

# DO RELATIONSHIPS MATTER? EVIDENCE FROM LOAN OFFICER TURNOVER

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## Abstract

Using exogenous shocks to the relationship between borrowers and loan-officers, we document that borrowers are less likely to receive new loans from the bank and are more likely to apply for credit from other banks when their original loan officers are absent. They also are more likely to miss payments or go into default. These effects are more pronounced when turnovers are unexpected as in the case of sickness leaves or when officers do not have strong incentives to transfer information, e.g. terminated loan officers. However, when given the right situation, e.g. voluntary resignations of loan officers, it seems possible to transfer soft information between employees within the same institution.

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# Introduction

Credit to small and opaque borrowers often relies on extensive interaction between loan officers and the businesses they lend to. Loan officers perform the task of gathering soft, and often hard information about their clients to reduce the information asymmetry and the cost of lending to the bank. For examples of this, see Rajan (1992), Petersen and Rajan (1995), or Berger and Udell (2002). The positive effect of relationship lending might be reinforced if clients develop personal loyalties with their loan officer, since these often help clients with many business decisions. One could imagine that borrowers are less likely to engage in moral hazard behavior if they feel a personal connection with the loan officer.<sup>1</sup> However, on the downside, relying extensively on loan officers' personal contacts with the borrowers might make them indispensable in the lending process. Stein (2002) or Berger, Miller, Petersen, Rajan, and Stein (2005) argue that soft information cannot easily be transferred within the bank and thus limits the organizational structure and the bank's size .

In this paper, we test the impact of shocks to the relationship between loan officers and borrowers, by exploiting instances where loan officers are absent from their job for long periods of time. If soft information matters, and is difficult to transfer between employees of the bank, we would expect that access to credit deteriorates when the original loan officer is absent. A replacement loan officer might initially rely more on hard information in her credit

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<sup>1</sup>See Schoar (2012) for evidence along these lines.

assessment and, as a result, firms with worse observable characteristics, like smaller and less profitable firms, should see a bigger effect from the switch. We use detailed transaction-level data on small business borrowers from BancoEstado, the largest public bank in Chile. These loans are issued as personal loans, and therefore without limited liability. However, de facto, it is very difficult to seize any assets from these clients. Therefore, loans in this segment rely heavily on soft information. We obtain comprehensive data about the loan officers, their backgrounds and leaves, as well as the transaction details and repayment behavior of the clients in their portfolios.

We find that the relationship between loan officers and their clients has first-order effects on the borrowers' access to credit. If the original loan officer is absent, we observe an 18% drop in the unconditional probability that a client gets a new loan during that time period. When decomposing this drop into the application rate of the client and the approval probability of the bank, we see that not only does the approval rate drop by more than 6%, but also the rate at which clients apply for new loans falls by about 1%, which represents a 12% reduction in the unconditional probability of applying for a new loan. At the same time, we do not observe any significant changes in credit terms after a loan officer leaves; for example, interest rates and loan maturity are on average unchanged. However, there is a significant increase in the probability that a client becomes delinquent or even defaults when the original loan officer is out. For example, clients in good standing increase their probability of becoming delinquent by 22% compared to the average probability of missing

a payment. Furthermore, for those borrowers who are already delinquent, the probability of default shoots up by 17% compared to the unconditional probability of defaulting.<sup>2</sup> Finally, only 11% of clients who have been rejected for a loan by the replacement loan officer are able to borrow from the outside loan market. These findings suggest that borrowers whose loan officers are absent have reduced access to credit since new loan officers seem to rely on rationing clients who they perceive as riskier. In addition, borrowers demonstrate less loyalty towards the bank.

Next, we test if the documented negative impact of loan officer turnover can be mitigated if there is a possibility to transfer soft information to a replacement loan officer. For this purpose, we look at variations in (1) how well the absence of a loan officer can be planned in advance, since it should be more difficult to transfer soft information in the case of completely unplanned leave (2) whether the departing loan officer has any incentives to collaborate in conveying information to a replacement loan officer. We observe four different types of leave: due to sickness, resignation, pregnancy, and termination. The timing of a sickness leave is difficult to plan in advance, since we look at major illnesses like heart attacks or cancer, which are unexpected. Even though the officer might have incentives to convey soft information to a replacement, the severity of the disease usually prevents it. Here the replacement loan officer might not be able to access any of the soft information the previous loan officer had acquired. In comparison, a loan officer who is dismissed might

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<sup>2</sup>A client is considered in default if he or she has late payments of more than 60 days.

have sufficient lead-time but no incentives to cooperate with the replacement. In contrast, pregnancy has a nine-month lead-time, where the bank could ensure that the replacement loan officer be given information on the soft factors of the borrowers. Furthermore, the previous loan officer has an incentive to collaborate since she gets her clients back after the maternity leave. Similarly, in the case of resignations, loan officers usually have to give a one-month notice before they leave, which is usually enough time to brief the replacement loan officer. If we see deterioration in the credit terms, even in the last two circumstances, it would suggest that soft information is difficult to transmit, even when given enough time.

We find that clients whose loan officer takes a sick leave are 1.2% less likely to get a new loan from the bank during the time of the absence, compared to the average probability of getting a new loan, which is 6.5%. This is driven by a similarly strong decrease in the likelihood that clients apply for a loan, which can be a sign that they feel less loyal to the bank. These clients also show a 2.1% increase in the probability of getting a loan outside of the bank, which is almost 13% higher than the probability for an average client in the sample.<sup>3</sup> The fact that they are able to get outside financing also suggests that they are of reasonable credit risk. Furthermore, these borrowers experience a very significant increase of 0.95% in the probability of delinquency. Overall, these results suggest that the sudden leave of a loan officer has a significant impact for the credit access but also the loyalty of clients. The sickness leave can be interpreted as a quasi baseline, since loan officers do not

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<sup>3</sup>The average client gets a loan from another bank with a 16.2% probability.

have a chance to transfer information to their replacement due to exogenous circumstances.

In comparison, the clients of loan officers who are on pregnancy leave show a similar decline in their likelihood to get a loan. However, the decline seems predominantly driven by a drop in the application rate during the loan officer's absence, not a reduction in approval. At the same time, these clients show no propensity of going to a bank outside of the current relationship. We find that one of the reasons for this outcome is that borrowers in this group are more likely to take out a loan in the month before the loan officer goes on pregnancy leave. This effect is only observable for pregnant loan officers, but none of the other types of absentee spells. It appears that pregnant loan officers prepare for their absence by setting their clients up with a loan before they leave, possibly because they anticipate that the soft part of the information is difficult to transfer. On the other hand, it is likely that pregnant officers have an incentive not to transfer soft information to their replacement, since they do not want to lose clients when they come back. Moreover, clients show an increased propensity to be late on their loans, which might underscore that these clients feel less loyalty to the interim loan officer.

