

# Lending Relationships in Loan Renegotiation: Evidence from Corporate Loans

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## Abstract

This paper presents evidence that personal relationships between corporate borrowers and bank loan officers improve the outcomes of loan renegotiation. Exploiting a bank reorganization in Greece in the mid-2010s, I find that firms that experience an exogenous interruption in their loan officer relationship confront three consequences: one, the firms are less likely to renegotiate their loans; two, conditional on renegotiation, the firms are given tougher loan terms; and three, the firms are more likely to alter their capital structure. These results point to the importance of lending relationships in mitigating the cost of distress for borrowers in loan renegotiations.

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# 1 Introduction

Are personal relationships with bank loan officers consequential for corporate borrowers? Could stronger relationships help a firm secure better loan terms in a renegotiation? Most corporate credit is mediated by a personal relationship between a firm and a loan officer, as this connection helps to mitigate agency problems. Financial intermediation theory suggests that relationships can be beneficial because they reduce information asymmetries and alleviate moral hazard (through monitoring, screening, repeated interaction etc.).<sup>1</sup> At the same time, strong relationships between borrowers and lenders may give rise to other problems, e.g., soft-budget-constraint problems, hold-up problems, or nepotistic behavior.<sup>2</sup> Whether the benefits of these relationships offset the costs is a challenging empirical question.

In this paper, I study the impact of lending relationships between loan officers and firms on loan renegotiations and investigate whether these relationships have significant effects on the probability of successful renegotiation and on the newly agreed loan terms. A renegotiation can be initiated by either the creditor or the borrower prior to or coincident with default on a loan. Classic contract theory suggests that in unanticipated states of the world, renegotiation is Pareto improving.<sup>3</sup> Especially when financial distress results from a macroeconomic shock, it is probable that both the bank and the borrower benefit from a successful renegotiation. Renegotiation relaxes inefficient constraints on the borrowers as well as the bank and can increase expected loan repayments.

There are two main challenges for accurately estimating the impact of personal relationships on loan renegotiation. The first is the difficulty of quantifying the value of a personal relationship. No direct measure of relationship intensity exists. The length of a given relationship may seem like a straightforward measure, but the endogeneity of the decision to sever an existing relationship will

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<sup>1</sup>Classic references: Leland and Pyle (1977), Diamond (1984), Ramakrishnan and Thakor (1984), Allen (1990)

<sup>2</sup>Sharpe (1990), Rajan (1992), Dewatripont and Maskin (1995), Bolton and Scharfstein (1996)

<sup>3</sup>Hart and Moore (1988), Rajan (1992), Aghion, Dewatripont, and Rey (1994), Bolton and Scharfstein (1996), Hart and Moore (1998), Maskin and Moore (1999), Gorton and Kahn (2000), Garleanu and Zwiebel (2008)

complicate the interpretation of the time span measure. The endogeneity factor creates the second challenge. A bank's decision to break an existing relationship may reflect its perception of the declining creditworthiness of the borrower. Under some circumstances a successful firm may seek to broaden its access to external finance by weakening its relationship with the particular bank. Such decisions are endogenous and would bias any results estimated by treating relationships as exogenous in a simple OLS framework.

To overcome these challenges, I use micro data and a 2013 bank reorganization in Greece. This experiment provides exogenous variation in the length of the relationships between loan officers and firms. Moreover, detailed confidential data on corporate loans allow me to quantify accurately the effect of interrupted relationships, by controlling for region, bank unit, and firm-specific effects. My central finding is that relationships between loan officers and firms have a significant positive impact on loan renegotiation. Firms with interrupted relationships are less likely to renegotiate a loan compared to firms experiencing continuous relationships. In addition, firms with interrupted relationships receive tougher loan terms on the loans that are renegotiated. I also observe that firms alter their capital structure after the relationship with the loan officer is interrupted.

The empirical setting is based on the consolidation of a major commercial bank in Greece with business activity throughout the country. Bank network consolidation is a common response of banks to financial distress, as consolidation reduces operating costs and centralizes lending decisions.<sup>4</sup> During consolidation, some bank units are closed and the loan accounts from those units are merged with accounts in other surviving units. A bank unit closure interrupts personal relationships between loan officers and firms because merged accounts obtain new loan officers. Thus, after consolidation, two types of firms are identified: one, those whose loans were transferred to another unit and whose personal relationships were consequently discontinued, and two, those that remained at the same unit for the entire period.

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<sup>4</sup>Several banks in Italy, Spain, Portugal have consolidated their network during the recent crisis as well as banks in the United States.

The criterion for bank units' consolidation was geographic location. My identifying assumption is that the decision to close a bank unit is orthogonal to firms' characteristics. I find support for that assumption in the data by testing for differences in observable characteristics. First, I compare the loan terms and performance, and firm financial variables of borrowers in closed and open units in the pre-unit closure period and I find no statistically significant differences. Second, I provide out-of-sample evidence that the identifying assumption holds by using the Amadeus Bureau van Dijk dataset to test for differences based on the zip codes of bank units.

I apply a difference-in-difference methodology to estimate the effect of relationship interruption. I define as *treated* the firms with exogenously discontinued personal relationships and as *control* those with continuing relationships. Hard information passed from one loan officer to another as the transfer happened within the same bank. Observed differences between the two groups in the post-consolidation period should be driven by the consequences of interrupted relationships.

I find strong evidence for the significant effect of personal relationships on loan renegotiations at both extensive and intensive margins. Loans to firms with interrupted relationships have a 14% lower probability to be renegotiated upon their transfer to another unit, compared to loans to firms that remained at the same unit. The unconditional probability of renegotiating a loan is 59% and the estimated effect corresponds to a 9% lower probability of renegotiation. Moreover, conditional on renegotiating a loan, affected firms received tougher loan terms on their renegotiated loans. The affected loan terms for firms whose accounts were transferred to another unit include higher interest rates, approximately 150% shorter maturities, and requirements that these firms pledge 50% more collateral per loan amount compared to firms that remained with their original bank unit for the entire period. The economic magnitudes of the impact on loan maturity and collateral are significant as they correspond, on average, to approximately two years shorter maturity and an additional €0.65 of collateral for each euro of loan amount. The results remain robust when I exploit a within-firm variation and apply a difference-in-difference-in-differences methodology. This confirms that the effect of the interrupted relationships is not driven by any firm characteristics.

I also observe that firms alter their capital structure after their relationship with the bank is interrupted. The change in capital structure indicates that firms cannot substitute lending from other banks without cost when the relationship with one bank is exogenously interrupted. In particular, we observe that, when the relationship with one bank is interrupted, firms raise more equity and decrease leverage. Firms only partially substitute loans from other banks to make up for the borrowing reduction from the bank whose relationship was severed. This change in a firm's sources of financing is likely to have important implications for the firm's business model and investments.

A possible selection bias on renegotiation could change the interpretation of the results for loan term differences between interrupted- and continuing-relationship loans. If the loan officer chooses to renegotiate with firms based on their performance, the intensive margin results will be biased. To address this concern, I conduct two tests. First, I compare the pre-unit-closure period characteristics of the treated and control firms that renegotiated a loan in the post-unit-closure period and I find no statistically significant difference. Second, I consider all the hard information available to both the loan officer and the econometrician to identify the variables that can trigger a renegotiation. This test demonstrates that the loan officer who remained at the same unit for the entire period chose to renegotiate with treated firms with higher profitability prospects. Loan officer behavior, therefore, biases estimated coefficients towards zero, implying that my intensive margin results are conservative.

To further investigate the explanatory mechanism for the value of a relationship between a loan officer and a firm, I examine closer and more distant relationships separately. In most cases, a closer relationship entails fewer outside financing options, and when a closer relationship is interrupted, it causes a significant informational loss. In contrast, firms with more distant relationships and, hence, greater outside financing options are expected to have stronger bargaining power. To test for the value of a stronger relationship, I construct a measure of relationship strength. This analysis confirms the value of relationships, as a firm with a stronger previous loan-officer relationship displays a significant negative effect on its renegotiated loan terms when this relationship ends.

This paper's main conclusion is that personal relationships mitigate the cost of distress for the firm in a loan renegotiation. The firm is worse off following the interruption of its loan officer relationship, as it is less able to renegotiate, and receives tougher loan terms on renegotiated loans. Moreover, an interruption of the firm-loan officer relationship causes the firm to alter its capital structure and its sources of financing. These results may be driven either by a loss of valuable soft information or by unwarranted favoritism. The similar performance of firms with interrupted relationships with that of firms with continuing relationships as well as the firm level effects support the view that favoritism is not driving the results.

In the next section, I describe the paper's contributions to the literature. In section 3, I provide an overview of the institutional background and the dataset structure. In section 4, I present the empirical specification and a detailed comparison of the treated and control groups. The regression results are presented in section 5. In section 6, I conclude.

## 2 Related Literature

This paper contributes to the literature by being the first to combine two classic research streams—relationship banking and contract renegotiation—and by estimating the consequences of personal relationships between loan officers and firms for loan renegotiations.

The broader literature to which this study contributes addresses the role of relationships in credit markets. A rich theoretical literature on bank debt highlights the importance of informational asymmetry and moral hazard for financial intermediation.<sup>5</sup> Several empirical papers have examined the relationship between banks and borrowers for evidence to determine whether asymmetric information affects lending. Petersen and Rajan (1994) and Berger and Udell (1995) used

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<sup>5</sup>Jaffee and Russell (1976); Stiglitz and Weiss (1981); Myers and Majluf (1984); Diamond(1984,1991); Ramakrishnan and Thakor (1984);Sharpe (1990); Besanko and Kanatas (1993); Rajan and Winton (1995);Bolton and Freixas (2000)

the repeated interaction between a borrower and a financial institution as a measure of relationship. Mian (2006), Agarwal and Hauswald (2010), Canales and Nanda (2012), and Bolton, Freixas, Gambacorta, and Mistrulli (2016) define relationship lending as a function of geographic distance. Ongena and Smith (2001) analyze the duration of a bank relationship with a firm. Sufi (2007) and Ivashina (2009) explore informational asymmetries in a lending syndicate.<sup>6</sup>

The empirical literature to which this paper is most closely related identifies the effects of personal relationships between bank employees and borrowers. These studies focus on how loan approvals or performance can be influenced by different factors such as cultural proximity (Fisman, Paravisini, and Vig, 2017), social connections (Haselmann, Schoenherr, and Vig, 2016), hierarchical and geographical distance (Liberti and Mian, 2009), or the loan officer being on leave (Drexler and Schoar, 2014). Several papers examine the effect on interest rates of strong interpersonal connections between a banker and a firm (Engelberg, Gao, and Parsons, 2012), or the effect of a strong relationship as measured by the number of interactions (Herpfer, 2017), or the effect of an interruption of a relationship caused by an executive's death or retirement (Karolyi, 2018). Lastly, Hertzberg, Liberti, and Paravisini (2010) and Cole, Kanz, and Klapper (2015) provide insights on the effects of bank-specific governance policies on the moral hazard behavior of a loan officer.

Within the field of literature on relationship banking, this paper is the first to demonstrate how exogenous interruptions in bank-borrower relationships affect loan renegotiation. One important difference between new and renegotiated loans is the bank's prior exposure to the risk of default on pre-existing loans, which gives the borrower a stronger negotiation position. The risk of a higher probability of default is magnified in a crisis period, such as in Greece in 2010-2015, when banks faced very high delinquency ratios that drove their overall risk assessment. In such periods, the value of a successful renegotiation surges.<sup>7</sup> This paper not only shows the effect of relationships on the probability of renegotiation, but also on the attributes of the loans that are renegotiated.

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<sup>6</sup>Extensive surveys of this literature are provided by Ongena and Smith (2000), Boot (2000), Srinivasan (2014)

<sup>7</sup>Karolyi (2018) highlights also the importance of lending relationships during recessions.

Further, whereas existing literature focuses on estimating relationship effects on lending either at the extensive margin or on the interest rate only, this paper examines the impact on the three main variables characterizing the loan structure (i.e., interest rate, maturity, and collateral).

Given that the main focus of this paper is loan renegotiations, the analysis also contributes to the literature on contract renegotiation. Several influential papers have examined renegotiation in incomplete contracts as an out-of-equilibrium phenomenon.<sup>8</sup> Although the existing theory of contract renegotiation has evolved significantly, the empirical evidence on this topic is limited due to data restrictions. This paper investigates renegotiation independent of previous defaults on a loan payment, and for that reason is also related to the work of Roberts and Sufi (2009), who analyze in detail the factors triggering a renegotiation, and those determining its outcomes. Roberts (2015) is the closest to my paper, as he shows that a corporate loan renegotiation happens frequently, modifies significantly the initial loan terms, and is affected significantly by the duration of the lending relationship. Although similar conclusions to those found in these two papers arise in my analysis regarding the frequency and the outcomes of a renegotiation, my paper advances beyond these to estimate the effect of the relationship between a loan officer and a borrower on the probability of renegotiation and the nature of its outcomes.

A few empirical papers have considered other factors affecting loan renegotiation. The importance of the liquidation value of collateral (Benmelech and Bergman, 2008) of the mortgage securitization (Piskorski, Seru, and Vig, 2010), and of policy intervention (Agarwal, Amromin, Ben-David, Chomsisengphet, Piskorski, and Seru, 2017) on loan renegotiation are highlighted. James (1995) focuses on debt restructurings and shows that the financial condition of the firm determines the bank's incentives to make concessions. Lastly, Chodorow-Reich and Falato (2017) show the importance of the financial institution's health on contracting credit using covenant violations.

