Does Soft Information Matters? Evidence From Loan Officer Absenteeism

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Abstract

This paper provides evidence that shocks to the relationship between loan officers and their borrowers affects the credit decisions of the bank as well as customers' repayment and borrowing behavior. When a loan officer unexpectedly has to be absent from the job (due to either sickness, pregnancy, dismissal or retirement), the existing borrowers of the absent loan officer are less like to take on a new loan from this bank but are more likely to get a loan from another bank. At the same time the existing clients of the absent loan officer show a 15% increase in the probability of missing a payment or going into delinquency. Borrowers with better credit score experience a much smaller reduction in their access to finance from their existing bank even when the loan officer leaves.

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Introduction

Most credit programs are based on extensive interactions between loan officers and the businesses they lend to. This relationship based approach to lending is especially widespread for small and more opaque borrowers, where formal documentation of profits and record keeping is less reliable. The loan officer has the difficult role of solving the informational gap between the bank and the borrower by gathering soft information about potential borrowers. The relationships between loan officers and their clients often extends beyond information collection, and many times loan officers help borrowers assessing the financial needs of their business or even help ensuring that clients repay. The importance of loan officers in the lending process has been proposed in a myriad of theory papers, see for example Rajan (1992), Petersen, and Rajan (1994), Petersen, and Rajan (1995), Berger, and Udell (2002), Berger, Miller, Petersen, Rajan, and Stein (2005). However, there has been only little empirical research to document the role of loan officers in mitigating information asymmetries or moral hazard between the bank and its clients. A few notable exceptions are Herzberg, Liberti, and Paravisni (2010), and Liberti, and Mian (2009).

The novel contribution of this paper is that we study (exogenous) shocks to the loan officer-client relationship: Their impact on the credit provision to borrowers as well as the borrowers' behavior. Specifically the shocks we rely on are loan officer absentee spells due to sickness, pregnancy, resignation or layoffs. We work with a bank in Chile, BancoEstado, which lends to small businesses in the informal sector where credit screening entirely relies

on soft information collected by loan officers. We obtained comprehensive data not only on the loan officers but also on the entire client portfolio each loan officer manages (client characteristics and repayment borrowing behavior).

Overall we find that loan officer absenteeism leads to significant changes in the borrowing and repayment behavior of client and the credit provision of the bank. In particular, when the original loan officer is absent we observe a 0.8% reduction in the probability of taking up a new loan from the bank (18% reduction as a fraction of the unconditional probability of taking up a new loan from the bank). This switch in credit access is particularly interesting since we do not see a change in credit terms after a loan officer leaves, e.g. interest rates and loan maturity is unchanged on average. This is of course contingent only on the borrowers who do choose to take up a new loan. We also see that clients who lost their original loan officer display a 1.1% higher probability of missing a monthly payment (10% increase as a fraction of the unconditional probability of missing a payment), and also higher probability of going into delinquency.

However, not all absentee spells can be considered exogenous. In particular layoffs and resignation might be correlated with the prior performance of the loan officer's portfolio. Laid off loan officers might be let go due to the particularly poor performance of their portfolio; while resigning loan officers might be poached away by competitors due to their above average skills or performance. Pregnancies differ from the other absentee spells in that there is a long lead time which allows the bank and the loan officer to prepare the

clients for the loan officer's leave in order to prevent potential problems. Therefore the most exogenous source of absenteeism in our sample are major sickness periods of loan officers. These spells are largely unexpected for both the bank and the loan officer, and are independent of the loan officers' portfolio characteristics.