In contrast, in the case of retiring loan officers (who usually retire because they have received an outside offer...), conditions should be optimal to transfer information since there is enough lead time and the departing loan officer has no incentives to withhold information from the successor.<sup>4</sup> Interestingly, in this case we see no drop in the access

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<sup>4</sup>Anecdotal evidence suggests that the incentives to transfer information are mostly explained by career concerns. Indeed, the job market of loan officers is specialized; they get a 6 month formal training plus

to credit and no significant change in the application or approval rates. These clients also show no propensity of approaching an outside bank, which underscores that their access to finance does not change. While the likelihood of a client missing one month of payments also increases when their loan officer is hired away, the likelihood of outright defaulting on a loan does not increase. This could be a sign of transitory adjustment costs rather than a situation where the portfolio is permanently deteriorating when the previous loan officer leaves. Overall, these results suggest that given the right circumstances soft information seems to be transferable between loan officers.

Finally, for the portfolio of loan officers who are terminated, we see a much stronger drop in the probability of getting a new loan compared to all other spells of absence, which is equally driven by a reduction in approval rates as well as applications. There is also a significant increase in the probability that clients fall late on their loans and default. In fact, in the two months before the loan officer is dismissed, we see a sharp increase in delinquency rates. It appears that the dismissed loan officers made bad loans and thus these clients do not get credit after the turnover. The new incoming loan officer has incentives to report poorly performing borrowers to start with a clean slate of clients. For a similar argument see Hertzberg, Liberti, and Paravisini (2010).

As a final step, we investigate whether the magnitude of the reported effects varies with 

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important training in the field. The market is also small and people from different banks know each other. Therefore, when loan officers switch banks, they want to keep their reputation in the industry, which maximizes their future outside opportunities. In particular they do not want to be perceived as un-loyal by stealing clients, or a poor performer if their old portfolio defaults just after they leave the bank.

the characteristics of the borrowers. If relationship lending is less important in situations with more reliable hard information, we should see a smaller effect for these firms when the original loan officer leaves. We find interesting heterogeneity depending on the type of leave. For loan officers who are out due to sickness and thus did not have time to transmit any soft information to their replacement, we see a sharp decline in credit to small and low credit score clients, while there is almost no reduction in the access to credit for large borrowers and those that have high credit scores (which are usually seen as less opaque borrowers). We do also see that larger and high credit score clients are significantly less likely to fall behind in their repayments. For the portfolio of pregnant loan officers, we find qualitatively similar, but quantitatively weaker heterogeneous treatment effects.

In contrast, these heterogeneous treatment effects are not present for the portfolios of loan officers who either resign or are terminated. For resigning loan officers, we see no differentiation based on observable information. Most importantly, we see no reduction in credit for borrowers with worse observable characteristics. This might indicate that resigning officers were able to successfully brief their replacements about the soft (and hard) information of the clients. Lastly, for clients of terminated loan officers, we see a drastic decline in access to finance for all types of borrowers independent of observable characteristics. We confirm the same dynamics for female borrowers compared to male borrowers: women clients are often perceived as riskier and more opaque, since they have fewer assets and thus have to rely on soft information lending. Women experience a stronger



reduction in access to credit during loan-officer turnovers; this difference is particularly strong during temporary leaves such as sickness and pregnancy.

Taken together, the results suggest that in situations where a loan officer has had little time or motivation to transfer information to the replacement loan officer before leaving, e.g. when falling sick, it is difficult to communicate the details of the loan portfolio to her replacement. As a result, access to credit for the existing clients is reduced, the credit quality of his or her portfolio suffers, and borrowers turn to other banks for loans. But, when given enough lead time, e.g. in the case of resignations, loan officers seem to be able to transfer (soft) information minimizing the impact on the bank.

The rest of the paper is structured as follows: Section 1 describes the relationship to prior literature. Section 2 describes the empirical setting. Section 3 describes the data and the identification strategy. Section 4 presents empirical results on the effect of loan officer absences on the credit decisions of the bank as well as customers' repayment and borrowing behavior. Section 5 discusses the main implications of the findings and conclusions.

## **I Relationship to Prior Literature**

Our paper contributes to the literature on relationship lending and the role of soft information in the credit process. A number of recent papers compare the effect of individualized credit evaluation via loan officers versus rule based credit scoring based on hard information.

For example, Qian, Strahan, and Yang (2011) study the reform of a Chinese bank that led to a delegation of credit risk assessment to the individual loan officer. The authors find that as a result, the predictability and performance of credit rating metrics improve. Berg, Puri, and Rocholl (2012) study a bank where loan decisions are based solely on hard information input by loan officers into a scoring system. They find that loan officers' discretion even plays a role in hard information lending, since loan officers can make a judgment on the data they collect. The authors show that loan officers use more scoring trials for loan applications that do not pass the cut-off rating in the first trial. Consequently, the number of trials positively predicts future default rates. Paravisini and Schoar (2012) find that providing loan officers with hard information based on credit scoring increases the efficiency of their decision making. The specific channel they identify is that hard information leads to more accountability, and therefore increased incentives. On the other hand, Banerjee, Cole, and Duflo (2009) point out that one of the dangers of relationship lending is that loan officers can hide bad information about a firm and evergreen loans until they are too late to save.

A related strand of the literature looks at the importance of distance to the bank as a measure of how much a bank can rely on soft information. For example, Berger, Miller, Petersen, Rajan, and Stein (2005) find that larger banks lend to more distant clients compared to smaller banks, but are more likely to use credit scoring based "hard information" tools. However, they do not find that, on net, the access to credit is lower for firms that borrow from either of these types of lenders. Similarly, Agarwal and Hauswald (2010) find that

borrowers that are closer to a bank get larger amounts, but also more expensive credit from the bank. And in turn more distant borrowers get less credit from the bank, but the credit is cheaper. Mian (2006) finds that geographical and cultural distance reduce the ability of the banks to rely on soft information, to renegotiate, and to recover defaulted loans. As a consequence, banks reduce credit to distant opaque firms. Our findings are complementary to this work since we focus on the impact of individual loan officers within a relationship lending process, rather than the difference between one credit regime to another.

A second important strand of this literature has focused on the impact of loan officer compensation on the quality of their lending decisions and portfolio. Agarwal and Ben-David (2012) study a bank that changed from a fixed loan to a loan volume based compensation structure. This led to a 19% increase in loans granted and a 23% increase in the size of loans. Furthermore, these loans were 28% more likely to default. The results also suggest that the quality of the information that was collected deteriorated under the new volume-based incentive scheme. In a related study, Cole, Kanz, and Klapper (2011) use a lab setup to study how performance incentive affects risk-taking and lending decisions of real world loan officers. They explicitly compare volume-based and performance-based compensation, and find that more reliance on performance-based compensation increases the credit quality of the loan portfolio. Similarly, Udell (1989) discusses the importance of loan officer incentives for small business lending.