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<sup>8</sup>Hart and Moore(1988 1998, Rajan (1992), Aghion et al. (1994), Von Thadden (1995), Bolton and Scharfstein (1996), Maskin and Moore (1999), Gorton and Kahn (2000), Garleanu and Zwiebel (2008), Tirole (2010)

This paper also complements literature examining the impact of bank branch consolidation. In this area, the most relevant paper is by Nguyen (2019), as she examines how branch closures in the United States affect local access to credit. Lastly, this paper is linked to the strain of European debt crisis literature that employs micro-level data to identify the impact on bank lending.<sup>9</sup>

## **3 Institutional Background & Data**

### **3.1 Institutional Background**

The identification setting and the data that I use in this paper come from a Greek bank and cover the period 2012–2015. Several important facts characterize the economy and the banking sector of that period.<sup>10</sup> From 2008 and until the end of 2016, the Greek GDP contracted by approximately 25%; unemployment rose to approximately 26% of the labor force, the highest level in the European Union; and investment declined by 75%. The collapse in investment was partially caused by a decreased access to credit. Access to finance was the most pressing concern for small- and medium-size enterprises (SMEs) operating in Greece, as 33% of SME owners consider this their most important problem.<sup>11</sup> This issue is critical given that SMEs account for more than 90% of private companies and 87% of total employment.

The Greek banking sector suffered during this period from a lack of access to international capital markets, deposit flight, and losses from the sovereign debt restructuring. Several banks were resolved and their deposits as well as a number of their loan portfolios were transferred to the four largest banks, thus causing a significant centralization of the sector. The four largest banks

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<sup>9</sup>Acharya, Eisert, Eufinger, and Hirsch (2016), Bentolila, Jansen, and Jiménez (2016), Cingano, Manaresi, and Sette (2016), Popov and Van Horen (2015), De Marco (2016)

<sup>10</sup>Gourinchas, Philippon, and Vayanos (2017) provide a detailed empirical and theoretical analysis of the Greek crisis.

<sup>11</sup>OECD, 2016 Financing SMEs Report

went through three large-scale recapitalizations (July 2013, May 2014, and December 2015) during this period. However, availability of long-term finance remained limited, and cost of credit was very high compared to EU standards. One of the main reasons for the limited credit supply was the deterioration of banking asset quality. In 2016, the nonperforming loans (NPLs) reached 45% of the loan portfolio, and provisions stood at 50% of total NPLs. In particular, in the corporate sector, about 60% of loans to small- and medium-size businesses were nonperforming. The rise of the NPLs ties up bank capital, thereby reducing profitability and increasing funding costs.

In this paper, I exploit a major internal reorganization that was implemented in one of Greece's largest banks, and led to the closure of bank units. It is important to clarify what a bank unit is and distinguish bank units from branch closures. In this case, a bank unit entails a center that manages corporate loans, and more centralized centers managing specific loan types. For the analysis that follows, a bank unit can be considered a type of branch, because, as in distinct branches, personal relationships develop between loan officers and the firm whose loans they manage.

The main goal of this internal reorganization was increased efficiency regarding NPL management. In response to the significant rise in the NPL ratio for corporate loans, the bank established specialized NPL workout units at the end of 2013. The new units were separate from the units responsible for loan origination and were responsible for monitoring, managing, or liquidating the nonperforming exposures. Approximately half of total loans to small- and medium-size corporations were transferred to these specialized NPL units.

This transfer of loans to the NPL units caused a significantly reduced workload for the original units assigned to manage corporate loans. Consequently, it became cost effective for the bank to consolidate the original units, by closing several and relocating the loans' management to the closest unit that remained open. Originally there were 112 units that managed corporate loans, and after the mergers, there were 37. The bank intended to retain its network across the country, ensuring clients would remain. For that reason, the main criterion for mergers was geographic location, and mergers would only take place in areas served by two or more units. The unit remaining open

in a given area, would be the unit managing the largest volume of loans. An important feature of the consolidation was the relocation of the loan officers. Loan officers who had worked in units that closed were transferred to the newly established NPL units. Loan officers who worked in units that remained open continued to manage their old loans and became additionally responsible for the loans transferred from closed units. Because firms whose loans were transferred to the closest unit lost the relation with the loan officer who had managed their loans, the feature of unit mergers, provides a good setting for testing the effect of personal relationships on loan renegotiation.

### **3.2 Dataset structure and descriptive statistics**

The main data used in this study come from one of the largest commercial banks in Greece. The dataset contains detailed annual information on corporate loans for approximately 8,000 small and medium nonretail enterprises (SME) covering four years (2012–2015). The construction of the sample is based on the ECB supervision guidelines for the Asset Quality Review (AQR). Under these guidelines, an SME is defined as a corporation that has annual turnover up to € 50 million and employs fewer than 250 persons.

For several reasons, a restricted sample of nonretail SMEs is the most appropriate sample for the proposed analysis. First, it is necessary to exclude large corporations as they have access to other sources of financing, such as international banks and the stock market. Moreover, credit for large corporations is approved at higher level at the bank, and for that reason, relationships with loan officers are expected to be irrelevant. Second, the retail sector is also excluded from the dataset, as a different department at the bank manages this sector. By focusing on nonretail SMEs, I gained access to credible firm financial information, since the majority of the firms in the sample have audited financial statements, which they are required to submit to the bank. Moreover, by excluding very small firms, we can expect sample firms to be unaffected by the narrow local economic environment. Firms in the sample operate either regionally or nationally and their

performance is expected to be affected by the economic conditions at the region and industry level.

The dataset includes detailed information on the loan terms and performance as well as basic firm financial information. Each firm has multiple loans at this bank, and the loan types vary from the more secure, such as leasing, to the less secure, such as factoring, letters of credit, and revolving credit. Moreover, an indicator of the bank unit responsible for each loan is included, which allows for tracking transfers across units. Personal relationships develop between loan officers and firms at the bank unit and changes in the bank unit indicator reflect interruptions of such relationships.

As I focus on the merger of the original bank units, I exclude the loans that were transferred to the specialized NPL units. For that reason, the sample included is not representative of the Greek economy during this period, but rather represents the set of firms that performed relatively well during the crisis. The final sample consists of loans to 3,984 firms located across the 13 geographic regions of the country. Following the merger, a single bank unit managed on average 340 loans to 107 firms. Table 1 presents the summary statistics for the main variables in the pre-period (2012, 2013). A median firm in the sample has two loans with a total balance of approximately € 536,000 and total collateral cover of € 187,630. The average interest rate is 5.97%, and the average remaining maturity of the loans is approximately one and a half years (528.34 days). The median firm performs well, with no nonperforming exposures, and has not delayed a payment. Regarding the firm's financial information, the median firm was medium-size with approximately € 6 million in total assets and € 4.25 million in total debt. It has a positive EBITDA of approximately € 270,000, and a high leverage equal to 0.69. The summary statistics confirm the fact that the sample is comprised of firms that performed relatively well during the crisis.

## 4 Empirical Methodology

### 4.1 Identification Strategy

The identification of relationship interruption is based on a bank's internal reorganization and the closure of bank units. I employ this exogenous variation, define appropriate treatment and control groups, and apply the difference-in-difference methodology to accurately estimate the effect of interrupted personal relationships between loan officers and firms on loan renegotiation.

The first step is to exclude loans were transferred to the specialized NPL units. The sample is thus constrained to relatively good performing firms. The next step is to identify the firms whose accounts were transferred to another unit because their original unit closed. By looking at the transfers across bank units, we observe a set of firms whose accounts were transferred to other bank units without their original unit closing.<sup>12</sup> It is necessary to exclude these firms from the analysis, due to the endogeneity of their transfer.

By using the closure of the original bank unit as the source of exogenous variation, I overcome the selection bias that may arise at the firm level. In particular, treated firms are defined as those whose loan accounts were transferred to another bank unit because their original unit closed. Control firms are defined as those whose loan accounts remained at the same unit during the whole period of the sample. This specification of treatment and control groups ensures that the variation comes only from the bank unit level and not from the firm level. Loans transferred from one unit to another as a result of a cause other than unit closure are excluded from the sample.

The feature that allows me to identify an interruption in personal relationships between loan officers and firms is the relocation of loan officers. Loan officers who worked in units that closed were transferred to the new NPL units. Loan officers who worked in the units that remained open

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<sup>12</sup>This set of observations accounts for approximately 11% of the original sample.

continued to manage their old loans and became responsible for the loans that were transferred from the closed units. For that reason, firms that remained at the same unit continued to interact with the same loan officers, while firms whose accounts were transferred had to establish a new relationship with a different loan officer.

The baseline specification is a difference-in-difference, which allows me to compare the difference on the outcome variables between loans to firms in the treated group and those in the control group in the post-unit closure period (2014, 2015) relative to the difference that the two groups had in the pre-unit closure period (2012, 2013). The baseline regression is:

$$y_{ijurt} = \alpha + \alpha_j + \alpha_{pre-u} + \alpha_{post-u} + \alpha_{rt} + \delta(Post_t * Treat_{ijur}) + \varepsilon_{ijurt} \quad (1)$$

where  $y_{ijurt}$  stands for the outcome variable for firm  $j$  obtaining a loan  $i$  from bank unit  $u$  and located in region  $r$  in year  $t$ .  $Treat_{ijur}$  is a dummy variable equal to one for treated firms and zero for control firms.  $Post_t$  is a dummy variable equal to zero for the period before the bank units' closure (2012 – 2013) and one after the closures (2014 – 2015). The baseline specification includes firm fixed effects ( $\alpha_j$ ) to capture any time-invariant firm characteristics. Both pre-period bank unit ( $\alpha_{pre-u}$ ) and post-period bank-unit ( $\alpha_{post-u}$ ) fixed effects are included to capture any time-invariant characteristics of the original bank unit and of the bank unit that the loan was transferred in the post-period (e.g., different lending limits). Region-year fixed effects ( $\alpha_{rt}$ ) capture any region and time-varying shocks. The coefficient of interest is  $\delta$ , which measures the difference in the outcome variable for the firms that experienced an interruption in their relationship with the loan officers, relative to the firms that did not, controlling for the pre-period difference.

The outcome variables of interest belong to three groups: (i) the probability of renegotiating a loan (extensive margin); (ii) renegotiated loan terms (intensive margin); and (iii), firm level effects. Regarding the loan terms of the renegotiated loans, I use as outcome variables the interest rate, the remaining maturity of the loan, and the collateral value relative to the loan balance. I also

construct two additional variables to help capture the effect of collateral. The first is an unsecured loan dummy and the second is a type-of-collateral dummy. To capture firm outcomes from an interrupted relationship, I examine the firm's equity over total assets, total debt over total assets, EBITDA over total assets, and the firm's total loan balance at the subject bank over its total debt.

## **4.2 Comparison of treated and control groups in the pre-unit closure period**

The most important threat to identification is a possible selection bias that arises from the decision to close a bank unit. It is necessary to assume that the bank did not close units where debtors performed, or were expected to perform, worse. The main criterion for unit closure is geographic location: in areas where there were two or more units, the bank kept only one, while in areas with only one unit, it was optimal for the bank to keep it open and retain its clients.

A comparison between the two groups in the pre-unit-closure period (2012–2013) provides evidence that there are no statistically significant differences across the two groups. Table 2 presents this comparison and includes variables related to loan terms, performance, and firms' financials. Column 1 shows the mean value and the standard deviation for the control firms, Column 2 for the treated firms, and Column 3 shows the *p*-value for the difference, with regional fixed effects included. The only variable significantly different across the two groups is the ratio of loans transferred to the NPL units from the originals: this variable is higher for the bank units that remained open. This difference indicates that, to the extent that units were selected for closure based on loan performance, the bank units that closed had better performing loans. For that reason, if a selection bias exists on which units closed, it will bias the results downwards. The fact that we do not observe any statistically significant difference for the loan terms, performance, and firms' financial information supports the assumption that the two groups shared similar characteristics. The probability is therefore high that the two groups would have continued to look similar if the personal relationships with loan officers had not been interrupted.

I report also parallel trend graphs in Figures 1 and 2 for the nonperforming dummy, as higher default ratios could predict the bank-unit closure. These graphs provide evidence against this hypothesis. Figure 1a plots the mean values for the treated and the control groups, and Figure 1b plots the mean values of the residuals from a regression of the nonperforming dummy on region fixed effects. Figure 2 plots the regression coefficients and confidence intervals from a regression of the nonperforming dummy on region and bank-unit fixed effects. These graphs support the hypothesis that no pre-trend difference of the loan performance existed to predict bank-unit closure.

### **4.3 Out-of-sample comparison of firms located in exposed and control areas**

In this section, I perform an out-of-sample comparison of firms located in geographic areas where a bank unit closed (exposed areas), and firms in areas where a unit remained open (control areas). This test provides further evidence that the local economic conditions, and operating in exposed and control areas, are similar. The data for this comparison come from the Amadeus Bureau van Dijk dataset and cover the same period of the experiment (2012–2015). The Amadeus dataset provides information on firms' financial statements. In addition, I use the bank units' zip codes to identify exposed and control areas. I match the firms' zip code with the bank units' zip code, and construct a subsample of the Amadeus dataset appropriate for the out-of-sample comparison.

Table 3 presents the results comparing firms located in exposed and control areas. The first column shows the mean value and the standard deviation of firms located in control areas, and the second column for firms in exposed areas. The third column shows the  $p$ -value of the difference. The main variables of interest in Table 3 are those related to firms' financial performance. Any difference in these variables would suggest that the economic conditions differ between exposed and control areas. No statistically significant differences in these variables are observable (EBIT, net income, sales, etc.). There is a small and significant difference in total assets and the number of employees, which suggests that firms in control areas are larger. To account for this difference, I

include the firm's total assets as a control variable in the baseline results in section 5.1.3. Moreover, in subsection 5.2.2, I restrict the sample to areas in which firms are similar to provide further evidence that local economic conditions do not explain differences between the two groups.

Lastly, to capture the potential differences associated with unobserved economic indicators, I use the firms' financial characteristics as dependent variables and apply the baseline regression 1 to examine whether there is an out-of-sample effect of a bank unit closure. Column 4 of Table 3 shows the estimated coefficients from the difference-in-difference regressions on firms' variables. No coefficient is statistically significant. The fact that there is no statistically significant difference across any specification for the firms' observable characteristics supports the assumption that economic conditions in the exposed and control areas are similar.

