(0.002)		
Relationship × Small	-0.003			-0.000			0.001		
	(0.003)			(0.001)			(0.002)		
Relationship x Micro	-0.013***	-0.010***	-0.008***	-0.004***	-0.003***	-0.003***	-0.005***	-0.005***	-0.004***
	(0.004)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Relationship x log (1+age)			0.004***			0.002***			0.002***
			(0.001)			(0.001)			(0.001)
Relationship x Number of relationships			-0.000			-0.000			-0.000
			(0.000)			(0.000)			(0.000)
Loan controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm×Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.6181	0.6181	0.6144	0.6181	0.6181	0.6144	0.6181	0.6181	0.6144
Obs.	2,144,459	2,144,459	2,062,202	2,144,459	2,144,459	2,062,202	2,144,459	2,144,459	2,062,202