Finally, the two studies that are closest to the current paper are Herzberg, Liberti, and

Paravisini (2010) and Fisman, Paravisini and Vig (2012), which both examine the impact of loan officer turnovers. The first paper shows that after a turnover, the new loan officer has an incentive to reveal the poorly performing loans of the prior loan officer in order to have clean slate. The second paper analyzes the role of social and ethnic ties for the credit screening of a loan officer. The authors find that loan officers find it easier to assess the credit quality of people with whom they share a similar ethnic and religious background. In comparison, we focus on the opposite side of the turnover; by focusing on the departing loan officer, we can analyze the distortions in access to credit for the existing portfolio when client relationships are interrupted. It also allows us to analyze whether information is transferrable between loan officers. In comparison, the above papers analyze the impact of an arriving loan officer on the selection choices that they make.

## II The Setting

We analyze the credit characteristics and repayment behavior of small businesses that take loans from a large public bank in Chile, BancoEstado. We obtain loan information for all of the clients that have taken loans from the micro-credit division of the bank. Only clients with yearly sales below US\$ 110,000 can borrow from the micro-credit division; clients exceeding this limit must borrow through the regular lending process of the bank. The micro-credit division of the bank has 210,000 clients, of which 187,000 were borrowers (had

non-zero debt) at some point during the period of this study, 2006-2008. The micro-credit division operates independently of the rest of the bank and has its own loan products, credit assessment technology, and branch personnel.

The bank has three zones: the North of Chile, the metropolitan area of Santiago, and the South of Chile. The metropolitan area consists of the capital city, Santiago, and the counties surrounding it. North of Chile consists of the rest of the counties located north of Santiago, and South of Chile consists of the rest of the counties located south of Santiago. Each zone is divided into “módulos,” a geographical subdivision that can contain one or more cities or rural counties depending on client density. There are 22 “módulos.” Each “módulo” has several branches, although, not all branches offer micro-credit services.

Clients can freely choose which branch they go to, but usually select the branch that is closest to their business. In addition, clients rarely switch branches unless they relocate their home and/or business. However, some clients prefer to go to a bigger branch, even if it is located further away from their home or business. Once the client has chosen his or her branch, the allocation of new clients to loan officers works as follows: the new clients go to the branch and are allocated to the first available loan officer. This allocation of new clients to loan officers is random within branches. However, once a client has been assigned to a loan officer, they usually stay with this person for the duration of their time as a client of the bank.

Loan officers are important to their client. In a typical day, a loan officer usually spends

half of the day in the office meeting clients and processing loan documents. The other half is spent doing field work, where the loan officer visits the businesses of clients who are applying for a loan. They also do collection visits to clients who are delinquent. Loan officers often also give financial advice or investment ideas to their clients. They are even consulted by their clients about when to get a loan or how large of a loan to ask for. Loan officers are also important in the credit assessment of their clients. The decision to extend a new loan to a client depends on two variables: the payment capacity, and the risk category of the client. The loan officer estimates the payment capacity (per month free cash flows) based on the client's business cash flows, household expenses, and nonbusiness-related income. A central risk department estimates the risk category. This category depends on demographical characteristics of the client, payment history with the bank, payment history with other banks, and the default history with formal companies in Chile. Together these two dimensions determine the size of the loan and the interest rate at offering.

Most loans are issued at the personal level, and therefore there is no limited liability. Nonetheless, seizing the personal assets of a micro-credit borrower in Chile is extremely costly, and sometimes not possible. Specifically, litigation costs for this type of claim are high compared to the expected recovery. Furthermore, for this type of claim, the law system is extremely slow and allows a defaulting borrower to hide or sell valuable assets before the bank can seize them. However, defaulting on a loan is still costly for the client. A delinquent client is reported to the credit bureau, thus severely affecting the client's future ability to

access the formal loan market.

Furthermore, it is important to understand the incentives for the loan officers. Loan officers have a base salary and a performance bonus that can be up to 20% of their base salary. The performance bonus depends on the size and default rate of the portfolio. The base salary ranges between US\$ 1,000 and US\$2,500 depending on the seniority of the loan officer. Anecdotal information obtained from the managers and loan officers suggests that a 20% variable bonus generates strong performance incentives. This ensures that it is in a loan officer's best interest to invest effort in the collection of soft information and to use it for credit assessment. However, it might also prevent a new loan officer from blindly lending to people whose overall credit risk they cannot assess.

### **III Data and Empirical Strategy**

#### **A The Data**

Using data from the internal records of the micro-credit division of the bank, we construct a monthly panel of all the loans that are sanctioned in a given month and the repayment history of those loans. This information is extracted directly from the bank's internal management information system and contains information on loan size, interest rate, maturity, whether there is a grace period, credit score, repayment data, and total credit amount in the formal financial market. The repayment information is divided according to the time

elapsed since the payment became delinquent (these comprise delinquent payments less than 31 days old, delinquent payments between 31 and 60 days old, delinquent payments between 61 and 90 days old, and delinquent payments 91 or more days old).<sup>5</sup> Based on the bank records, we reconstruct the length of the relationship between the loan officer and the client that is defined as the number of months the client and the loan officer have been working together.

The panel is merged with a second database that comes from the human resources department of the bank itself. This database contains information on temporary and permanent loan officers' leaves, including sick leaves, pregnancy leaves, layoffs, and resignations. It also contains the loan officers' starting dates as well as other demographic variables about the loan officers such as age, gender, and marital status.

The panel covers three years (2006-2008) and comprises monthly observations from 187,000 clients and 480 loan officers. In the estimations, we only include loan officers that have at least 50 active clients in their portfolio, where active clients are defined as clients having at least \$10,000 Chilean pesos in debt (approximately US\$ 20).

In Table I, we present the characteristics of the loan officers and their absentees. We observe that 49% of the loan officers are men, are an average of 32.6 years old, 58% are married, and the average years of experience at the bank are 3.7. The average number of clients per loan officer is 569 of which 339 are classified as active meaning they have more

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<sup>5</sup>In the paper we consider that a client is in default if he or she has delinquent payments of more than 60 days.



than US\$ 20 in outstanding loans. A loan officer is considered absent if during a month he or she worked less than two weeks. We have 32 loan officers that had sick leaves, and a total of 43 sick leaves (some loan officers where sick more than once during the study period). The average length of each sick leave is 2.12 months with a standard deviation of 1.18. We have 33 loan officers that had pregnancy leaves and 34 pregnancy leaves; the average length of a pregnancy leave is 4.64 months with a standard deviation of 1.12. It is important to mention that by law maternal leaves in Chile were 4.5 months long at the time of the study. We also have 26 loan officers who were terminated, and 15 loan officers that voluntarily resigned. We have anecdotal evidence that most of the people who quit their jobs received offers from other banks.