## **5 Results**

First, I report the baseline results on loan renegotiation. I examine the impact of personal relationships between loan officers and firms on the probability of renegotiating a loan and, conditional on renegotiating a loan, I estimate the impact on the loan terms. Firm-level effects are included. Lastly, I examine how the strength of the relationship affects the results by using different measures of relationship strength.

### **5.1 Results on Loan Renegotiation**

#### **5.1.1 Probability of Renegotiation**

First, I analyze the extensive margin and the probability to renegotiate a loan after a firm's loans are transferred to another bank unit. I compare loans to firms that experienced an exogenous interruption in the relationship with their loan officer with those that did not. The outcome variable

of interest is the probability that a firm's pre-existing loan is renegotiated. More formally, the dependent variable is a dummy variable equal to one if a loan is renegotiated and zero if a loan is not renegotiated. Table 4 presents the results with different specifications regarding fixed effects and control variables. It can be seen that loans to firms with interrupted relationships with a loan officer have a 14% lower probability of renegotiation, compared to firms with uninterrupted relationships, when firm, pre-period bank unit, post-period bank unit, and region-year fixed effects are included.

A loan renegotiation can be initiated either by the bank or by the firm and does not require a delayed loan payment. A renegotiation is expected to be mutually advantageous, as otherwise one of the parties would not agree to the new terms. The firm benefits by renegotiating a loan, because one or more of the initial loan terms is relaxed. At the same time, the bank prevents a default or improves its covenants. Since renegotiation benefits the firms, firms with interrupted relationships receive worse treatment as the result of the transfer of their loans to another bank unit.

The results from four different specifications are presented in Table 4. In all specifications, both pre- and post- period bank unit fixed effects are included to capture any unit-level time-invariant variation, and the standard errors are clustered at the pre-period unit level. Even though bank lending policies are similar across units, a larger unit or a higher in the organizational hierarchy unit may have different limits on the loan terms it is allowed to approve. Moreover, I control for the regional differences by adding region-year fixed effects. When constructing the region-year fixed effects, I define the region more broadly than strict geography to ensure that at least two bank units are open per region in the post-unit closure period and I combine only neighbouring regions that have similar industry composition. No adjustment is done on regions that have two or more bank units in the post-period. To control for firm level differences, firm fixed effects are included to capture any time-invariant firm characteristics of the firm such as size, industry, etc. In Columns 2-4, I add different firm-level time-varying control variables. The results remain robust under these specifications and this confirms that variations at the firm level are not driving the estimated coefficients.

### **5.1.2 Possible Renegotiation Outcomes**

After a renegotiation, both the loan terms and loan amount can be altered, depending on the firm's needs and the bank's constraints. A renegotiation can have one or more of the following outcomes: an increase in the loan amount <sup>13</sup>, a decrease or an increase in the interest rate, an extension of the loan maturity, and an increase or a decrease in collateral value. An increase in collateral is in most cases necessary if the loan amount is increased, but can be a requirement under other renegotiation outcomes as well. A decrease in collateral is possible, as it may be optimal for the bank to free up part of the assets previously pledged as collateral to let the firm use them for new loans. The most common outcomes in the data is a decrease in the interest rate and a change in collateral pledged, and the least common change is an extension in loan maturity.

I estimate the effect of an interruption in the relationship with a loan officer on the probability of receiving each of the possible outcomes. Table 5 presents these results using the baseline regression specification. Firms with interrupted relationships have a lower probability compared to the control firms to receive any renegotiation outcome, except for an increase in the collateral. In particular, they have approximately 18% lower probability of increasing the loan amount, and of decreasing the interest rate, approximately 4% lower probability of extending the loan's maturity, and approximately 60% lower probability of decreasing collateral. Treated firms have also approximately 90% higher probability of increasing collateral.

### **5.1.3 Loan Terms Conditional on a Renegotiation**

Figure 4 and Table 6 present the results for the newly agreed loan terms after renegotiating a loan. Overall, we observe that firms with interrupted loan officer relationships receive worse terms. Specifically, they receive 0.4% higher interest rates, 150% shorter maturities, and they have to pledge a 50% higher value of collateral relative to the total loan balance. Even though the effect on

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<sup>13</sup>more frequent in the case of a credit line

interest rate is statistically significant, the economic magnitude is small. In contrast, the estimated effects on maturity and collateral are both statistically and economically significant. This difference may be related to the fact that a range for the interest rate is generated by an automated program, while the maturity and the collateral are determined by the negotiation with the loan officer.

Figure 4 plots the effect of an interruption in the loan officer relationship on renegotiated loans' terms, controlling for region and bank-unit fixed effects. Table 6 presents the same results for the newly agreed loan terms under different specifications. Column (a) presents the results of the baseline specification and in column (b) I include as time-varying firm control variables the lagged log of total assets and of total debt over total assets. Results are robust under the two specifications.

*Interest Rate:* From the baseline regression, we observe that firms with interrupted loan officer relationships receive a 0.4% higher interest rate on renegotiated loans, compared to firms that remained at the same bank unit. The economic magnitude of this difference is small as it corresponds to only 0.04 basis points (likely due to the automated program-generated interest rate).

*Maturity:* Firms whose relationships with their loan officers are interrupted receive significantly shorter maturities on their renegotiated loans. Table 6 includes the results for the remaining maturity, as measured by the log of remaining days. Based on the baseline specification, treated firms receive approximately 150% fewer days remaining on their renegotiated loans, which corresponds to approximately two-year-shorter maturities.

*Collateral:* The outcome variable that is used to estimate the effect on the collateral is the ratio of collateral value relative to the total loan balance. An absolute effect on collateral value would not be informative, as it could be driven by an increase in the loan amount. Firms with interrupted loan officer relationships pledge a significantly higher value of collateral on renegotiated loans. The baseline regression shows that treated firms have to pledge 51.8% more collateral relative to the loan balance after their loans are transferred, which corresponds to an additional €0.65 of collateral for each euro of loan amount.

#### 5.1.4 Renegotiated Loans' Collateral Type

The focus of this section is on the qualitative information regarding collateral types. The value and the type of collateral are determined by the loan officer and for that reason, a measurable impact of personal relationships is expected on the collateral-related variables. In Table 7, the effect of sustained personal relationships on relaxing collateral requirements is presented, and the economic magnitude of this effect is large.

I construct two dummy variables that explore the impact of renegotiation on collateral pledged. The first is an *Unsecured Loan* dummy, which is one if the loan does not have any collateral pledged and is considered unsecured, and zero otherwise. Approximately 36% of the loans included in the analysis were unsecured in the pre-unit closure period, and no statistically significant difference occurs between the treated and the control groups.

In addition, I construct a second dummy variable that quantifies the effect on the type of collateral. This is important because the enforceability of collateral depends on its type. This variable is a *Secure Type of Collateral* dummy that is equal to one if the collateral is highly secure and zero otherwise. I define real estate (commercial and residential), ships, deposits, and debt securities as highly secure. As less secure collateral types, I define accounts receivable, equities or convertible bonds, and other types of guarantees. Both groups have pledged highly secure types of collateral in approximately 50% of their collateralized loans. In 2012 and 2013, approximately 36% of the secured loans employ receivables as collateral, 30% real estate, and 20% deposits.

Table 7 presents the results for the two collateral variables. Column 1-a, shows that loans to firms in the treated group have a 30% lower probability of being unsecured after a renegotiation. Column 2-a, shows that an interruption in the loan officer relationship induces firms to pledge more highly secure collateral on their renegotiated loans. In particular, treated firms are 13.4% more likely to pledge highly secure collateral compared to control firms.

### 5.1.5 Estimates using a within-firm variation

In table 8 I use a within-firm variation to estimate the effect of an interruption in the loan officer relationship on loan renegotiation. Some of the loan types that a firm may have, such as corporate bond loans, letters of credit, and factoring, are managed at a centralized level. The relationship with the loan officer should not impact these loans that are not managed at the bank-unit level. On this section, I include all the loans that a firm has, both at a centralized and at a bank-unit level, and I exploit this within-firm variation using a difference-in-difference-in-differences specification. The equation for this test is the following:

$$\begin{aligned}
 y_{ijurt} = & \alpha + \alpha_j + \alpha_{pre-u} + \alpha_{post-u} + \alpha_{rt} + \delta_1(Post_t * Treat_{ijur} * Noncentralized_{ijur}) \\
 & + \delta_2(Post_t * Noncentralized_{ijur}) + \delta_3(Treat_{ijur} * Noncentralized_{ijur}) \\
 & + \delta_4(Post_t * Treat_{ijur}) + \delta_5 Noncentralized_{ijur} + \varepsilon_{ijurt}
 \end{aligned} \tag{2}$$

where  $Noncentralized_{ijur}$  is a dummy variable equal to one for loans that are managed at a noncentralized bank unit and zero for loans at a centralized unit. The variables  $y_{ijurt}$ ,  $Treat_{ijur}$ , and  $Post_t$  are defined as in the baseline equation 1. This specification includes firm ( $\alpha_j$ ), both pre- ( $\alpha_{pre-u}$ ) and post-period bank-unit ( $\alpha_{post-u}$ ), and region \* year fixed effects ( $\alpha_{rt}$ ). The main coefficient of interest is  $\delta_1$ , and it measures the difference in the outcome variable for loans to firms that experienced an interruption in their loan officer relationship and are managed at a noncentralized bank unit, relative to loans to firms that did not, controlling for the pre-period difference.

The results for all the outcome variables are presented in table 8. We observe that the estimated regression coefficients using the DDD approach and controlling for within-firm variation remain robust for the outcome variables and increase in economic magnitude. Only the effect on the interest rate is not significant under this specification. These within-firm results confirm that the significant effect of the interruption of the firm-loan officer relationship is not driven by any firm characteristics (observable or unobservable, time-variant or invariant).

## **5.2 Addressing possible threats to identification**

### **5.2.1 Identifying Possible Selection Bias on Renegotiation**

One concern regarding the validity of the estimated effects of an interrupted relationship is a possible selection bias concerning whether a loan is renegotiated. In section 4.2, I demonstrated that firms in the treated and control groups share similar pre-unit closure characteristics. Two of my main findings are that firms with interrupted relationships have a lower probability of renegotiating a loan (section 5.1.1), and conditional on a renegotiation, these firms receive worse loan terms (section 5.1.3). If loan officers choose to renegotiate with interrupted-relationship firms based on different criteria than those used for the continuous-relationship firms, then the intensive margin results would be biased. If loan officers for interrupted-relationship loans granted renegotiation more frequently for firms with relatively inferior performance, while they did not do so for continuing-relationship firms, then the estimated effect on the renegotiation terms would exaggerate the true effect. In fact, however, I find the opposite, implying that my estimated effect of interrupted relationships on renegotiation terms is conservative.

I conduct two tests, which are presented in Tables 9 and 10. In Table 9, a similar analysis as in Table 2 is conducted, but for this test, I include only firms that renegotiated a loan in the post-unit closure period, and compare the pre-unit closure period characteristics between the treated and control groups. We observe no statistically significant difference in any of the variables. Firms in the two groups that renegotiated loans in the post-unit closure period shared similar characteristics in the pre-period, which suggests no selection bias exists regarding whether a loan is renegotiated.

Table 10 presents a second test, which considers observable variables that can prompt a renegotiation. I rank firms within each bank unit based on the year-before-the-transfer value for each variable. The decision to renegotiate a loan is made by the loan officer at the bank unit, and, for that reason, any correlation outside the unit would not be informative for the criteria used to

renegotiate a loan at the bank unit. The rank within the bank unit allows me to control for the variation at the bank unit and any criterion based on hard information used by the loan officer. I regress a dummy variable for renegotiating a loan on the firm's within-bank-unit rank separately for each variable and include bank-unit and region-year fixed effects. This test provides us with correlations that show which firms have a higher probability of renegotiating a loan, based on the previous year's hard information available to the loan officer and to the econometrician. Table 10, Column 1 presents the result for the whole sample, Column 2 for control firms in the post-period, and Column 3 for treated firms in the post-period.

The most interesting observation comes from the year-before-the-transfer EBITDA growth rate. We observe that, for the whole sample and for the control group in the post-period, there is no statistically significant effect, while for the treated group in the post-period there is a positive statistically significant correlation. This finding indicates my estimates are conservative. Table 10 implies, also, a common rule with respect to the firm's leverage, total loans at the subject bank, and total loan-loss provision is applied for all firms, independent of whether they belong to the treated or control group. Firms in the whole sample and in the control group appear to be selected similarly for renegotiation based on their total assets, total debt, and payments' days past due. In contrast, we do not observe a correlation between these variables and renegotiation for the treated group. Again, this finding indicates conservative estimates.

### **5.2.2 Controlling for firms' differences in zip codes locations**

Section 4.3 discussed the differences between firms located in areas where a bank unit closed (exposed) and in areas where a bank unit remained open (control). Based on the zip code comparison using the Amadeus dataset presented in Table 3, firms located in exposed areas are smaller in size. Even though I control for total assets in the estimated results, in this section, I provide further evidence that firms' differences across geographic locations are not driving the results.

To accurately control for potential differences in the geographic location of the exposed and the control areas, I restrict the sample to areas in which firms across the two areas have no statistically significant difference in financial variables. In particular, I exclude firms located in Attica, the region where Athens is located, and I repeat the analysis. Table 11 presents the results of the subsample on the comparison of exposed and control areas using the Amadeus dataset. This finding confirms that no significant difference in financial variables obtains between the two groups.

The next step is to show that, when I restrict the sample to areas where firms across the two groups are similar, the estimated results on the outcome variables hold. Table 12 presents these results. The estimated coefficients for both the probability to renegotiate a loan and the intensive margin results on loan terms performance are similar in economic significance to the baseline results. This confirms that the baseline results are not driven by the differences on the firm's characteristics nor by the economic conditions at the zip-code level.