We therefore separately study the effects of the different absentee spells on the loan officer's client portfolio. When only looking at sickness spells, we find that clients whose loan officer has to take a sickness leave are 0.9% less likely of renewing their loan with the bank during the months that the original loan officer is on leave (20% as a fraction of the unconditional probability of renewing the loan). These clients also show a 2% increase in the probability of borrowing outside the bank (12.5% increase as a fraction of the unconditional probability of borrowing outside the bank), and an increase of 1.7% in the probability of missing a payment (16% as a fraction of the unconditional probability of missing a payment). Interestingly, when looking at the credit portfolio of loan officers who were fired we see a much stronger drop in the likelihood of starting a new loan, a steep increase in the interest rate and a spike in non payment. These findings are consistent with an interpretation that the new incoming loan officer has an incentive to reduce the bank's exposure to bad loans and to report non-paying borrowers. [1] In comparison we find that clients of loan officers who were resigned (in most cases because they were hired away) do not see a change in their

[1]See also Hertzberg, Liberty, and Paravisini (2010), who show that incoming loan officers have strong incentives to report bad news about the portfolio of a predecessor loan officer. While in our set up the fired loan officers could not suppress information about non payment they could have manipulated default rates by renewing loans for clients that are experiencing economic distress.

loan approval probability or interest rate. But they do experience an increase in missed payment. And finally, loan officers who leave due to pregnancy see no increase in missed payments at all and not change in interest rates. However, these clients show a drop in loan approvals during the time of the loan officer's leave. We conjecture that this drop might be a form of 'loyalty' by the clients, who wait for the new loan until their loan officer is back from maternity leave. Overall these results suggest that the relationship between loan officers and their clients has first order effects on the borrowing behavior and the access to credit.

Finally, we investigate whether there is an interaction effect between the characteristics of the borrowers in the loan officer's portfolio and the effect of loan officers leaving. In particular we are interested in client characteristics that proxy for the importance of soft information for the lending decision, such as credit score and average loan sizes for a borrower prior to the current loan (unfortunately we do no have balance sheet information for the borrowers).

Larger firms, with below average credit score, show a much weaker response to absentee spells of their loan officers, independent of the reasons for leave. These firms are more likely to receive a renewal loan within the current bank and are less likely to get a loan from another bank during the loan officer leave. These firm also experience almost no change in interest rates during the absentee spell. At the same time they also are much less likely to miss a payment or go into delinquency. We find very similar results of the effect of loan

officer absenteeism for borrowers with high credit scores, and below average credit size. One interesting difference is that large firms, with below average credit score do not show an increase in their probability of borrowing outside the bank. This might suggest that big firms with low credit scores are the ones experiencing the biggest probability of being hold up by their bank.

Finally larger firms, with above average credit score are the ones that are more likely to borrow outside the bank when the loan officer is absent, this suggests that large firms with good credit score have the lowest cost to borrow from outside institutions, and therefore are less prone to be hold up by their bank. An interesting finding about large firms with good credit score is that they show a significant increase in their probability of missing a payment and even their probability to go into delinquency. This findings are consistent with the findings in Hertzberg, Liberty, and Paravisini (2010). In fact loan officers will have strong incentives to suppress bad news about large companies, because disclosing these news will strongly affect their wage. Furthermore, by hiding this information, the loan officer lets big companies in financial distress to keep a good credit score. As suggested by Hertzberg, Liberty, and Paravisini, when the loan officer has to leave the bank (either permanently or temporarily) the replacing loan officer will have strong incentives to disclose the situation about these firms.

Overall our results suggest that the relationship between loan officers and their clients is important. It appears that even within the same bank loan officers find it difficult to trans-

mit 'soft' information to a colleague. When loan officers have to go on leave unexpectedly, in particular due to sickness, we see that their clients are less likely to get a new loan within the bank. While small borrowers and high score borrowers are able to substitute the loss in credit access by taking on new loans outside the bank, big clients with poor credit score are not able to get outside funding. In addition borrowers with smaller loans and worse credit scores show a deterioration in repayment behavior when their loan officer is absent. This might suggest that loan officers also play a role in reducing moral hazard behavior especially for small and opaque firms.

These results also shed an interesting new dimension on the pricing behavior of banks. If interest rates increase after the new loan officer takes over and borrowers are still accepting a loan from this bank, it means that they were previously charged less than their willingness to pay for the loan. In addition we see that larger and higher score borrowers are more likely to seek an outside loan only after the original loan officer left. So it seems that loan officers do not use soft information they have on borrowers to hold them up for higher margins but instead charge lower interest rates to these borrowers potentially to be more competitive in the credit market.