In Table II, we present the characteristics of the clients at the beginning of the sample period. We present separately the characteristics of clients from loan officers that are not absent during the sample period and the characteristics of the clients from loan officers who have absentee episodes during the sample period. In the last column, we present a t-test; we can note that none of the differences are significant which supports our view that the findings in the paper are not driven by ex-ante self selection.

## **B Empirical Strategy**

To estimate the effect of loan officer turn over on a client's credit availability and repayment behavior, we estimate a panel regression at the client level. We include a dummy variable

that takes the value of zero when the loan officer is present and the value of one when the loan officer is absent. Each panel regression includes time and client fixed effects, controls for the loan time to maturity, and the characteristics of the loan officer.<sup>6</sup> To avoid biasing the comparison group, we exclude from the estimations the clients that have experienced a loan officer leave, which is different from the leave being estimated. For example, if we estimate the effect of a pregnancy leave, we exclude clients who have had their loan officer leave due to sickness, termination of position, or voluntary resignation. This leads to the following specification:

$$Y_t = C + \beta_{absent}absent_t + \sum\beta_iControl_{it} + time_{fe} + client_{fe}, \quad (1)$$

where  $Y$  is the dependent variable. The *absent* is a dummy variable that takes the value of zero when the loan officer is present, and one when he or she is absent. The *Control<sub>i</sub>* are control variables, *time<sub>fe</sub>* is time fixed effects, *client<sub>fe</sub>* is client fixed effects, and  $t$  is time expressed in months. Standard errors are clustered at the loan officer-level.

We also estimate how the effect of loan officer turnover changes with the characteristics of the client that proxy for the relevance of soft information. In particular, we estimate the interaction effects between the variable *absent* and: i) the loan size of the client, ii) the credit score of the client, and iii) the gender of the client. This estimation leads to the

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<sup>6</sup>To control for time to maturity we divide the loan cycle into ten intervals, one being a newly issued loan and ten being a loan that is close to expiration, and we create a dummy for each interval. This approach addresses nonlinear effects between maturity and the dependent variables.

following specification:

$$Y_t = C + \beta_{absent}absent_t + \Sigma\beta_{absent \times var_j}absent_t \times var_{j_t} + \Sigma\alpha_jvar_{j_t} + \Sigma\beta_iControl_{it} + time_{fe} + client_{fe}, \quad (2)$$

where all the terms are similar to equation 1, and  $var_j$  is the variable that is interacted with the absent dummy: size, score, and gender.

## IV Results

### A Aggregated Effect of Loan-Officer Turnover

In Table III, we present results from an aggregate specification across all types of leaves (i.e., *absent* takes the value of one if the loan officer is sick, pregnant, terminated, or resigns). In the first column of Table III, we observe that loan-officer absence generates a reduction of 1.18% in the probability that the client gets a new loan from the bank, which represents an 18% reduction as a fraction of the unconditional probability of getting a loan from the bank. In columns (2) and (3), we observe that the reduction in the probability of getting a new loan is explained by both a reduction in the application rate for new loans and a reduction in the approval rate per application. In particular, the application for new loans decreases by 0.91%, which represents an 11.7% decrease as a fraction of the unconditional probability

of applying for a new loan; and the approval rate decreases by 5%, which represents a 6% decrease as a fraction of the unconditional approval rate. In column (5), we observe that loan-officer absence increases by 0.87% the probability that a client who is up to date with his or her payments will miss a payment, which represents a 19% increase as a fraction of the unconditional probability of missing a payment. And in column (6), we show that for clients that already have up to a 30-day late balance, loan officer absentees increase by 8% the probability that he or she will miss another payment, which represents a 32% increase as a fraction of the unconditional probability. In columns (7) and (8), we observe that loan-officer turn over does not have a significant effect on interest rates or the maturities of newly issued loans. Finally, columns (9) and (10) show that loan officer turn over does have a significant effect on the average loan size with BancoEstado. However, loans issued by other banks are larger on average.

## **B Differences Across Types of Leaves**

The analysis in Table IV is similar to the analysis in Table III but breaks out the different types of absences separately. The first panel of this table shows the results for sickness leaves. The sequence of dependent variables follows exactly the same set up as Table III. In Columns (1) through (3) we see that the probability that the client gets a new loan from the bank drops by 1.19% when the loan officer is sick. The change in the likelihood of getting a new loan can be decomposed into two separate pieces: a change in the application rate of the

client, and a change in the approval probability. The application rate decreases significantly by 0.95% when the loan officer is sick. The approval probability is reduced by around 1.7% but is not significant. As a result it seems that clients whose loan officers are sick increase their probability of borrowing outside the bank by 2.2%. Finally the probability that a client who is not delinquent will miss a payment increases by 0.95%, and those clients who are already late in their payments have a 6.4% higher probability of missing another payment.

In comparison clients whose loan officer goes on pregnancy leave see a 1.03% drop in their access to credit, which is mainly driven by a 0.94% reduction in applications for loans. Delinquencies go up by 0.76% when the loan officer is on pregnancy leave and the likelihood of falling late conditional on having been late before goes up by 8.1%. However, the likelihood of taking up a loan from another bank does not increase significantly.

When looking at terminations, we see a much larger reduction of 1.77% in the likelihood of getting a new loan from BancoEstado. A large fraction of this drop is explained by lower approval rates of 1.23%. However, at the same time, these clients do not see a significant increase in outside credit which might suggest that they are not perceived as acceptable credit risks by other lenders. Clients of terminated loan officers also have a rise in the late payment rate of 0.95% and a 7.5% increase in delinquency conditional on having been late before.

Finally, loan officers who voluntarily resign do not see a significant change in the likelihood of obtaining credit from the bank. These borrowers also see no change in the proba-

bility of getting outside credit, which might be simply a function of not being constrained at all through the transition. There is however an increase of 1.2% in 30 day late payments when the loan officer resigns and 7.7% increase in delinquencies. This might suggest that even in the case of smooth loan officer turnovers, clients experience adjustment costs in the transition.

### **C Are Loan Officer Absences Anticipated?**

In Tables V to VI, we study how access to credit and repayment behavior change in the two months that precede the leaves, where we break out the analysis for each type of leave separately. For sick leaves and resignations the effects in the months that precede the leave are minimal. The coefficients on the *leaddummies* for all dependent variables are close to zero and not significant. It is reassuring for our hypothesis that there are no observable lead effects since it confirms the idea that these types of absences were not planned in advance. A different story emerges for terminated loan officers: we see a significant decrease in the probability of getting a new loan and an increase in the probability of borrowing from an outside bank and not BancoEstado. We also find that an increase in the probability of becoming delinquent as soon as two months before the leave actually occurs. The latter result underscores that the performance of terminated loan officers starts deteriorating within the two months before the dismissal and in fact might be contributing to the decision.