### **5.2.3 Controlling for bank unit size**

If more than one unit operated in the same geographic area, the bank decided to keep the larger units open and close the smaller ones. For that reason, a possible concern would be whether the difference in the size of the bank unit where the accounts were transferred can explain the results. To address this concern, I perform an analysis controlling for the size of the bank unit.

To test for an effect from the bank unit size, I construct first a measure of the unit's size based on the number of accounts managed per unit in 2013, the year before the reorganization. The relative rank of the units' size, for those that remained open, did not change after the reorganization. Second, I filter the observations based on the bank-unit size where the treated firms were transferred. In particular, I restrict the sample of the treated firms to those transferred to a unit that was at most 20% larger than their original unit. Also, I restrict the control firms to those managed at a unit receiving loans from units that were at most 20% smaller (from the "filtered" treated group).

After I construct the subsample that allows me to control for unit size, I repeat the analysis of the outcome variables of interest. The results are presented in table 13. The results on the probability of renegotiating a loan and on the intensive margins of loan terms bear similar magnitude and significance to the baseline results. These findings show that the baseline results in all outcome variables are not driven by differences in bank-unit size.

### **5.3 Results on Loan Performance**

In this section, I estimate the effect of an interrupted loan officer relationship on loan performance. For this test, I include all loans that a firm has at the subject bank. The set of all loans includes: old loans that were not renegotiated, old loans that were renegotiated, and new loans. The results on all loans reveal whether significant differences between the two groups on performance exist.

Table 14 presents the results from the baseline specification. As measures of loan performance, I use three variables: a nonperforming dummy variable that is equal to one if the loan is characterized as nonperforming and zero otherwise; the ratio of the number of days past due over the remaining number of days; and the ratio of the total loan provisions over the total balance. We do not observe a statistically significant effect on any of the three variables related to loan performance between firms with interrupted relationships and firms with continuous relationships. Thus, we cannot explain the results on the renegotiated loans' terms by worse firm economic performance.

The results on loan performance provide insights on the underlying mechanism.<sup>14</sup> Several mechanisms can explain the impact of personal relationships between loan officers and firms on lending. The most obvious implication of long-lasting personal relationships is the acquisition of soft information about the borrower through a continuing interaction between a loan officer and a firm. Alternatively, personal relationships may create a propensity for unwarranted favoritism (or nepotism). In that case, a poorly performing firm with a close relationship would receive the

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<sup>14</sup>Fisman et al. (2017) follow a similar approach to clarify the underlying mechanism.

same or better loan terms than a good-performing firm. In subsection 4.2, I demonstrated that firms in the treated and control groups have similar financial characteristics, loan terms, and loan performance in the pre-period. This suggests that there is no favoritism for the treated group in the pre-period. In other words, if only the treated group received favorable treatment in the pre-period, we would observe a difference either in the loan terms, with similar firm financial information, or in firm profitability and loan performance, with similar loan terms.

Furthermore, from the results on loan performance we observe that firms with continuing relationships have similar performance with firms with interrupted relationships. This result suggests that the acquisition of soft information for firms with continuing relationships, as opposed to unwarranted favoritism, explains my findings.

## 5.4 Firm-Level Effects

In this section, I examine whether the bank unit closure and the interruption in the loan officer relationship is associated with any effects on the capital structure of the firms that borrowed from the closed units. To test for firm-level effects, I apply the baseline specification 1 to the firms' financial variables provided by the bank. Even though table 3 column 4 shows no average real effect following a bank unit closure on the firms located at the same zip-code area, in this section I restrict the sample to the bank clients by using only the bank data. Table 15 presents these results.

The main conclusion from the firm-level effects is that the capital structure and the sources of financing changed after the relationship with the bank is disrupted. In particular, relative to control firms, treated firms raise 30% more equity over total assets and decrease their leverage<sup>15</sup> by 30%. Moreover, I examine the effect of an interrupted relationship on a substitution of lending from other banks. I measure substitution by constructing a new variable, the *dependence ratio*, that is equal to the ratio of the amount of debt that a firm has at this bank relative to the total amount of

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<sup>15</sup>Leverage is measured as the ratio of total debt over total assets.

its debt. The dependence ratio decreased 10% for treated firms relative to control firms, suggesting that treated firms partially substituted loans from the subject bank with new bank loans.

The results show that the main sources of external financing and the capital structure are altered for firms with interrupted loan officer relationships. The negative effects on both leverage and the dependence ratio show that firms increase their relative lending from other banks, but they substitute only partially their total debt from other banks when their relationship with the subject bank is interrupted. These results, combined with a significant increase in equity, suggest that, when firms experience an interrupted relationship, they cover their financing needs with new sources of funds, including funds from other banks.

At the same time, we observe a positive statistically and economically significant effect on EBITDA for the treated firms. In particular, the EBITDA over total assets of the treated firms is 6% higher than that of the control firms in the post-period. This effect suggests that the change in the capital structure could cause alterations in the way that firms operate and subsequently on their profitability. It also provides further evidence that the financial performance of the treated group in the post-period doesn't explain the results on the loan terms as treated firms perform better.

## **5.5 Heterogeneity by Relationship Strength**

In this section, I further investigate the value of a relationship between a loan officer and a firm by constructing a measure of relationship strength and comparing the impact of an interrupted relationship on firms with stronger relationships and those with weaker relationships. The main result of this section is that the interruption of a strong relationship with a loan officer has a more significant negative effect on the renegotiated loan terms.

One of the main assumptions for a mutually advantageous renegotiation is that the firm has outside options for financing, as those options would increase the firm's bargaining power. For small-and medium-size corporations, the outside options for financing are either other local banks,

or raising inside or outside private equity. It follows that if a firm borrows from other banks, and has an established relationship with them, it is easier for the firm to seek financing from other banks once the relationship with the subject bank is interrupted. On the other hand, if the firm depends mostly on the subject bank to satisfy its financing needs, then its negotiation power is limited. This section provides a comparison of these two groups, i.e., firms with closer relationships and fewer outside options versus firms with weaker relationships and more outside options.

As a measure of how close the relationship is, I estimate an indicator variable which I label the *Dependence Ratio*. The *Dependence Ratio* is defined as the ratio of the total amount of loans at this bank over the total debt that a firm had to other banks in 2013, the year before the bank units' closure. This measure shows whether a firm had an established relationship with other banks or whether it borrowed predominantly from the bank featured in this study.

First, I estimate the correlation between the *Dependence Ratio* and the probability of renegotiating a loan. Table 16 presents the results. The first two columns show the results for the whole sample in the pre- and the post-unit closure period, where Columns 3 and 4 report results for the control firms, and Columns 5 and 6 for the treated firms. Overall, there is a positive and significant correlation between the dependence ratio and the probability of renegotiating a loan, suggesting that firms with closer relationships have a higher probability of renegotiating. Note that this correlation is not significant for the treated group in the post-period, although it was significant in the pre-period. This suggests a loss in the value of close relationships between the firm and the bank once the relationship with the loan officer is interrupted. Treated firms that borrowed predominantly from the subject bank in the pre-unit-closure period do not have a higher probability of renegotiating in the post-unit-closure period.

Figure 5 presents the density distribution of the *Dependence Ratio* in 2013. The higher the value of the ratio, the more dependent the firm is on this bank. The lower the value of the ratio, the less important this bank is to the firm, since it borrowed from multiple sources. As shown in Figure 5, the majority of firms borrow from multiple banks, while a smaller number borrows mostly from

the subject bank. In the following analysis, I test separately the effect of interrupted relationships for firms with closer relations, and for those with more distant ones.

Table 17 presents the results for these two subsamples. Firms with a *closer relationship* are defined as those with a dependence ratio above 50%. Firms with a *less close relationship* are defined as those with a dependence ratio below 20%.<sup>16</sup> Table 17 shows that firms that had a close relationship with the subject bank in the pre-unit closure period have a 32% lower probability of renegotiating a loan after the relationship is interrupted, while firms with a less close relationship have the same probability to renegotiate a loan independent of whether the relationship was interrupted. Regarding the loan terms, firms with a closer relationship pay a higher cost from interruption by receiving tougher loan terms on the renegotiated loans. In particular, firms with close and interrupted relationships receive higher interest rates and significantly shorter maturities, and have to pledge more collateral, compared to firms with closer and uninterrupted relationships. On the other hand, firms with weaker and interrupted relationships receive the same or better loan terms on their renegotiated loans. In particular, they receive similar interest rates and maturities, and have to pledge less collateral compared to firms with weak and uninterrupted relations.

The effect on firms with weaker relationships can be driven by two different channels. First, concerning firms for which only a small part of their total debt originated at this bank, the value of a personal relationship with a loan officer is very small. In that case, an interrupted relationship has little effect. A second channel explaining the results is that firms with established relationships with other banks have a stronger bargaining position with the subject bank. These firms with outside options can walk away more easily from the subject bank and negotiate better loan terms elsewhere. In these cases, we should see the continuing relationship with a loan officer at the subject bank as an incentive to retain the clients at the subject bank. Better bargaining position and a willingness to exercise it would also translate into better loan terms, as we observe in Table 17.

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<sup>16</sup>The cutoffs were chosen to secure enough statistical power to the tests. The results remain robust when I use the continuous variable of the Dependence Ratio in Table 18.

## 6 Conclusion

Lending relationships have a significant positive effect in corporate loan renegotiation, mitigating the costs of distress for firms. A relationship between a loan officer and a firm helps eliminate frictions that arise in loan renegotiation. When a relationship is interrupted, the renegotiation outcome is less likely to be beneficial and the efficient contract is less likely to be achieved. Using the consolidation of bank units as a source of exogenous variation, I analyze a proprietary dataset on corporate loans. I find strong evidence that a relationship with a loan officer significantly affects loan renegotiation outcomes both at the extensive and intensive margins. Notably, I observe that firms with interrupted relationships have a lower probability of renegotiating a loan upon their transfer to another bank unit. Conditional on renegotiating a loan, affected firms also receive tougher terms (higher interest rates, shorter maturities, and higher value of collateral).

Firms also alter their capital structure after their relationship with the bank is interrupted. The change in the capital structure indicates that firms cannot substitute lending from other banks without cost when a lending relationship is exogenously interrupted. This change in a firm's sources of financing is likely to have implications for the firm's business model and investment decisions.

An important implication comes from the fact that the effect of relationships is estimated for firms with pre-established relationships with the bank. Hard information passed from one loan officer to another as the transfer happened within the same bank. Thus, the effect of relationships is unlikely to be mitigated by the introduction of a credit bureau and access to hard information.

In general, the result that firms with interrupted relationships receive tougher loan terms on renegotiated loans may be driven either by a loss of valuable soft information or by unwarranted favoritism. From the results on loan performance we observe that firms with continuing relationships have similar performance with firms with interrupted relationships. This supports the view that the acquisition of soft information, as opposed to unwarranted favoritism, is driving the results.

## References

- Acharya, Viral V, Tim Eisert, Christian Eufinger, and Christian W Hirsch, 2016, Real effects of the sovereign debt crisis in europe: Evidence from syndicated loans .
- Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, Tomasz Piskorski, and Amit Seru, 2017, Policy intervention in debt renegotiation: Evidence from the home affordable modification program, *Journal of Political Economy* 125, 654–712.
- Agarwal, Sumit, and Robert Hauswald, 2010, Distance and private information in lending, *The Review of Financial Studies* 23, 2757–2788.
- Aghion, Philippe, Mathias Dewatripont, and Patrick Rey, 1994, Renegotiation design with unverifiable information, *Econometrica: Journal of the Econometric Society* 257–282.
- Allen, Franklin, 1990, The market for information and the origin of financial intermediation, *Journal of Financial Intermediation* 1, 3–30.
- Benmelech, Efraim, and Nittai K Bergman, 2008, Liquidation values and the credibility of financial contract renegotiation: Evidence from us airlines, *The Quarterly Journal of Economics* 123, 1635–1677.
- Bentolila, S, M Jansen, and G Jiménez, 2016, When credit dries up: job losses in the great recession, cemfi.
- Berger, Allen N, and Gregory F Udell, 1995, Relationship lending and lines of credit in small firm finance, *Journal of Business* 351–381.
- Besanko, David, and George Kanatas, 1993, Credit market equilibrium with bank monitoring and moral hazard, *The Review of Financial Studies* 6, 213–232.
- Bolton, Patrick, and Xavier Freixas, 2000, Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information, *Journal of Political Economy* 108, 324–351.
- Bolton, Patrick, Xavier Freixas, Leonardo Gambacorta, and Paolo Emilio Mistrulli, 2016, Relationship and transaction lending in a crisis, *The Review of Financial Studies* hhw041.
- Bolton, Patrick, and David S Scharfstein, 1996, Optimal debt structure and the number of creditors, *Journal of Political Economy* 104, 1–25.
- Boot, Arnoud WA, 2000, Relationship banking: What do we know?, *Journal of Financial Intermediation* 9, 7–25.