I Setting

We analyze the credit characteristics and repayment behavior of micro entrepreneurs of a large local bank operating in Chile, as well as how these characteristics and repayment behaviors change when the loan officer is absent for one month or longer. We study all of the clients borrowing from the micro-credit division of the bank. The micro credit division operates independently of the rest of the bank, and has its own lending technology, specially designed for micro credit businesses. The micro credit division operates in the branches of the bank but has separate personnel and office space. Clients borrowing from the micro-credit division must have yearly sales below US$ 110,000. The micro credit division of the bank has 210,000 clients of which 144,000 were borrowers at the time of the study.

The bank as well as its micro credit division is organized in 3 Zones: North of Chile, Metropolitan area, and South of Chile. The Metropolitan area consists of the capital city and the "provincias" (counties in English) nearby. North of Chile consists of the rest of the cities and "provincias" located north of Santiago, and South of Chile consists of the rest of the cities and "provincias" located south of Santiago. Each zone is divided into "modulos", a geographical subdivision that can contain one or more cities, depending on the cities' population. Big cities can have more than one "modulo" depending on the number of clients in the city. In total, there are 22 "modulos". Each modulo has several branches, however not all branches offer micro-credit services. In total, the bank has 341 branches, of which 202 offer micro credit services.

A branch that offers micro credit services must have at least one loan officer, and may have one or more loan officer assistants. Loan officers assistants can only process pre-approved loans (loans already approved by the risk department), but cannot evaluate, or issue regular loans. Pre-approved loans are loans offered to clients with good credit score without checking their business or personal cash flows. Loan officers can issue pre-approved loans as well as regular loans. In this study we will focus on loan officers, because they have decision power in the lending process.

The allocation of loan officers to clients starts when the client chooses his branch. Clients can freely choose their branch but will usually choose 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. In particular, the main branch located in downtown Santiago is very popular and has many clients that do not live particularly close to the main office. Once the client has chosen his branch the allocation of new clients to loan officers works as follows: The clients goes to the branch, new clients are serviced in a first come first serve basis and are allocated to the loan officer that becomes available. Old clients, on the contrary, wait until their already assigned loan officer becomes available. Given this protocol, the allocation of new clients to loan officers is random within branches. To be conservative in this study, we cluster the standard errors at the loan officer level, but similar results are obtained when clustering the standard errors at the branch level. Each

loan officer works in only one branch. A loan officer usually spends half of the day in the branch, meeting clients and processing loan paperwork. The other half of the day, he spends doing field work where he visits the businesses of clients who have requested a loan, and clients who are late with their payment. During field work, some of the loan officers also give financial advice to their clients. For example, in one of our field visits, a client asked his loan officer whether building a second story to expand his business was a profitable idea. According to loan officers, this type of situation happens quite often.

The loan decision for clients requesting a regular depends on two variables; the payment capacity and the risk category of the client. The payment capacity (free cash flows the client has to pay back the loan) is estimated by the loan officer based on the client's business cash flows, investment opportunities, household expenses, and non-business related sources of income. The risk category is estimated by the risk department and depends on demographical characteristics of the client, his payment history with the bank, credit history with the rest of the Chilean financial system, [2] and finally the clients' history of defaults outside the financial system. The default history outside the financial system is purchased from the private institution, Dicom Equifax, and contains any reported default episodes that had happened within the last 2 years [3]. If the client is in the best risk category he can get a loan with a maximum monthly installment equal to the payment capacity. If the client is

[2]This information is provided by the Bureau for Bank Regulation, and is available to all financial institutions.

[3]The Chilean law explicitly prohibits the disclosure of any default situations that were resolved more than 24 months before the report is issued. Report of default to Dicom Equifax is voluntary.

in a lower risk category his monthly installments can be a fraction of the payment capacity.

In a rational framework, the loan officer will estimate the payment capacity in order to maximize his salary. The payment capacity that maximizes his salary can be different from the real payment capacity of the client. In practice there is a limit in the extent to which the loan officer can manipulate the information; Loans are reviewed by a credit committee, and this committee has a deep understanding of the cost structure of the businesses the bank works with. Therefore if the loan officer inflates the cash flows too much he will eventually be caught by the committee. In simple works the loan officer can manipulate information within the reasonable.