Similarly, the results in the second panel of Table V show that during the months that

precede a maternity leave, there is a significant increase in the application rate for new loans with BancoEstado and a reduction in the probability of taking a loan from another bank. This confirms that in particular pregnancies are planned leaves and loan officers seem to provide their clients with sufficient access to finance in anticipation of the time that they are going to be out of the office.

## D Interactions With Client Characteristics

In Tables VII, and VIII we look at heterogeneous treatment effects for larger loans, borrowers with higher credit scores and those that are male. The idea is that these are observable characteristics we could obtain from the bank and that usually are associated with less opaque credit risk assessment. As before, we break out the analysis by type of leave.

Within the portfolio of loan officers who are on a sick leave, we see very strong heterogeneous treatment effects. The negative effects of sickness leaves on access to credit and repayments are particularly strong for small, low credit score, and female borrowers. In contrast, the interaction terms of the absence dummy with the client characteristics show that the effects are much more muted for larger and high credit score borrowers. More specifically, the effect is reduced by more than half for these sets of borrowers. For example, the direct effect of *leave* on the probability of getting a new loan is negative 0.024 and the interaction term of the *leave* dummy with the log of firm size is positive 0.014 and highly significant. Similarly, looking at whether clients access outside loans, we see that the direct

effect of leave on the smaller and lower credit score borrowers increases by 5.7%, which represents an increase of 35% as a fraction of the unconditional probability of borrowing outside of the bank. This effect is even more pronounced for clients with a good credit score. They experience a 7.04% increase in the probability of borrowing outside of the bank, which represents a 43% increase as a fraction of the unconditional probability of borrowing outside of the bank. On the other hand, large clients do not experience an increase in the probability of borrowing outside of the bank. The interaction with *size* is negative and equal in magnitude to the direct effect (the coefficient is 0.061 and significant at the 1% level), which suggests that these large borrowers are not constrained in their access to finance. Finally, columns (5) and (6) of Table VII, show that late payment rates vary significantly for borrowers with larger loans and higher credit scores.

In the second panel of Table VII we look at the impact of pregnancy leaves on different client types. The results are weaker than for sick leave but go in a similar direction. Loan renewals are less negatively affected for larger borrowers and those with better credit scores. As a result, these clients seem to be less likely to seek a loan from an outside bank. As before, we see in this case that delinquency rates are less negatively affected by a loan officer absence for the clients with larger loans or higher credit scores.

Interestingly, when looking at terminated loan officers in the first panel of Table VIII we find very limited differentiation by borrower characteristics. As before, we see that access to finance for clients drops significantly for clients whose loan officers are fired. But there is



no differential effect in obtaining a loan for borrowers that are larger or have better credit scores. In column (2) we do see that those firms, which had larger loans previously, are more likely to apply for a loan. However, it seems that their applications are not accepted. In addition, these larger firms are less likely to receive a loan from other banks outside of BancoEstado, which is the opposite from what we found for sick loan officers, where clients with larger loans got more outside credit. It might be another indication that in the case of terminated loan officers, clients were receiving too much leverage previously, and once a new loan officer comes in the portfolio is consolidated to a reasonable level.

Finally, we do not see any heterogeneous treatment effects for the loan officers who resign, in Panel 2 of Table VIII, neither for their ability to get a new loan from the bank nor the likelihood of accessing outside loans. This result confirms the idea that in the case of resignation loan officers are able to pass on information about all borrowers to the replacement. As a result, even borrowers with bad observable characteristics are able to keep their access to finance with the bank.

## V Discussion and Conclusion

In this paper, we show that the sudden leave of a loan officer due to sickness or termination leads to a significant reduction in the likelihood that the existing clients of the loan officer receive a new loan from the bank. This decrease depends on two separate effects: first, a

drop in the probability that a client applies for a new loan, and second, a lower likelihood that the bank approves the application. These results suggest that not only are clients less willing to apply for a loan when the original loan officer is gone, but they also face a lower approval rate. It seems that as a result these clients are more likely to apply to other banks for loans and to fall behind in their payments with the original bank. These findings suggest that the relationship between the borrower and lender has first order impact for the access to finance of a client and also on their repayment behavior.

Interestingly, these effects vary strongly with the type of absence. In line with the interpretation that the transmission of soft information within the bank matters for the quality of lending decisions, we see that the negative effects are strongest in the cases of unplanned leaves such as sickness. Here, the outgoing loan officer usually does not have time to transfer any soft information to the replacement loan officer since we focus on serious illnesses such as heart attacks or cancer. As a result, the existing clients see a strong drop in their likelihood of receiving new loans and instead borrow from outside sources. We also observe a sharp increase in the default probability. Finally, we find evidence suggesting that in these cases, hard information (observable borrower characteristics such as size, gender or credit score) becomes more important.

We find a much weaker effect in the case of anticipated leaves, which can be planned for in advance, such as resignations. These are usually cases where the loan officer is hired away but has to give one month's notice. In that time period, they seem to be able to provide

the new person with the important information, since we do not find any disruption at all in the lending relationship. Pregnancy related absences are somewhere in the middle: while the loan officer has a long lead time in which she could prepare the replacement officer, she might not have incentives to do so in order to keep the client when she returns. We find that in these cases, loan officers provide clients with loans *prior* to leaving for maternity leave. However, in cases where clients do have to get loans while the original loan officer is out of the office, they seem to experience more obstacles to access credit. Finally, in the case of terminations, we see a strong drop in credit access and a spike in defaults. We think that this is not driven by differences in soft information but rather by an effort of the bank to reduce its exposure to the portfolio of high risk clients that the terminated loan officer had built up.

Our analysis highlights that relationships matter for the quality of lending decisions and borrower behavior. However, given the right organizational structure and lead time, it seems that soft information might be transferable between loan officers, e.g. in the case of resignations. However, we speculate that departing loan officers need to have the right incentives to be willing to transfer their knowledge as seen in the instances of pregnancies or terminations. But the findings also hint at some of the negative dimensions of relationship lending; poorly performing loan officers tend to evergreen loans by rolling them over even if clients are a poor credit risk in the long run. Once the bank dismisses these loan officers, even well performing borrowers in that portfolio might lose their access to finance.

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# Tables

Table I: The Summary Statistics for Loan Officers

In this table, we present the summary statistics for the loan officers and the different sources of turnover. The gender variable takes the value of one for men and zero for women. The married variable takes the value of one for married loan officers and zero for single loan officers. The city variable takes the value of one for loan officers working in urban areas and zero for loan officers working in rural areas.