- Canales, Rodrigo, and Ramana Nanda, 2012, A darker side to decentralized banks: Market power and credit rationing in sme lending, *Journal of Financial Economics* 105, 353–366.
- Chodorow-Reich, Gabriel, and Antonio Falato, 2017, The loan covenant channel: How bank health transmits to the real economy .
- Cingano, Federico, Francesco Manaresi, and Enrico Sette, 2016, Does credit crunch investment down? new evidence on the real effects of the bank-lending channel, *The Review of Financial Studies* 29, 2737–2773.
- Cole, Shawn, Martin Kanz, and Leora Klapper, 2015, Incentivizing calculated risk-taking: Evidence from an experiment with commercial bank loan officers, *The Journal of Finance* 70, 537–575.
- De Marco, Filippo, 2016, Bank lending and the european sovereign debt crisis .
- Dewatripont, Mathias, and Eric Maskin, 1995, Credit and efficiency in centralized and decentralized economies, *The Review of Economic Studies* 62, 541–555.
- Diamond, Douglas W, 1984, Financial intermediation and delegated monitoring, *The Review of Economic Studies* 51, 393–414.
- Diamond, Douglas W, 1991, Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy* 99, 689–721.
- Drexler, Alejandro, and Antoinette Schoar, 2014, Do relationships matter? evidence from loan officer turnover, *Management Science* 60, 2722–2736.
- Engelberg, Joseph, Pengjie Gao, and Christopher A Parsons, 2012, Friends with money, *Journal of Financial Economics* 103, 169–188.
- Fisman, Raymond, Daniel Paravisini, and Vikrant Vig, 2017, Cultural proximity and loan outcomes, *The American Economic Review* 107, 457–492.
- Garleanu, Nicolae, and Jeffrey Zwiebel, 2008, Design and renegotiation of debt covenants, *The Review of Financial Studies* 22, 749–781.
- Gorton, Gary, and James Kahn, 2000, The design of bank loan contracts, *The Review of Financial Studies* 13, 331–364.
- Gourinchas, Pierre-Olivier, Thomas Philippon, and Dimitri Vayanos, 2017, The analytics of the greek crisis, *NBER Macroeconomics Annual* 31, 1–81.
- Hart, Oliver, and John Moore, 1988, Incomplete contracts and renegotiation, *Econometrica: Journal of the Econometric Society* 755–785.

- Hart, Oliver, and John Moore, 1998, Default and renegotiation: A dynamic model of debt, *The Quarterly Journal of Economics* 113, 1–41.
- Haselmann, Rainer, David Schoenherr, and Vikrant Vig, 2016, Rent-seeking in elite networks, Technical report, SAFE Working Paper Series.
- Herpfer, Christoph, 2017, The role of bankers in the us syndicated loan market .
- Hertzberg, Andrew, Jose Liberti, and Daniel Paravisini, 2010, Information and incentives inside the firm: Evidence from loan officer rotation, *The Journal of Finance* 65, 795–828.
- Ivashina, Victoria, 2009, Asymmetric information effects on loan spreads, *Journal of Financial Economics* 92, 300–319.
- Jaffee, Dwight M, and Thomas Russell, 1976, Imperfect information, uncertainty, and credit rationing, *The Quarterly Journal of Economics* 90, 651–666.
- James, Christopher, 1995, When do banks take equity in debt restructurings?, *The Review of Financial Studies* 8, 1209–1234.
- Karolyi, Stephen Adam, 2018, Personal lending relationships, *The Journal of Finance* 73, 5–49.
- Leland, Hayne, and David H Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, *The Journal of Finance* 32, 371–87.
- Liberti, Jose M, and Atif R Mian, 2009, Estimating the effect of hierarchies on information use, *The Review of Financial Studies* 22, 4057–4090.
- Maskin, Eric, and John Moore, 1999, Implementation and renegotiation, *The Review of Economic studies* 39–56.
- Mian, Atif, 2006, Distance constraints: The limits of foreign lending in poor economies, *The Journal of Finance* 61, 1465–1505.
- Myers, Stewart C, and Nicholas S Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.
- Nguyen, Hoai-Luu Q., 2019, Are credit markets still local? evidence from bank branch closings, *American Economic Journal: Applied Economics* 11, 1–32.
- Ongena, Steven, and David C Smith, 2000, Bank relationships: A review, *Performance of financial institutions: Efficiency, innovation, regulation* 221.

- Ongena, Steven, and David C Smith, 2001, The duration of bank relationships, *Journal of Financial Economics* 61, 449–475.
- Petersen, Mitchell A, and Raghuram G Rajan, 1994, The benefits of lending relationships: Evidence from small business data, *The Journal of Finance* 49, 3–37.
- Piskorski, Tomasz, Amit Seru, and Vikrant Vig, 2010, Securitization and distressed loan renegotiation: Evidence from the subprime mortgage crisis, *Journal of Financial Economics* 97, 369–397.
- Popov, Alexander, and Neeltje Van Horen, 2015, Exporting sovereign stress: Evidence from syndicated bank lending during the euro area sovereign debt crisis, *Review of Finance* 19, 1825–1866.
- Rajan, Raghuram, and Andrew Winton, 1995, Covenants and collateral as incentives to monitor, *The Journal of Finance* 50, 1113–1146.
- Rajan, Raghuram G, 1992, Insiders and outsiders: The choice between informed and arm’s-length debt, *The Journal of Finance* 47, 1367–1400.
- Ramakrishnan, Ram TS, and Anjan V Thakor, 1984, Information reliability and a theory of financial intermediation, *The Review of Economic Studies* 51, 415–432.
- Roberts, Michael R, 2015, The role of dynamic renegotiation and asymmetric information in financial contracting, *Journal of Financial Economics* 116, 61–81.
- Roberts, Michael R, and Amir Sufi, 2009, Renegotiation of financial contracts: Evidence from private credit agreements, *Journal of Financial Economics* 93, 159–184.
- Sharpe, Steven A, 1990, Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships, *The Journal of Finance* 45, 1069–1087.
- Srinivasan, Anand, 2014, Long run relationships in banking, *Foundations and Trends in Finance* 8, 55–143.
- Stiglitz, Joseph E, and Andrew Weiss, 1981, Credit rationing in markets with imperfect information, *The American Economic Review* 71, 393–410.
- Sufi, Amir, 2007, Information asymmetry and financing arrangements: Evidence from syndicated loans, *The Journal of Finance* 62, 629–668.
- Tirole, Jean, 2010, *The theory of corporate finance* (Princeton University Press).
- Von Thadden, Ernst-Ludwig, 1995, Long-term contracts, short-term investment and monitoring, *The Review of Economic Studies* 62, 557–575.

Table 1: Summary statistics based on the 2012–2013 values

Variable	Mean	Std. Dev.	Median
<i><u>Loan-Related Variables:</u></i>			
Total Balance	2,611,645	10,057,676.6	535,934.5
Interest Rate	.0597	.034	.0621
Total Collateral Value	3,234,279	20,128,240	187,630
Days Remaining (Maturity)	528.34	995.16	52.35
Unsecured loan (Dummy)	.35	.45	0
Secure type of collateral (Dummy)	.50	.45	.51
Number of loans per year	4.72	29.31	2
<i><u>Performance-Related Variables :</u></i>			
Nonperforming (Dummy)	.11	.31	0
Days Past Due	29.8	82.32	0
Days Past Due over Remaining Days	10.1	52.03	0
Total Provision	1,438,472	30,789,946	0
Debtor Renegotiated a Loan (Dummy)	.59	.49	0
At Least One Forborne (Dummy)	.05	.21	0
<i><u>Firm's Financial Information :</u></i>			
Total Assets	35,710,880	204,072,593	6,124,094
Total Debt	24,219,150	140,099,180	4,253,020
Total Equity	12,862,210	90,149,735	1,644,740
EBITDA	1,384,210	26,161,717	271,487
Total Debt over EBITDA ratio	-26.7	3,325.4	7.5
Leverage (Debt over Assets)	.72	.72	.69

This table displays summary statistics of the main variables. The variables are constructed at the firm level. A simple sum of all loans a firm holds each year is used for the total balance, total collateral value, number of loans, and total provision. A weighted average with weights equal to the ratio of the specific loan exposure over the total balance of the firm is used for the interest rate, days remaining, nonperforming (dummy), and days past due. All variables are based on the 2012–2013 values.

Table 2: Comparison of pre-period mean values for treated and control groups

Variable	(1) Control	(2) Treated	(3) <i>p</i> - value on Difference
<i>Loan-Related Variables:</i>			
Total Balance	1,869,579.3 (4,776,310.2)	2,120,987.9 (6,169,253.0)	(0.561)
Interest Rate	0.0596 (0.0275)	0.0634 (0.0320)	(0.357)
Days Remaining (Maturity)	473.7 (883.3)	719.5 (1,152.0)	(0.143)
Total Collateral Value	2,065,921.8 (5,768,343.3)	2,179,571.9 (7,031,001.6)	(0.513)
Unsecured Loan (Dummy)	0.360 (0.452)	0.361 (0.470)	(0.818)
Secure Type of Collateral (Dummy)	0.490 (0.450)	0.566 (0.454)	(0.593)
<i>Performance-Related Variables:</i>			
Nonperforming (Dummy)	0.105 (0.306)	0.126 (0.333)	(0.672)
Days Delayed over Remaining Days	10.82 (63.07)	15.81 (61.02)	(0.257)
Total Provision	249,563.1 (5,159,275.7)	370,674.6 (2,335,973.3)	(0.181)
Ratio of Loans Transferred to NPL specialized unit	0.462 (0.00107)	0.434 (0.00126)	(0.000)
<i>Debtor's Financial Information:</i>			
Total Assets	16,790,437.7 (32,811,715.8)	11,378,434.3 (21,205,845.9)	(0.377)
Total Debt over Total Assets	0.690 (0.263)	0.693 (0.244)	(0.544)
Total Equity over Total Assets	0.306 (0.263)	0.307 (0.244)	(0.459)
EBITDA over Total Assets	0.0521 (0.0819)	0.0563 (0.0764)	(0.670)

This table displays the mean values and standard deviations separately for the treated and control groups. Column 3 reports the *p*-value for the difference between Columns 1 and 2. *p*-values are obtained from a regression of the main variable on a treatment indicator and region fixed effects. All variables and estimations are based on the 2012–2013 values.

Figure 1: Trends for the nonperforming dummy for the treatment and control groups

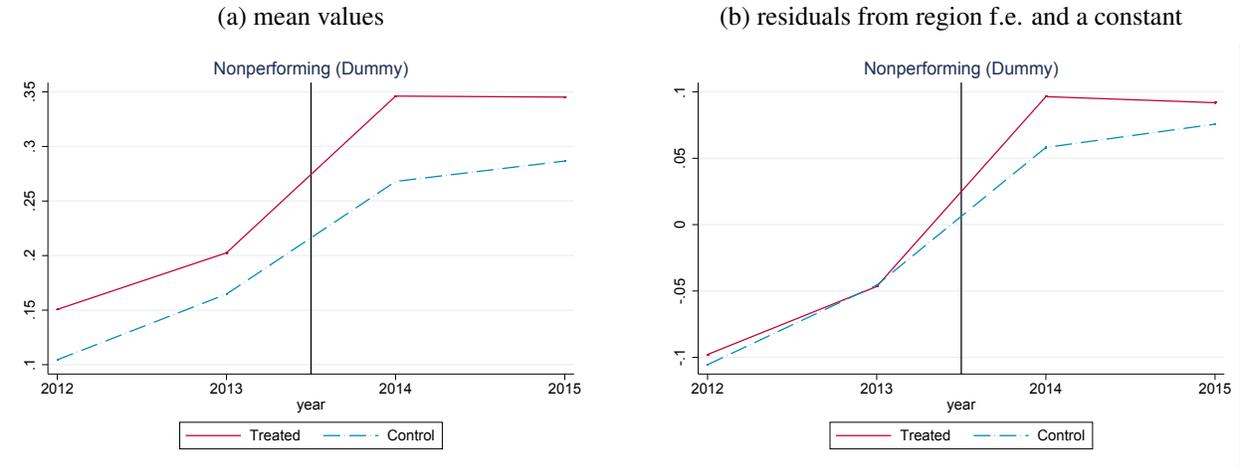


Figure 1a plots the mean values of the nonperforming dummy variable for the treated and the control groups from 2012 until 2015. Figure 1b plots the residuals from a regression of the nonperforming dummy variable on region fixed effects for the treated and control groups over the same period.

Figure 2: Regression coefficients and confidence intervals after controlling for region and bank-unit fixed effects

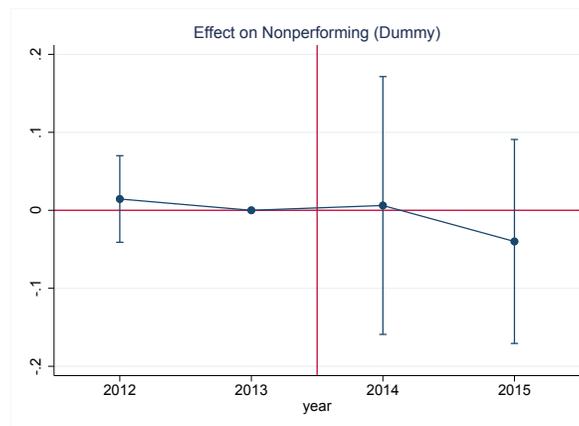


Figure 2 plots the effect of an interruption in the relationship between a loan officer and a firm on the nonperforming dummy variable. The coefficients are obtained from a regression of the nonperforming dummy on the treatment indicator and on region and bank-unit fixed effects. Bars show 95% confidence intervals.

Table 3: Summary statistics and Difference-in-Difference coefficients for firms in exposed and control areas - Match on the zip code

	(1)	(2)	(3)	(4)
	Mean values for Control areas	Mean values for Exposed areas	<i>p</i> - value on Difference	Coefficient from DiD
Total Assets	2,046,750.4 (2,213,766.2)	1,825,612.9 (2,042,689.0)	(0.053)	-1,198.2 (42,739.4)
Total Debt	498,087.1 (1,031,146.5)	458,946.9 (974,348.2)	(0.273)	12,978.2 (13,685.6)
Shareholders Funds	906,964.1 (1,336,612.6)	780,377.7 (1,086,455.0)	(0.015)	-18,101.5 (21,782.0)
Number of Employees	13.33 (15.84)	11.86 (12.78)	(0.034)	-0.131 (0.317)
EBIT	95,948.5 (215,807.3)	70,551.1 (186,164.2)	(0.138)	-2,360.2 (6,868.1)
EBIT Growth Rate	-0.450 (29.85)	-0.0356 (8.002)	(0.368)	2.070 (3.758)
Net Income	35,171.8 (162,093.6)	20,397.8 (146,359.9)	(0.396)	-2,071.4 (5,756.2)
Sales	1,609,808.0 (2,476,738.2)	1,401,415.3 (2,267,099.8)	(0.205)	25,852.7 (30,432.5)
Gross Profit	440,155.2 (584,430.4)	374,192.1 (528,494.3)	(0.102)	-1,232.8 (16,640.0)
Cash Flow	95,235.7 (194,803.9)	79,114.4 (171,806.5)	(0.094)	-1,455.9 (7,490.2)
Return on Total Assets (%)	3.153 (13.62)	2.784 (13.74)	(0.298)	-0.161 (0.652)
Profit Margin (%)	2.185 (20.73)	1.091 (21.09)	(0.527)	0.0524 (0.652)

The data source for this table is the Amadeus Bureau van Dijk database. This table in columns 1 and 2 displays the mean values and standard deviations for firms located in zip-code areas where a bank unit closed (exposed areas) and firms located in zip-code areas where a unit remained open (control areas). Column 3 reports the *p*-value for the difference between Columns 1 and 2. *p*-values are obtained from a regression of the main variable on an indicator of whether the firm is located at the zip-code area where a bank unit closed, and region fixed effects. Column 4 presents the estimate coefficients from difference-in-difference regressions on the firms' variables. All variables and estimations are based on 2012–2015 values.