The salary of loan officers has a fixed base of 80% and a performance bonus of 20% that depends on the loan officer's portfolio loan size, and its default rate. The base salary ranges between US$ 1,000 and US$ 2,500 depending on the loan officer seniority. Anecdotal information obtained from the managers and loan officers suggests that a 20% variable wage generates strong performance incentives.

The bank sets the salary of the loan officer in order to maximize its profit, and the loan officer estimates the payment capacity of the client that maximize his salary. The potential manipulation of the information is not necessarily bad for the bank. If soft information only known by the loan officer can improve the estimation of the optimal credit, then it could be efficient for the bank to give the loan officer some freedom to manipulate the information.

An alternative methodology used by banks to improve the loan officers' incentives to

report accurate information is explored in Hertzberg, Liberti and Paravisini 2011. Hertzberg et all, show that loan officer rotation can improve the accuracy of the loan officers' reports. The basic intuition of their study is that bad information about a portfolio can be reported by the loan officer of the portfolio, or by a new loan officer that replaces the old one in the portfolio. Bad information reported by the loan officer that manages the portfolio is better for this loan officer career than bad news reported by a new loan officer that replaces him in the portfolio. Therefore, if rotation can happen, the loan officer has stronger incentives to disclose bad information than the case in which rotation never happens. Hertzberg, Liberty, and Paravisini focus on the situation where the loan officer wants to hide ex-post bad news. In our study, we focus on the manipulation of the ex-ante manipulation of expected cash flows.

The work of Hertzberg, Liberty, and Paravisini is a seminal attempt to understand the relevance of loan officers in the lending channel. In our paper we try to add to this body of knowledge by exploring to what extent the relationship between the loan officer and the client, and the potential soft information that is generated in this interaction, can affect credit availability and credit characteristics. In order to answer our research questions we study what happens when the loan officer that has been working with the client suddenly has to leave the bank due to sickness, pregnancy, lay offs, or resignations.

First, we study whether loan officer absenteeism affects credit availability, default rates, and other characteristics of the credit like interest rates, maturity, grace periods and loan

size. Second, we study to what extent the length of the leave affects the former effects. Third, we study whether these effects persist once the loan officer returns to work, this last analysis can only be performed for sickness and pregnancy leaves, because in the other two type of leaves (lay offs, and resignations) the loan officer does not return to work.

II Data and Empirical Strategy

Using data from the internal records of the micro credit division of the bank, we construct a monthly panel of entrepreneurs' credit characteristics. The variables we obtained, directly from the bank records, are credit size, interest rate, maturity, grace period, credit score[4], and missed payment information divided according to the time elapsed since the payment was missed (these include payment missed less than 60 days ago, payment missed between 60 and 89 days ago and payment missed 90 or more days ago). In this paper, we call default any payment in arrears for more than 90 days. Missed payments of less than 90 days are not considered default. Based on the bank records, we construct the additional variables: client experience, which is defined as the time the client has been borrowing from the bank, and length of the relationship between the loan officer and the client, which is defined as the number of months the client and the loan officer have been working together.

The panel is merged with two additional data sources; a database of the SBIF (or the

[4]Chile does not have a centralized credit score, each financial institution designs its own credit score for internal policy

Spanish acronym for Bureau for Bank Regulation), and a database from human resources department. SBIF is an institution that oversees the aggregated risk of the financial system in Chile and supervises and enforces that the banks follow the risk guidelines established by the Chilean law for bank operations. Each bank is required to report to SBIF the total credit of each client and any missed payments that the client has had. SBIF aggregates the information by customer and makes it available to all formal financial institutions. Therefore, financial institutions make their lending decisions based on the aggregated leverage and default of each client in the system. The variables in the SBIF database are total consumption credit, total commercial credit, total mortgage, total consumption credit in default, total commercial credit in default, and total mortgage in default. The amounts of default in the SBIF database are divided into default from 30 to 89 days and default of more than 90 days. The database of human resources department contains the information on all temporary and permanent loan officers' leaves, including sick leaves, pregnancy leaves, layoffs and resignations. It also contains the loan officers' starting date, as well as other demographic variables about the loan officer such as age, sex, marital status, and home address.