Loan-Officer Characteristics				
	N	mean	sd	median
Gender male %	370	49	50	
Age	370	32.6	4.7	31.8
Married %	370	58	49	
Number of children	370	0.77	0.9	1
Years of experience	370	3.7	2.6	3.2
City %	293	64	48	
Number of clients	480	339	112	341

  

Absentee Episodes				
	number of officers that were absent	number of episodes	average length (in months)	sd length
Sick leave	32	43	2.12	1.18
Pregnancy	33	34	4.64	1.12
Layoff	26	26		
Resignation	15	15		

Table II: The Summary Statistics for Clients

In this table, we present the characteristics of the borrowers at the beginning of the sample period. The probability of missing one payment is estimated for clients without late payments, and the probability of missing two monthly payments is estimated for clients with one monthly payment past due. Probability of credit with other banks is the probability that the client gets a new loan outside of the bank at any given month. The interest rate is expressed per month and in nominal currency and maturity is expressed in months.

	clients from non absent loan officers	clients from absent loan officers	difference (s.e. difference)
renewal probability	0.0598	0.0608	-0.00101 (0.00325)
application probability	0.0682	0.0704	-0.00217 (0.00346)
approval probability	0.877	0.864	0.0126 (0.0171)
prob credit other bank	0.237	0.230	0.00694 (0.00586)
log loan size	14.28	14.38	-0.101 (0.0746)
log loan outside bank	12.48	12.48	0.000510 (0.0594)
interest rate	1.654	1.636	0.0177 (0.0239)
maturity	24.67	25.66	-0.992 (0.917)
delinquent 1 <sup>st</sup> month	0.0404	0.0408	-0.000397 (0.00281)
delinquent 2 <sup>nd</sup> month	0.360	0.339	0.0213 (0.0260)



Table III: The Effect of Turnover on Credit Availability, Credit Characteristics, and Repayment Behavior

We present the effect of all the sources of turnover. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
Leave	-0.012*** (-5.73)	-0.009*** (-3.95)	-0.050*** (-3.34)	0.002 (0.63)	0.009*** (4.85)	0.062*** (5.67)	0.024 (1.17)	0.353 (0.57)	0.029 (1.07)	0.085** (2.28)
l.o. experience	-0.000 (-0.44)	-0.000** (-2.02)	0.001*** (2.70)	0.000 (0.09)	-0.000** (-2.28)	-0.001** (-2.34)	0.001** (2.33)	-0.002 (-0.14)	-0.000 (-0.43)	-0.003*** (-3.47)
l.o. gender	-0.001 (-1.39)	-0.001 (-0.71)	-0.006 (-0.94)	0.001 (1.24)	0.001 (0.84)	0.006 (0.94)	0.019** (1.97)	0.040 (0.18)	0.001 (0.10)	-0.021 (-1.39)
rel. length	0.000* (1.66)	0.000 (1.61)	0.000 (0.41)	0.000 (0.55)	0.001*** (8.29)	0.002*** (4.16)	-0.000 (-0.44)	0.030* (1.88)	0.003*** (4.50)	0.007*** (5.61)
N	2471578	2471578	191774	2471578	2217262	216418	135545	135545	135545	403459
adj-r <sup>2</sup>	0.081	0.084	0.090	0.200	0.185	0.325	0.668	0.401	0.812	0.655

Table IV: The Effect of Sickness Leaves, Pregnancy Leaves, Terminations, and Resignations on Credit Availability, Credit Characteristics, and Repayment Behavior

We present the effect of different sources of turnover. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
Sick	-0.012*** (-3.10)	-0.009** (-2.54)	-0.035 (-1.30)	0.021** (2.30)	0.010*** (3.38)	0.041* (1.91)	-0.002 (-0.06)	0.531 (0.52)	0.061 (1.31)	0.083 (1.36)
Pregnancy	-0.010** (-3.03)	-0.009** (-2.19)	-0.017 (-0.72)	0.002 (0.67)	0.008** (2.21)	0.071*** (3.30)	0.031 (0.87)	0.532 (0.45)	0.025 (0.51)	0.109 (1.50)
Terminated	-0.018*** (-4.41)	-0.012*** (-2.68)	-0.074*** (-2.65)	-0.011 (-1.37)	0.009** (2.43)	0.048** (2.29)	0.046 (1.23)	0.253 (0.27)	0.038 (0.71)	0.002 (0.07)
Resigned	-0.007* (-1.65)	-0.006 (-1.58)	-0.042 (-1.43)	-0.003 (-0.33)	0.012*** (3.30)	0.058* (1.82)	0.023 (0.42)	-0.065 (-0.04)	0.015 (0.29)	0.149 (1.35)

Table V: The Effect of sickness, and Pregnancy Absentees in the Two Months that Precede the Leave

We present the effect of sickness, and pregnancy absentees on the credit characteristics and credit behavior of the borrowers. The effects are presented for the months of absence and for the two months prior to the absence. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
sick										
Leave	-0.012*** (-2.67)	-0.009** (-2.11)	-0.049* (-1.84)	0.022** (2.35)	0.009*** (3.23)	0.037 (1.49)	-0.003 (-0.08)	0.535 (0.50)	0.055 (1.20)	0.053 (0.82)
Lead1	-0.002 (-0.40)	0.001 (0.18)	-0.040 (-1.04)	0.008 (0.59)	0.004 (1.17)	0.015 (0.67)	-0.012 (-0.19)	1.290 (0.88)	-0.012 (-0.17)	0.075 (0.57)
Lead2	-0.004 (-0.63)	-0.001 (-0.23)	-0.075* (-1.90)	0.010 (0.75)	-0.000 (-0.11)	0.010 (0.33)	0.010 (0.19)	0.673 (0.39)	0.017 (0.26)	0.014 (0.25)
Lag1	-0.003 (-0.58)	-0.004 (-0.64)	0.008 (0.16)	0.016* (1.91)	0.011** (2.35)	0.107*** (3.57)	0.090* (1.82)	-0.369 (-0.22)	0.112 (1.34)	0.080 (1.51)
Lag2	-0.005 (-0.99)	-0.004 (-0.74)	0.010 (0.25)	0.003 (0.28)	0.009* (1.75)	0.043 (1.43)	0.020 (0.47)	-0.942 (-0.72)	-0.005 (-0.06)	0.186*** (3.03)
pregnancy										
Leave	-0.009** (-2.36)	-0.007 (-1.54)	-0.029 (-1.17)	-0.003 (-0.75)	0.007** (2.02)	0.050** (2.09)	0.047 (1.32)	-0.003 (-0.00)	0.006 (0.14)	0.083 (1.23)
Lead1	0.006 (1.43)	0.008* (1.80)	-0.028 (-0.69)	-0.031** (-2.01)	0.003 (0.70)	-0.002 (-0.10)	0.063 (1.45)	1.500 (0.67)	0.068 (1.17)	0.034 (0.40)
Lead2	0.005 (1.27)	0.007 (1.40)	-0.013 (-0.28)	-0.019 (-1.41)	0.003 (0.92)	-0.010 (-0.50)	0.047 (0.60)	0.232 (0.14)	-0.004 (-0.05)	0.050 (0.69)
Lag1	-0.007 (-1.32)	-0.004 (-0.55)	-0.033 (-0.91)	-0.010 (-1.22)	0.011** (2.38)	0.103** (2.55)	0.040 (0.61)	1.350 (0.99)	0.101 (1.48)	0.074 (0.98)
Lag2	-0.001 (-0.15)	-0.001 (-0.15)	0.022 (0.62)	0.006 (0.62)	0.013** (2.37)	0.096*** (3.17)	0.056 (1.35)	0.806 (0.53)	0.203*** (2.70)	0.186** (2.31)