Figure 3: Regression coefficients and confidence intervals on loan renegotiation after controlling for region and bank-unit fixed effects

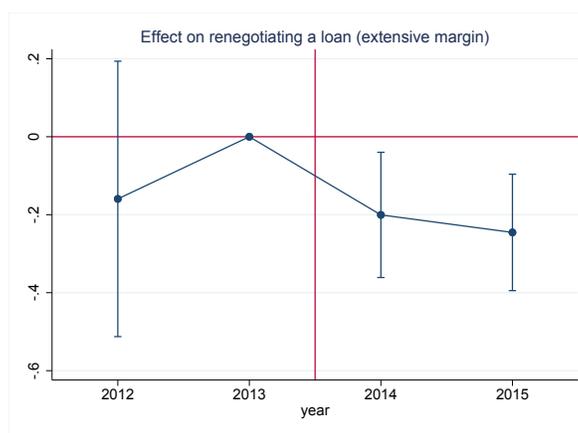


Figure 3 plots the effect of an interruption in the relationship between a loan officer and a firm on renegotiating a loan (extensive margin). The coefficients are obtained from a regression of the renegotiation dummy on the treatment indicator and on region and bank-unit fixed effects. The renegotiation dummy variable is equal to one if the firm  $j$  renegotiated a loan  $i$  at time  $t$  and zero otherwise. Bars show 95% confidence intervals.

Table 4: Effect on renegotiating a loan (extensive margin)

	(1)	(2)	(3)	(4)
<i>Post * Treat</i>	-0.143*** (0.0286)	-0.174** (0.0664)	-0.107*** (0.0184)	-0.110*** (0.0191)
Observations	18,325	9,291	16,807	16,243
$R^2$	0.122	0.042	0.124	0.122
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
<i>Lagged log of EBITDA over Total Debt</i>		✓		
<i>Lagged log of Total Balance</i>		✓		
<i>Lagged log of Total Assets</i>			✓	✓
<i>Lagged Total Balance over Total Debt</i>			✓	
<i>Lagged log of Total Debt over Total Assets</i>				✓
Cluster Level		Bank Unit		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1. The dependent variable is a dummy variable that is equal to one if the firm  $j$  renegotiated a loan  $i$  at time  $t$  and zero otherwise. The dummy variable  $Treat$  is equal to one if the firm experienced an interruption in its relationship with the loan officer due to the bank unit closure, and zero otherwise. The dummy variable  $Post$  is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). The bottom of the table depicts information on the fixed effects and the control variables included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 5: Effect on different renegotiation outcomes (extensive margin)

	(1)	(2)	(3)	(4)	(5)
	<i>Increased Maturity</i>	<i>Increased Loan amount</i>	<i>Increased Collateral</i>	<i>Decreased Collateral</i>	<i>Decreased Interest Rate</i>
<i>Post * Treat</i>	-0.0352* (0.0182)	-0.175*** (0.0146)	0.911*** (0.0355)	-0.589*** (0.0227)	-0.187*** (0.0673)
Observations	18,325	18,325	18,325	18,325	18,325
$R^2$	0.054	0.083	0.112	0.109	0.148
Firm F.E.	✓	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓	✓
Cluster Level			Bank Unit		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 for different renegotiation outcomes. The dependent variables are dummy variables that are equal to one if loan  $i$  of firm  $j$  received that particular renegotiation outcome at time  $t$  and zero otherwise. The dummy variable *Treat* is equal to one if the firm experienced an interruption on its relationship with the loan officer due to the bank unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). In the regressions, firm, pre-period bank-unit, post-period bank-unit and region \* year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Figure 4: Regression coefficients and confidence intervals on renegotiated loans' terms after controlling for region and bank-unit fixed effects

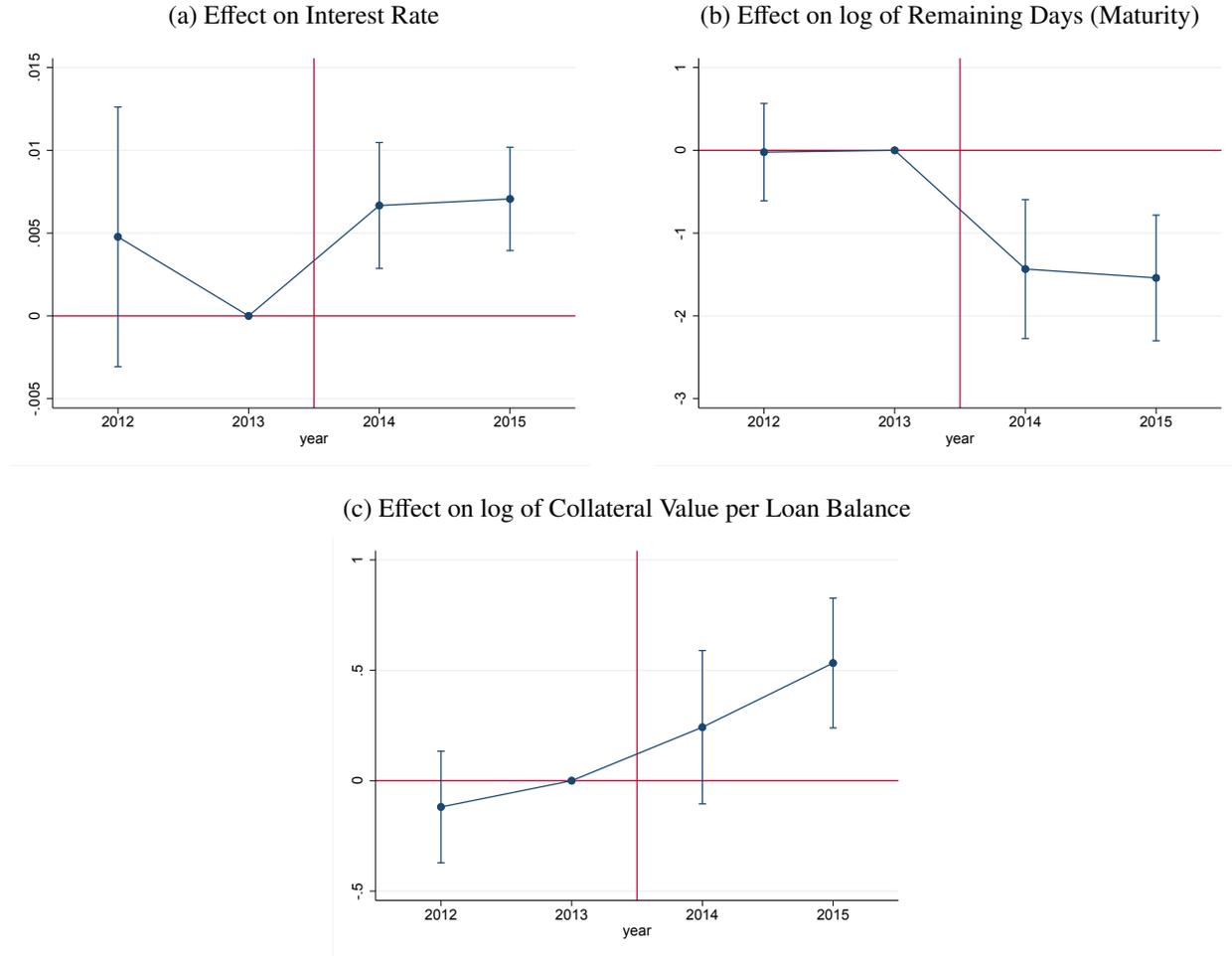


Figure 4 plots the effect of an interruption in the relationship between a loan officer and a firm on renegotiated loans' terms. The coefficients are obtained from a regression of the dependent variable on the treatment indicator and on region and bank-unit fixed effects. In figure 4a, the dependent variable is the interest rate of the renegotiated loans that firm  $j$  had. In figure 4b, the dependent variable is the log of days remaining as a measure of loan maturity. In figure 4c, the dependent variable is the log of collateral value per loan balance. Bars show 95% confidence intervals.

Table 6: Effect on renegotiated loans' terms (intensive margin)

<i>Log of</i>	(1)		(2)		(3)	
	(a)	(b)	(a)	(b)	(a)	(b)
<i>Post * Treat</i>	0.00453*** (0.00141)	0.00318** (0.00142)	-1.519*** (0.313)	-2.140*** (0.324)	0.518*** (0.158)	0.475** (0.189)
Observations	8,755	7,881	8,755	7,881	8,755	7,881
$R^2$	0.207	0.226	0.203	0.139	0.033	0.035
Firm F.E.	✓	✓	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓	✓	✓
Firm level controls						
Cluster Level				Bank Unit		✓

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 only for loans that were renegotiated at least once over the sample period. In columns 1-a and 1-b, the dependent variable is the log of interest rate of the renegotiated loans that firm  $j$  had. In columns 2-a and 2-b, the dependent variable is the log of days remaining as a measure of loan maturity. In columns 3-a and 3-b, the dependent variable is the log of collateral value per loan balance. The dummy variable *Treat* is equal to one if the firm experienced an interruption on its relationship with the loan officer due to the bank unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). The bottom of the table depicts information on the fixed effects and the control variables included. In the regressions, firm, pre-period bank-unit, post-period bank-unit and region \* year fixed effects are included. Firm level controls include the *lagged log of Total Assets* and the *lagged log of Total Debt over Total Assets*. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 7: Effect on variables related to collateral type - Only renegotiated loans

	(1)		(2)	
	<i>Unsecured Loan</i>		<i>Secure Type of Collateral</i>	
	(a)	(b)	(a)	(b)
<i>Post * Treat</i>	-0.302*** (0.0660)	-0.104* (0.0529)	0.134* (0.0737)	0.121* (0.0705)
Observations	8,755	7,881	8,174	7,322
$R^2$	0.007	0.007	0.007	0.006
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Firm level controls		✓		✓
Cluster Level			Bank Unit	

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 only for renegotiated loans for two variables related to loan collateral. The observations included in the analysis are the loans that were renegotiated at least once during the sample period. Columns 1-a and 1-b present the results for an unsecured loan dummy variable that is equal to one if loan  $i$  had no collateral at time  $t$  and equal to zero otherwise. Columns 2-a and 2-b present the results for a secure type of collateral dummy variable that is equal to one if loan  $i$  had more secure collateral at time  $t$  and zero otherwise. As more secure collateral, real estate (commercial or residential), ships, deposits, and debt securities are characterized. As less secure collateral, accounts receivable, equities or convertible bonds, and other types of guarantees are characterized. The dummy variable *Treat* is equal to one if the firm  $j$  experienced an interruption on its relationship with the loan officer due to the bank-unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). The bottom of the table depicts information on the fixed effects and the control variables included. In the baseline regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Firm level controls include the *lagged log of Total Assets* and the *lagged log of Total Debt over Total Assets*. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 8: Effect on the extensive and intensive margins using Difference-in-Difference-in-Differences

	Extensive Margin		Intensive Margin		
	(1)	(2)	(3)	(4)	(5)
	Renegotiation	Log of Remaining Days	Log of Collateral per Balance	Unsecured Loan	Secure Collateral
<i>Post * Treat * Noncentralized</i>	-0.358** (0.153)	-1.949*** (0.306)	0.681* (0.346)	-0.345*** (0.0983)	0.236** (0.0995)
<i>Post * Noncentralized</i>	-0.0818*** (0.0225)	0.0474 (0.114)	0.0545 (0.114)	0.0332 (0.0292)	0.00502 (0.0452)
<i>Post * Treat</i>	0.200 (0.142)	2.912*** (0.578)	-0.0891 (0.324)	0.290*** (0.0934)	-0.102 (0.0973)
Observations	25,417	12,040	12,040	12,040	11,439
R <sup>2</sup>	0.125	0.160	0.033	0.008	0.008
Firm F.E.	✓	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓	✓
Cluster Level		Bank Unit			

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 2. On the extensive margin the dependent variable is a dummy that is equal to one if firm  $j$  renegotiated loan  $i$  at time  $t$  and zero otherwise. For the estimations on the intensive margin, only loans that were renegotiated at least once over the sample period are included. Results are estimated for three loan terms and for two variables related to collateral type. The dummy variable *Noncentralized* is equal to one if the loan is managed under a noncentralized bank unit and zero if it is under a centralized unit. The dummy variable *Treat* is equal to one if the loan officer relationship was interrupted due to the bank unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). In the regressions, firm, pre-period bank-unit, post-period bank-unit and region \* year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 9: Comparison of pre-period mean values for treated and control groups - Only firms that renegotiated a loan

Variable	(1) Control	(2) Treated	(3) <i>p</i> - value on Difference
<u><i>Loan-Related Variables:</i></u>			
Total Balance	2,320,155.2 (5,631,560.5)	2,556,412.6 (6,068,308.7)	(0.379)
Interest Rate	0.0696 (0.0284)	0.0682 (0.0237)	(0.711)
Days Remaining (Maturity)	1,072.9 (1,111.0)	1,445.2 (1,281.3)	(0.253)
Total Collateral Value	2,699,829.0 (6,738,534.2)	3,544,341.2 (9,340,773.5)	(0.940)
Unsecured Loan (Dummy)	0.209 (0.407)	0.145 (0.353)	(0.205)
Secure Type of Collateral (Dummy)	0.498 (0.439)	0.544 (0.440)	(0.775)
<u><i>Performance-Related Variables:</i></u>			
Nonperforming (Dummy)	0.116 (0.321)	0.170 (0.377)	(0.275)
Days Delayed over Remaining Days	12.28 (68.04)	15.85 (63.81)	(0.445)
Total Provision	403,718.0 (6,688,733.8)	491,064.1 (2,705,066.6)	(0.112)
<u><i>Debtor's Financial Information:</i></u>			
Total Assets	16,071,611.9 (27,579,856.0)	11,655,153.9 (24,242,158.6)	(0.669)
Total Debt over Total Assets	0.716 (0.246)	0.715 (0.262)	(0.117)
Total Equity over Total Assets	0.278 (0.246)	0.285 (0.262)	(0.645)
EBITDA over Total Assets	0.0530 (0.0798)	0.0482 (0.0652)	(0.949)

This table displays the mean values and standard deviations for the treated and control groups only for firms that renegotiated at least one loan. Column 3 reports the *p*-value for the difference between Columns 1 and 2. *p*-values are obtained from a regression of the main variable on a treatment indicator and region fixed effects. All variables and estimations are based on the 2012–2013 values.