The panel covers 3-years (2006-2008) and includes observations from 187,000 clients and 480 loan officers. In the estimations, we only include loan officers that had at least 50 active clients in their portfolio, where active clients are defined as clients having at least $10,000 Chilean in debt (approximately US\ 20)$.

In table 1, we observe the number of leaves and the average length of each leave [5]. We have 32 loan officers that had sick leaves, and a total of 43 sick leave episodes (some loan officers where sick more than once during the study period). The average length of each sick leave was 2.12 months. We have 33 loan officers that took pregnancy leaves and 35 episodes of pregnancy leaves; the average length of a pregnancy leave was 4.51 months. It is important to mention that maternal leaves in Chile are significantly longer than maternal leaves in the United States. We also have 26 loan officers who were laid off and 15 loan officers that voluntarily resigned from their job.

In tables 2 and 3, we present summary statistics of the data. In table 2, we observe that the average number of clients per loan officer is 569, of which 339 are active (more than US$ 20 in loan outstanding). In table 3, we present demographic information about the clients and information about their loans inside and outside of the bank. The average age for the clients is 48, 62% of them are men, and 72% are married. The average length of the relationship with their loan officer is 14.6 months. The average credit with the bank (sum of all the outstanding loans) for a client is $2,558,000 Chilean (approximately US$ 5,000). 66% of the clients have loans outside the bank, and the average size of the credit outside the bank is $1,372,000 Chilean (approximately US$ 2,750). In table 3, we also present the unconditional probability that a client renews his loan with the bank at any point in time, and the probability that the client gets a loan outside the bank. The probability of renewing

[5] All of the information is presented by month. A loan officer is considered absent in a particular month if during that month he was absent for more than half of the working days

the loan with the bank at any point in time is 4.4%, and the probability of getting a loan outside the bank is 16.2%. In table 3, we also present the basic characteristics of the loans issued by the bank. The average loan size is $1,944,000 (about US$ 4,000), the average maturity is 27 months, the average interest rate is 1.65% monthly nominal, and the average grace period is 121 days[6]. Finally, in table 3, we can observe that these clients have very few savings; only 39% of them save and the average total savings is $91,434 (about US$ 180).

To estimate the effect of a loan officer leave we estimate a panel regression at the client level where we include a dummy variable that takes the value 0 when the loan officer is present and 1 when the loan officer is absent. Each panel regression in controlled for client and time fixed effect, cyclical effects associated to the time to maturity of the loan, and characteristics of the loan officer. To reduce the noise in each estimation we exclude from the panel the clients that have ever experienced a loan officer leave that is different from the leave that is being estimated. For example, if we are estimating the effect of a pregnancy leave, we exclude from the panel all clients that have ever experienced a loan officer sickness leave, or that have ever worked with a loan officer that was laid off or that quit the job.

The basic equation (used to estimate tables 4 to 7) can be written as:

$$Y = C + \beta_{leave} dummy_{leave} + \Sigma \beta_i Control_i + time_{fe} + client_{fe} \quad (1)$$

[6]The average grace period is high because the agricultural clients usually have a 1 year grace period.

Where

Y is the dependent variable $dummy_{leave}$ is a dummy that takes the value 0 when the loan officer is present and 1 when he is absent C_i is a control variable

In tables 8 to 11 we estimate how the effect of the loan officer leaves changes with different characteristics of the client. In particular length of the relationship with the loan officer, loan size, and client credit score. The equation is similar to equation 1, but includes the interaction terms:

$$Y = C + \beta_{leave} dummy_{leave} + \Sigma \beta_{leave \times var_i} dummy_{leave} \times var_i + \Sigma \beta_i Control_i + time_{fe} + client_{fe} \quad (2)$$

Where all the terms are similar to equation 1, and var_i is the variable that is interacted with the leave dummy.