Table VI: The Effect of Terminations and Resignations in the Two Months that Precede the Leave.

We present the effect of termination and resignation on the credit characteristics and credit behavior of the borrowers. The effects are presented for the months of the absence, and for the two months prior to the absence. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
termination										
Leave	-0.019*** (-4.69)	-0.013*** (-2.69)	-0.077*** (-2.65)	-0.012 (-1.57)	0.010** (2.39)	0.060** (2.47)	0.046 (1.21)	0.319 (0.35)	0.042 (0.74)	0.056 (1.24)
Lead1	-0.002 (-0.41)	0.003 (0.47)	-0.043 (-1.17)	-0.026 (-1.53)	0.002 (0.71)	0.040** (2.08)	0.005 (0.13)	1.081 (0.67)	0.082 (1.03)	0.294* (1.94)
Lead2	-0.008** (-1.96)	-0.006 (-1.41)	0.008 (0.18)	0.023** (2.17)	0.007** (2.04)	0.020 (0.87)	-0.023 (-0.61)	-0.041 (-0.02)	-0.024 (-0.34)	0.276*** (2.61)
resignation										
Leave	-0.009* (-1.86)	-0.007 (-1.60)	-0.046 (-1.37)	-0.005 (-0.63)	0.012*** (2.77)	0.036 (0.97)	0.030 (0.49)	-0.134 (-0.07)	0.023 (0.42)	0.200 (1.60)
Lead1	-0.010 (-1.56)	-0.009 (-1.34)	0.043 (0.78)	0.003 (0.34)	-0.003 (-0.64)	-0.073** (-2.09)	0.080 (0.73)	-2.241 (-0.70)	0.021 (0.21)	0.247* (1.94)
Lead2	-0.003 (-0.57)	0.005 (0.59)	-0.093* (-1.79)	-0.022 (-1.23)	0.005 (0.84)	-0.011 (-0.26)	0.005 (0.19)	1.367 (0.39)	0.071 (1.03)	0.102 (1.16)

Table VII: The Effect of Sick Leaves, and Pregnancy Leaves Interacted with Client Gender, Client Size, and Credit Score

In this table, we show how the effects of turnover change with different characteristics of the borrower. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations present the interaction effects with the borrowers' gender, size, and credit score. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
sick										
Leave	-0.024*** (-3.92)	-0.024*** (-4.40)	-0.012 (-0.20)	0.057*** (3.39)	0.026*** (3.26)	0.158*** (3.95)	0.033 (0.44)	1.792 (1.02)	-0.066 (-0.56)	-0.025 (-0.31)
LeaveXgender	-0.009* (-1.80)	-0.011** (-2.34)	0.020 (0.35)	-0.003 (-0.32)	0.013** (2.05)	-0.014 (-0.38)	0.080 (0.82)	-2.460 (-1.39)	0.020 (0.24)	-0.043 (-0.71)
LeaveXsize	0.014*** (3.19)	0.020*** (3.55)	-0.057 (-1.21)	-0.061*** (-2.98)	0.002 (0.32)	-0.151*** (-5.91)	-0.085** (-2.47)	0.606 (0.33)	0.229* (1.86)	0.123 (1.23)
LeaveXscore	0.015*** (3.49)	0.014*** (2.91)	0.040 (0.83)	0.013* (1.67)	-0.050*** (-7.22)	-0.024 (-0.57)	-0.006 (-0.10)	-1.768 (-0.86)	-0.133* (-1.73)	0.073 (1.32)
pregnancy										
Leave	-0.017*** (-3.08)	-0.014** (-2.29)	-0.066 (-1.54)	0.008 (1.21)	0.031*** (4.41)	0.131*** (3.19)	0.036 (0.47)	0.487 (0.28)	-0.210** (-2.19)	0.113 (0.92)
LeaveXgender	-0.010** (-2.37)	-0.011** (-2.47)	-0.031 (-0.91)	0.002 (0.39)	0.007** (2.21)	-0.010 (-0.24)	0.037 (0.60)	0.937 (0.48)	0.051 (0.59)	-0.015 (-0.22)
LeaveXsize	0.009* (1.83)	0.008 (1.29)	0.073 (1.50)	-0.018** (-2.08)	-0.006 (-1.12)	-0.053 (-1.46)	-0.049 (-0.80)	0.733 (0.47)	0.319*** (3.40)	0.050 (0.43)
LeaveXscore	0.008* (1.78)	0.008 (1.60)	0.003 (0.06)	0.015 (1.43)	-0.046*** (-7.76)	-0.201*** (-5.60)	0.058 (0.95)	-2.503* (-1.67)	-0.151** (-2.37)	-0.079 (-1.28)

Table VIII: The Effect of Termination, and Resignation Interacted with Client Gender, Client Size, and Credit Score