Table 10: Selection on renegotiation

	(1) Whole Sample pre- and post-period <i>Renegotiation</i>	(2) Only control group post-period <i>Renegotiation</i>	(3) Only treated group post-period <i>Renegotiation</i>
<i>All variables are in lagged logs:</i>			
<i>Firm Variables:</i>			
EBITDA growth rate	0.000147 (0.000145)	-0.0000467 (0.000300)	0.00102*** (0.000328)
Total Assets	0.000613** (0.000229)	0.000570** (0.000228)	0.000574 (0.000685)
Total Debt	0.000853*** (0.000191)	0.000802*** (0.000192)	0.00141 (0.000976)
Total Equity	0.000223 (0.000247)	0.000209 (0.000265)	-0.000806 (0.000476)
Leverage (Debt over Assets)	0.000635*** (0.000205)	0.000602** (0.000221)	0.00132* (0.000763)
<i>Loan Variables:</i>			
Total Balance	0.00136*** (0.000186)	0.00169*** (0.000190)	0.00229*** (0.000638)
Total Provision	0.00166*** (0.000148)	0.00186*** (0.000190)	0.00172*** (0.000572)
Days Past Due	0.00118*** (0.000120)	0.00121*** (0.000135)	0.000122 (0.000337)
Bank Unit F.E.	✓	✓	✓
Region * Year F.E.	✓	✓	✓
Cluster Level		Bank Unit	

This table displays the estimated coefficients from separate regressions of the renegotiation dummy variable on firm and loan variables. The independent variables are constructed as the firm's rank within bank unit based on each variable's value at the year before the transfer. Bank-unit and region\*year fixed effects are included, and standard errors are clustered at the bank-unit level. Column 1 reports the estimated coefficients for the whole sample (treated and control groups over the whole period). Column 2 reports the coefficients for the control group in the post-period. Column 3 reports the coefficients for the treated group in the post-period.

Table 11: Summary statistics and Difference-in-Difference coefficients for firms in exposed and control areas - Exclude Attica and match on the zip code

	(1)	(2)	(3)	(4)
	Mean values for Control areas	Mean values for Exposed areas	<i>p</i> - value on Difference	Coefficient from DiD
Total Assets	1,626,610.8 (1,743,132.7)	2,014,598.6 (2,138,976.2)	(0.399)	87,059.6 (71,485.0)
Total Debt	355,360.0 (790,474.9)	549,881.4 (1,038,056.8)	(0.110)	-19,373.3 (17,135.4)
Shareholders funds	785,544.4 (1,189,319.0)	907,094.8 (1,129,909.4)	(0.814)	33,374.6 (25,500.5)
Number of Employees	11.37 (12.07)	12.33 (13.80)	(0.459)	0.0734 (0.588)
EBIT	83,964.2 (172,477.7)	60,042.6 (169,693.1)	(0.114)	14,415.8 (12,099.1)
EBIT growth Rate	-3.783 (79.72)	-0.167 (9.234)	(0.161)	26.74 (26.61)
Net Income	32,158.8 (137,600.4)	9,409.9 (138,692.2)	(0.558)	9,655.2 (8,291.5)
Sales	1,189,756.5 (1,794,288.1)	1,474,594.3 (2,414,726.8)	(0.576)	63,702.5 (50,256.1)
Gross Profit	374,294.3 (454,295.2)	334,154.7 (475,334.0)	(0.436)	-4,988.0 (37,769.4)
Cash Flow	88,236.9 (175,649.1)	81,123.2 (168,534.7)	(0.192)	5,758.8 (14,592.4)
Return on Total Assets (%)	3.821 (14.44)	1.522 (11.76)	(0.180)	0.744 (1.113)
Profit Margin (%)	3.447 (21.71)	-0.876 (20.89)	(0.143)	0.906 (0.814)

The data source for this table is the Amadeus Bureau van Dijk database, and it excludes the Attica region. The sample is restricted to areas where firms are similar. Columns 1 and 2 show the mean values and standard deviations for firms located in the zip code areas where a bank-unit closed (exposed areas) and firms located in the zip code areas where a unit remained open (control areas). Column 3 reports the *p*-value for the difference between Columns 1 and 2. *p*-values are obtained from a regression of the main variable on an indicator of whether the firm is located at the zip code area where a bank-unit closed and region fixed effects. Column 4 presents the estimate coefficients from difference-in-difference regressions on the firms' variables. All variables and estimations are based on 2012–2015 values.

Table 12: Effect on the probability of renegotiating a loan and on renegotiated loans' terms - Only areas with similar characteristics

	Extensive Margin		Intensive Margin	
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.607*** (0.0852)	0.00256** (0.00101)	-0.869* (0.421)	0.270*** (0.0863)
Observations	7,419	3,191	3,191	3,191
$R^2$	0.127	0.278	0.270	0.037
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 only for firms located in areas where firms have no statistically different characteristics, as it is shown at table 11. In Column 1 of the results on the extensive margin, the dependent variable is a dummy that is equal to one if loan  $i$  was renegotiated at time  $t$  and zero otherwise. For the estimations on the intensive margin, the observations included in the analysis are the loans that were renegotiated at least once during the sample period. Results are estimated for three loan terms. The dummy variable *Treat* is equal to one if the firm experienced an interruption in its relationship with the loan officer due to the bank-unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). In the baseline regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 13: Effect on the probability of renegotiating a loan and on renegotiated loans' terms - Control for bank unit size

	Extensive Margin		Intensive Margin	
	(1)	(1)	(2)	(3)
<i>Post * Treat</i>	<i>Renegotiation</i> -0.241* (0.132)	<i>Log of Interest Rate</i> 0.0177* (0.00799)	<i>Log of Remaining Maturity</i> -0.989* (0.423)	<i>Log of Collateral per Balance</i> 0.810** (0.386)
Observations	916	489	489	489
<i>R</i> <sup>2</sup>	0.146	0.232	0.274	0.045
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 only for loans that were transferred to a bank unit that was at most 20% larger than their original bank unit. Observations on the control group are also restricted to those that were managed at the unit that received loans from units that were at most 20% smaller (from the “filtered” treated group). In Column 1 of the results on the extensive margin, the dependent variable is a dummy that is equal to one if loan  $i$  was renegotiated at time  $t$  and zero otherwise. For the estimations on the intensive margin, the observations included in the analysis are the loans that were renegotiated at least once during the sample period. Results are estimated for three loan terms. The dummy variable *Treat* is equal to one if the firm experienced an interruption in its relationship with the loan officer due to the bank-unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). In the baseline regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 14: Unconditional effect on loans' performance

	(1)	(2)	(3)
	<i>Nonperforming (Dummy)</i>	<i>Log of Days Past Due over Remaining Days</i>	<i>Log of Total Provision per Total Balance</i>
<i>Post * Treat</i>	-0.0507 (0.0520)	0.114 (0.140)	-1.381 (0.881)
Observations	25,417	25,417	25,417
$R^2$	0.102	0.266	0.665
Firm F.E.	✓	✓	✓
Pre-period Bank unit F.E.	✓	✓	✓
Post-period Bank unit F.E.	✓	✓	✓
Region * Year F.E.	✓	✓	✓
Cluster Level		Bank unit	

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results from estimating equation 1 for all loans that firms hold over the sample period. The observations included in the analysis are the new loans, loans that were renegotiated, and old loans that were not renegotiated. The dependent variables are a nonperforming dummy variable, the log of days past due over the number of remaining days, and the log of total provision over total balance for the loans that firm  $j$  had at year  $t$ . The dummy variable *Treat* is equal to one if the firm experienced an interruption on its relationship with the loan officer due to the bank unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). Firm, pre-period bank unit, post-period bank unit, and region\*year fixed effects are included. The bottom of the table depicts information on the fixed effects and the control variables included. Standard errors are corrected for clustering at the pre-period bank unit level.

Table 15: Firm level effects

	(1) <i>Equity over Total Assets</i>	(2) <i>Total Debt over Total Assets</i>	(3) <i>EBITDA over Total Assets</i>	(4) <i>Total Balance over Total Debt</i>
<i>Post * Treat</i>	0.295*** (0.0642)	-0.299*** (0.0653)	0.0604*** (0.0125)	-0.106** (0.0406)
Observations	9,060	9,060	9,060	9,060
$R^2$	0.018	0.018	0.013	0.022
Firm F.E.	✓	✓	✓	✓
Pre-period Bank unit F.E.	✓	✓	✓	✓
Post-period Bank unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank unit	

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the results of an interruption in the relationship between a loan officer and a firm from estimating equation 1 on firm financial variables. In Column 1, the dependent variable is the ratio of equity over total assets for firm  $j$  at year  $t$ . In Column 2, the dependent variable is the ratio of total debt over total assets. In Column 3, the dependent variable is the ratio of EBITDA over total assets. In Column 4, the dependent variable is the ratio of the total balance at this bank over the total debt to all banks that a firm  $j$  has at year  $t$ . This is a measure of how much a firm borrows from this bank relative to its total debt from all banks. The dummy variable *Treat* is equal to one if the firm experienced an interruption on its relationship with the loan officer due to the bank unit closure, and zero otherwise. The dummy variable *Post* is equal to one if the year of the observation is after the reorganization (either 2014 or 2015) and zero if it is before the reorganization (either 2012 or 2013). Firm, pre-period bank unit, post-period bank unit, and region\*year fixed effects are included. The bottom of the table depicts information on the fixed effects and the control variables included. Standard errors are corrected for clustering at the pre-period bank unit level.

Table 16: Correlation of relationship strength with probability to renegotiate

	Whole sample		Only control		Only treated	
	(1)	(2)	(1)	(2)	(1)	(2)
	Pre-period	Post-period	Pre-period	Post-period	Pre-period	Post-period
<i>Dependence Ratio</i>	0.0440*** (0.0120)	0.147*** (0.0272)	0.0321** (0.0123)	0.140*** (0.0267)	0.162*** (0.0444)	0.0621 (0.0811)
$R^2$	0.422	0.013	0.431	0.014	0.378	0.103
Bank Unit F.E.	✓	✓	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓	✓	✓
Cluster Level				Bank Unit		

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

This table displays the estimated coefficients from separate regressions of the renegotiation dummy variable on the *dependence ratio*. The *dependence ratio* is the ratio of the total balance that a firm has at this bank over the total debt that the firm has at all banks. The *dependence ratio* is used as an approximate measure of relationship strength. Bank-unit and region\*year fixed effects are included, and standard errors are clustered at the bank unit level. The first two columns present the coefficients for the whole sample for the pre- and post-period separately. The second two columns present the coefficients only for the control group for the pre- and post-period separately. The last two columns present the coefficients only for the treated group for the pre- and post-period separately.

Figure 5: Density distribution of the *dependence ratio*

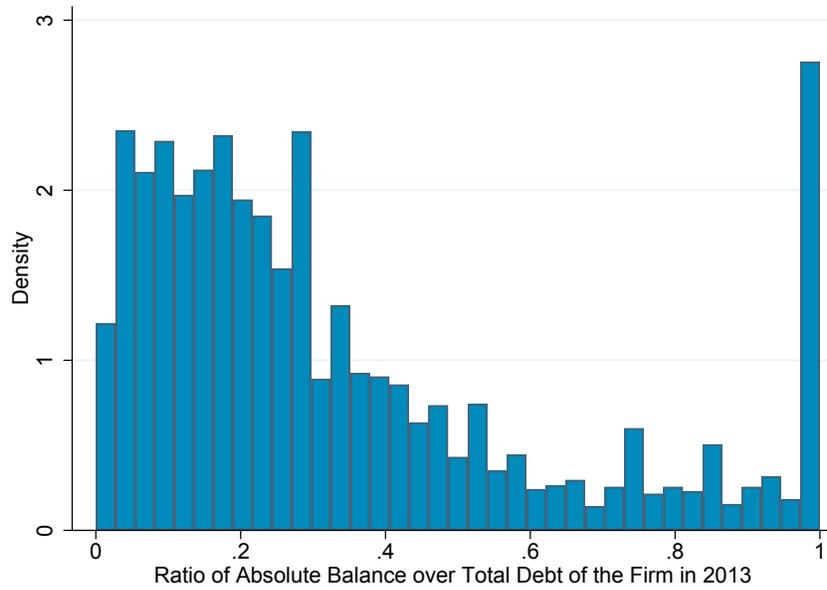


Figure 5 plots the density distribution of the *dependence ratio* as measured in 2013.