In this table, we show how the effects of absence change with different characteristics of the borrower. Each column represents one regression, and the columns are organized as follows: i) renewal probability, ii) application probability, iii) approval probability, iv) probability of getting credit from other banks, v) probability of missing one payment, vi) probability of missing two monthly payments, vii) monthly nominal interest rate, viii) maturity, ix) log loan size at the bank, and x) log loan size outside the bank. Estimations in columns vii to ix are restricted to clients that get a new loan at the bank, and estimation in column x is restricted to clients that get a new loan outside the bank. All the estimations present the interaction effects with the borrowers' gender, size, and credit score. All the estimations are controlled for time to maturity, client fixed effects, and time fixed effects. We present the standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	renewal prob.	applic. prob.	approval prob.	outside loan	delinquent 1 <sup>st</sup> month	delinquent 2 <sup>nd</sup> month	interest rate	maturity	loan size	out loan size
termination										
Leave	-0.027*** (-5.27)	-0.021*** (-4.60)	-0.140* (-1.92)	0.005 (0.38)	0.030*** (3.45)	0.047 (1.44)	0.080 (0.89)	-1.378 (-0.80)	0.022 (0.26)	0.179* (1.79)
LeaveXgender	0.004 (0.79)	0.001 (0.18)	0.072 (1.10)	-0.011 (-0.82)	0.013*** (3.46)	0.016 (0.35)	-0.029 (-0.38)	-0.130 (-0.08)	-0.032 (-0.56)	-0.186*** (-3.93)
LeaveXsize	0.007 (1.50)	0.012*** (2.98)	0.024 (0.40)	-0.022** (-2.47)	-0.006 (-1.03)	0.008 (0.21)	-0.060 (-0.97)	1.263 (0.81)	0.078 (0.82)	-0.016 (-0.20)
LeaveXscore	0.006 (1.12)	0.001 (0.10)	0.037 (0.60)	0.007 (0.75)	-0.044*** (-6.12)	-0.071 (-1.34)	0.072 (0.95)	1.732 (0.98)	-0.073 (-0.85)	-0.169** (-2.38)
resignation										
Leave	-0.007 (-1.08)	-0.013* (-1.72)	0.069 (0.96)	-0.011 (-0.59)	0.039*** (4.99)	0.127** (2.13)	-0.007 (-0.06)	-0.536 (-0.21)	-0.100 (-0.82)	0.198 (1.38)
LeaveXgender	-0.002 (-0.25)	0.002 (0.29)	-0.080 (-1.22)	-0.015 (-1.23)	0.003 (0.67)	-0.052 (-0.61)	0.070 (1.04)	1.262 (0.95)	-0.069 (-0.70)	-0.088 (-0.92)
LeaveXsize	-0.002 (-0.38)	0.003 (0.56)	-0.081 (-1.04)	0.013 (0.52)	-0.014** (-2.56)	-0.061 (-0.99)	-0.015 (-0.19)	0.497 (0.33)	0.188 (1.45)	0.105 (1.03)
LeaveXscore	0.005 (0.70)	0.008 (0.92)	-0.041 (-0.96)	0.012 (1.17)	-0.039*** (-5.01)	-0.038 (-0.74)	0.038 (0.65)	-1.175 (-0.36)	0.015 (0.16)	-0.208 (-1.36)

# Appendices

Table IX: Predictive Power of Observable Characteristics of the Client

In this table, we estimate the application probability, the approval probability, and the probability of paying late as a linear function of the observable characteristics about the client. The estimations are presented separately for when the loan officer is absent and for when he is present. We also test if the predictive power of observable characteristics (measured as the r-squared of the estimation) depend on the loan officers' being present or absent (following Cramer (1946) we test the difference in r-squared using the asymptotic distribution  $\sqrt{n}[\tilde{r}^2 - r^2] \sim N(0, (1 - r^2)^2)$ , where  $\tilde{r}^2$  is the estimated r-squared and  $r^2$  is the real r-squared.). All the estimations are controlled for time fixed effect, firm industry, and borrower educational level. We present the standard errors in parentheses. "Leverage bank" is the client's current loan outstanding at the bank divided by his maximum loan outstanding during the sample period. "Leverage out" is the client's current loan outstanding outside the bank divided by his maximum loan outstanding during the sample period. Bounced checks take the value of 1 if the client does not have cash to cover his checks, and zero otherwise.

	i application		iii	iv approval		vi	vii missed payment		ix
	absent	present	$\Delta$	absent	present	$\Delta$	absent	present	$\Delta$
Constant	50.69*** (5.73)	60.78*** (4.26)	-10.09 (7.14)	137.02*** (18.61)	89.57*** (9.06)	47.45** (20.69)	21.38*** (4.1)	25.99*** (2.35)	-4.61 (4.72)
Gender	-0.41 (0.34)	-0.74*** (0.24)	0.32 (0.41)	-1.26 (1.38)	0.41 (0.68)	-1.67 (1.54)	-0.01 (0.3)	0.24 (0.16)	-0.26 (0.34)
Marital status	0.26 (0.3)	-0.12 (0.21)	0.38 (0.36)	1.34 (1.74)	-0.65 (0.54)	1.99 (1.82)	0.34 (0.34)	-0.32** (0.14)	0.66* (0.36)
Log age	-0.89 (0.66)	-1.32*** (0.42)	0.43 (0.78)	-1.37 (4.16)	1.84 (1.12)	-3.21 (4.31)	-6.24*** (0.91)	-5.74*** (0.47)	-0.5 (1.03)
Savings	-0.35 (0.34)	-0.14 (0.16)	-0.21 (0.37)	-1.49 (1.64)	-0.61 (0.64)	-0.88 (1.76)	-0.39 (0.33)	-0.98*** (0.14)	0.59 (0.36)
Log size	1.07*** (0.23)	1.09*** (0.14)	-0.02 (0.27)	-2.17** (0.89)	-0.99*** (0.31)	-1.18 (0.94)	-0.09 (0.12)	-0.2** (0.08)	0.11 (0.15)
Leverage bank	-46.43*** (3.89)	-43.57*** (2.47)	-2.86 (4.61)	-19.58*** (3.14)	-8.43*** (1.58)	-11.15*** (3.52)	8.23*** (1.48)	4.81*** (0.62)	3.42** (1.6)
Leverage out	-0.13 (0.7)	1.25*** (0.35)	-1.37* (0.78)	2.25 (2.28)	3.25*** (1.08)	-1 (2.53)	2.91*** (0.44)	3.11*** (0.25)	-0.19 (0.5)
Delinquent 1 months	1.48** (0.64)	0.57 (0.49)	0.91 (0.81)	-7.59** (3.37)	-3.96** (1.64)	-3.64 (3.75)			
Delinquent 2 months	-1.59 (1.74)	-3.55*** (1.09)	1.96 (2.06)	5.57 (7.25)	-2.44 (3.76)	8.01 (8.17)			
Delinquent 3 months	-11.9*** (3.61)	-13.32*** (1.77)	1.43 (4.02)	-37.63 (25.57)	-7.21 (11.04)	-30.42 (27.85)			
Bounced checks	-4.54*** (0.52)	-5*** (0.27)	0.46 (0.59)	-10.1*** (3.76)	-8.5*** (1.6)	-1.6 (4.09)	8.63*** (0.89)	7.46*** (0.39)	1.17 (0.97)
R-squared	0.0883*** (0.0058)	0.0889*** (0.0027)	-0.0006 (0.0064)	0.1788*** (0.0197)	0.0687*** (0.0091)	0.1101*** (0.0217)	0.0415*** (0.0061)	0.0379*** (0.0028)	0.0036 (0.0067)
N	29700	137152		2406	12077		26537	125308	