The *dependence ratio* is defined as the ratio of the total balance that a firm has at this bank over the total bank debt of the firm.

Table 17: Heterogeneity by relationship strength - Effect on the probability of renegotiating a loan and on renegotiated loans' terms

(A) Closer Relationship				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.319*** (0.110)	0.0124*** (0.00356)	-4.173*** (1.445)	0.494** (0.240)
Observations	4,035	1,821	1,821	1,821
$R^2$	0.161	0.266	0.284	0.031
(B) Less Close Relationship				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.0253 (0.0673)	0.00128 (0.00158)	1.017 (0.610)	-0.462*** (0.145)
Observations	10,035	4,956	4,956	4,956
$R^2$	0.119	0.180	0.205	0.049
Firm F.E.	✓	✓	✓	✓
Pre-Bank Unit F.E.	✓	✓	✓	✓
Post-Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

This table displays the results from estimating equation 1 separately for firms with a closer relationship with the bank and for firms with a less close relationship. Firms with a *closer relationship* are defined as those with dependence ratio above 50% in 2013. Firms with a *less close relationship* are defined those with dependence ratio below 20% in 2013.

In Column 1 of the results on the extensive margin, the dependent variable is a dummy that is equal to one if loan  $i$  was renegotiated at time  $t$  and zero otherwise. For the estimations on the intensive margin, the observations included in the analysis are the loans that were renegotiated at least once during the sample period. Results are estimated for three loan terms. The dummy variables *Treat* and *Post* are defined as in the previous sections of the paper. In the regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 18: Heterogeneity by relationship strength - Effect on the probability of renegotiating a loan and on renegotiated loans' terms using Difference-in-Difference-in-Differences

	Extensive Margin		Intensive Margin	
	(1)	(2)	(1)	(3)
	<i>Renegotiation</i>	<i>Log of Remaining Days</i>	<i>Log of Interest Rate</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat * Dependence Ratio</i>	-0.513*** (0.0725)	-2.887*** (1.006)	0.00464 (0.00471)	0.346* (0.187)
Observations	16,824	8,212	8,212	8,212
R <sup>2</sup>	0.125	0.223	0.191	0.049
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

This table displays the results from estimating the equation:

$$y_{ijurt} = \alpha_j + \alpha_{pre-u} + \alpha_{post-u} + \alpha_{rt} + \delta_1(Post_t * Treat_{i,jur} * Dependence Ratio_{i,jur}) + \delta_2(Post_t * Dependence Ratio_{i,jur}) + \delta_3(Treat_{i,jur} * Dependence Ratio_{i,jur}) + \delta_4(Post_t * Treat_{i,jur}) + \delta_5(Dependence Ratio_{i,jur} + \varepsilon_{ijurt})$$

On the extensive margin the dependent variable is a dummy that is equal to one if firm  $j$  renegotiated loan  $i$  at time  $t$  and zero otherwise. For the estimations on the intensive margin, only loans that were renegotiated at least once over the sample period are included. Results are estimated for three loan terms and for two variables related to collateral type. The variable *Dependence Ratio* is a continuous variable equal to the ratio of the total balance at this bank over the total debt to all banks that a firm  $j$  has at year 2013. This variable is a measure of how much a firm borrows from this bank relative to its total debt from all banks. The dummy variables *Treat* and *Post* are defined as in the previous sections of the paper. In the regressions, firm, pre-period bank-unit, post-period bank-unit and region \* year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

## **Internet Appendix**

### **Heterogeneity by the Relative Size of the Firm**

In this section, I use as a measure of relationship strength the relative size of the firm as a corporate client within a bank unit. I estimate this measure as the ratio of the total balance of the firm over the total amount of loans that each bank unit manages in 2014, which captures the exposure of that bank unit to each corporate borrower: The larger the ratio, the larger the exposure of the bank unit to this client. The relative size of the firm is potentially correlated with two effects. Although, for larger firms, the potential profit margin for the bank is higher, the bank is also exposed to a higher risk. As both the profit margin and the risk are higher for larger firms, it is expected that loan officers will have a stronger incentive to establish closer relationships with larger clients.

Figure 6 shows the density distribution of the relative size of the firm within the bank unit. As expected, the distribution is highly skewed, and the majority of the firms are small clients for the bank unit. The indicator of relative firm size is estimated based on 2014 data, the first year after the transfer occurred. I use the relative size after the transfer to control for different behaviors towards the large clients in the post-period independent of whether a firm was in the treated or control group. In the following tests, I look separately at larger and smaller firms. I define as larger firms those whose balance at the specific bank unit accounts for at least 1% of the total amount of corporate loans the unit manages. The rest of the sample is defined as relatively small firms.<sup>17</sup>

Table 19 presents the results for larger and smaller firms separately. From the results on the extensive margin, we observe that both firms with smaller and larger balances, and an interrupted relationship have a lower probability of renegotiating a loan following the transfer to another bank unit. Regarding the results on the intensive margin, firms with larger balances are affected the most when their relationship with a loan officer is interrupted. In particular, treated firms with a large

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<sup>17</sup>The cutoffs were chosen to secure enough statistical power to the tests. The results remain robust when I use the continuous variable of the Corporate Client Size measure in Table 20.

balance receive a higher interest rate and shorter maturities, and they have to pledge a higher value of collateral. For treated firms with smaller balances, there is no statistically significant difference from the control group on the renegotiated loan terms.

From the analysis based on the relative size of the firm, I identify important heterogeneity. Firms with smaller balances, once their relationship with the loan officer is interrupted, have a lower probability to renegotiate a loan; however, conditional on a renegotiation, they receive loan terms similar to those of the firms with continuous relationships. This finding suggests that the value of a relationship for small firms affects the extensive margin to renegotiate a loan. Larger firms with interrupted relationships have a significantly lower probability of renegotiating a loan than larger firms with uninterrupted relationships; also, conditional on a renegotiation, they receive tougher loan terms. This effect suggests that, when a loan officer manages a client with whom he or she does not have an established relationship, the officer compensates for the higher risk by requiring tougher loan terms.

Figure 6: Density distribution of the firm's relative size

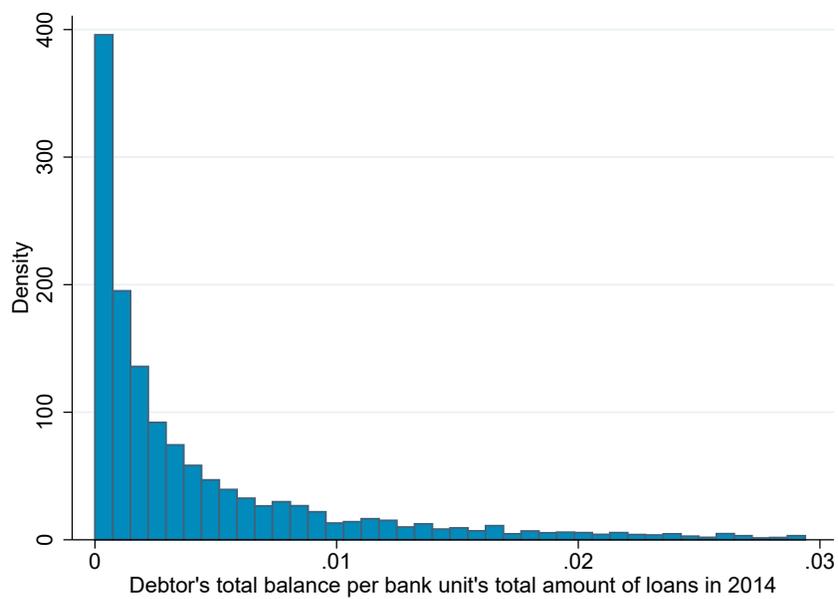


Figure 6 plots the density distribution of the firm's relative size as a corporate client within bank unit. The measure of firm's relative size is the ratio of the firm's total balance at the bank unit over the total amount of loans that each bank unit manages in 2014.

Table 19: Heterogeneity by firm's relative size as bank's corporate client within unit in 2014 - Effect on the probability of renegotiating a loan and on renegotiated loans' terms

(A) Smaller balance				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.260*** (0.0138)	0.00592** (0.00218)	0.1000 (0.654)	0.177 (0.212)
Observations	12,525	6,245	6,245	6,245
$R^2$	0.115	0.192	0.153	0.040
(B) Larger balance				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.729*** (0.121)	0.0110* (0.00576)	-1.891*** (0.374)	0.690*** (0.218)
Observations	5,800	2,510	2,510	2,510
$R^2$	0.188	0.408	0.254	0.056
Firm F.E.	✓	✓	✓	✓
Pre-Bank Unit F.E.	✓	✓	✓	✓
Post-Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

This table displays the results from estimating equation 1 separately for firms that had a smaller balance at the bank unit in 2014 and for firms that had a larger balance. Larger firms are defined as those whose balance at the specific bank unit accounts for at least 1% of the total amount of corporate loans that the unit manages. The rest of the sample is defined as relatively smaller firms.

In Column 1 of the results on the extensive margin, the dependent variable is a dummy that is equal to one if loan  $i$  was renegotiated at time  $t$  and zero otherwise. For the estimations on the intensive margin, the observations included in the analysis are the loans that were renegotiated at least once during the sample period. Results are estimated for three loan terms. The dummy variables *Treat* and *Post* are defined as in the previous sections of the paper. In the regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

Table 20: Heterogeneity by firm's relative size as bank's corporate client - Effect on the probability of renegotiating a loan and on renegotiated loans' terms using Difference-in-Difference-in-Differences

	Extensive Margin		Intensive Margin	
	(1)	(2)	(1)	(3)
	<i>Renegotiation</i>	<i>Log of Remaining Days</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat * Corporate Client Size</i>	27.52 (18.99)	-550.3*** (118.8)	-1.583* (0.884)	145.2** (64.33)
Observations	18,306	8,742	8,742	8,742
$R^2$	0.127	0.208	0.132	0.038
Firm F.E.	✓	✓	✓	✓
Pre-period Bank Unit F.E.	✓	✓	✓	✓
Post-period Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

This table displays the results from estimating the equation:

$$y_{ijurt} = \alpha_j + \alpha_{pre-u} + \alpha_{post-u} + \alpha_{rt} + \delta_1(Post_t * Treat_{i,jur} * Corporate Client Size_{i,jur}) + \delta_2(Post_t * Corporate Client Size_{i,jur}) + \delta_3(Treat_{i,jur} * Corporate Client Size_{i,jur}) + \delta_4(Post_t * Treat_{i,jur}) + \delta_5(Corporate Client Size_{i,jur} + \varepsilon_{i,jurt})$$

On the extensive margin the dependent variable is a dummy that is equal to one if firm  $j$  renegotiated loan  $i$  at time  $t$  and zero otherwise. For the estimations on the intensive margin, only loans that were renegotiated at least once over the sample period are included. Results are estimated for three loan terms and for two variables related to collateral type. The variable *Corporate Client Size* is a continuous variable equal to the ratio of the firm's total balance at a bank unit over the total amount of loans that the bank unit manages in 2014. This variable captures the exposure of that bank unit to each corporate borrower. The dummy variables *Treat* and *Post* are defined as in the previous sections of the paper. In the regressions, firm, pre-period bank-unit, post-period bank-unit and region \* year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.

## **Heterogeneity by Firms Pre-Unit-Closure Period Performance**

In this section, I analyze whether the firm's pre-unit-closure period loan performance influences the estimated results. I separate the sample between firms that delayed a loan payment in 2013, the year before the transfer, and firms that paid their loans on time. Table 21 presents the results of the main outcomes of interest separately for the two groups. A common conclusion is that the results are consistent independent of the previous behavior of the firm. We observe that both firms with good repayment behavior and those with delays in loan payments have a lower probability of renegotiating a loan when their loan officer relationships are interrupted.

The results on the intensive margin are not similar: Even though both groups receive a slightly higher interest rate when the relationship is interrupted, the results on maturity and on collateral vary significantly across the two groups. In particular, among the firms with on time loan payments, treated firms receive significantly shorter maturities (200% less remaining days) and are required to pledge higher collateral (180% higher collateral per loan balance). In contrast, among firms that delayed a payment in the past, we don't observe a statistically significant different effect on the maturity and the collateral.

Table 21: Heterogeneity by firm's pre-period performance - Effect on the probability of renegotiating a loan and on renegotiated loans' terms

<i>(A) On time loan payment</i>				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.144** (0.0622)	0.00927*** (0.00235)	-2.110*** (0.384)	1.826*** (0.109)
Observations	10,345	4,522	4,522	4,522
$R^2$	0.148	0.218	0.346	0.041
<i>(B) Delayed loan payment</i>				
	(1)	(1)	(2)	(3)
	<i>Renegotiation</i>	<i>Log of Interest Rate</i>	<i>Log of Remaining Days</i>	<i>Log of Collateral per Balance</i>
<i>Post * Treat</i>	-0.136* (0.0706)	0.0239*** (0.00175)	0.198 (0.672)	-0.163 (0.247)
Observations	7,980	4,233	4,233	4,233
$R^2$	0.099	0.214	0.122	0.034
Firm F.E.	✓	✓	✓	✓
Pre-Bank Unit F.E.	✓	✓	✓	✓
Post-Bank Unit F.E.	✓	✓	✓	✓
Region * Year F.E.	✓	✓	✓	✓
Cluster Level			Bank Unit	

This table displays the results from estimating equation 1 separately for firms that paid their loans on time in 2013 and for firms that delayed a loan payment in 2013.

In Column 1 of the results on the extensive margin, the dependent variable is a dummy that is equal to one if loan  $i$  was renegotiated at time  $t$  and zero otherwise. For the estimations on the intensive margin, the observations included in the analysis are the loans that were renegotiated at least once during the sample period. Results are estimated for three loan terms. The dummy variables *Treat* and *Post* are defined as in the previous sections of the paper. In the regressions, firm, pre-period bank-unit, post-period bank-unit, and region\*year fixed effects are included. Standard errors are corrected for clustering at the pre-period bank-unit level.