It is important to note that not all the leaves are exogenous. Indeed only sickness absenteeism is both unexpected for the bank and for the loan officer. Pregnancy absenteeism is unexpected news but the absenteeism happens several months after the news are realized. Layoffs are expected for the bank but unexpected for the loan officer. Resignations are unexpected for the bank but expected for the loan officer. However according to the human resources department, loan officers who resign usually express their willing to leave at least one month in advance.

III Results and Discussion

In table 4 we present the effect of loan officer absenteeism for all type of leaves (sick, pregnancy, layoffs, resignations). Each column presents a regression of a dependent variable as a function of the variable after dummy and a set of control variables. The variable after dummy takes the value 0 when the loan officer is working and 1 when the loan officer is not working, therefore the coefficient estimated for this variable in the regression captures the effect of the loan officer absenteeism. In the first column of table 4 we observe that loan officer absenteeism generates a reduction of 0.81% in the probability that the client renews its loan with the bank, this represents a reduction of 18% in the probability of renewing the loan as a fraction of the unconditional renewal probability which equals 4.4%. In the second column we observe that when the loan officer is absent, there is an increase in the probability of borrowing outside the bank, however this increase is not statistically significant. In columns 3, and 4 we present the effect of absenteeism on the probability of missing a payment, and on the probability of defaulting on the loan (missing a payment for more than 90 days), we observe that loan officer absenteeism has a significant effect on both the probability of missing a payment and the probability of defaulting on the loan. In particular when the loan officer is absent the probability of missing a payment increases in 1.07%, which represents a 10% increase as a fraction of the unconditional probability of missing a payment, also when the loan officer is absent the probability of defaulting on the loan increases in 0.2% equivalent to a 11% increase as a fraction of the unconditional

probability of default. In columns 5, 6, and 7 we observe that the loan officer leave does not have a significant effect on the interest rate, maturity, and size of the loan, in column 7 we observe that when the loan officer is absent the client increases its borrowing outside the bank in $ 54,000 Chilean, equivalent to US$ 110.

In table 5 we present a similar analysis than in table 4, but only for sickness absenteeism. We observe that when the loan officer is absent because of an illness the clients experiences a reduction of 0.89% in the probability of renewing its loan in the bank, this represents a 20% decrease as a fraction of the unconditional mean. In the second column we observe that an illness leave increases in 2% the probability that the client borrows outside the bank, this represents a 12.5% increase as a fraction of the unconditional mean of borrowing outside the bank. In column 3 we observe that a sickness leave increases in 1.7% the probability of missing a payment, this represents an increase of 16% as a fraction of unconditional probability of missing a payment. In columns 4 to 8 we observe that the effect of the sickness leave on the rest of the variables is not statistically significant.

In table 6 we present the effect of pregnancies, layoffs, and resignations on the credit conditions of the client. For brevity we only present the effects on probability of renewing the loan with the bank, the probability of missing a payment, and the interest rate. Layoffs have the strongest effect on credit characteristics. When a loan officer is laid off, the clients in his portfolio experience a 1.16% decrease in the probability of renewing their loans (25% decrease as a fraction of the unconditional probability), they increase their probability of

missing a payment in 1.4% (13% as a fraction of the unconditional probability of missing a payment), and the interest on their loans increase in 0.1% per month (6% increase as a fraction of the unconditional interest rate). Resignations only have a significant effect on the probability of missing a payment, specifically the probability of missing a payment when the loan officer resigns increases in 1.2% (or 11% as a fraction of the unconditional probability of missing a payment). Finally pregnancy leaves only show a significant effect on the probability of renewing the loan with the bank, in particular when a loan officer leaves because of a pregnancy the probability that her clients renew their loans with the bank decreases in 0.82% (or 19% as a fraction of the unconditional probability of renewing their loans).

In tables 7 to 9, we present a similar analysis than in tables 4 to 6, but we add interaction of the absenteeism variables with the characteristics of the borrowers, in particular we study to what extent the length of the relationship between the client and the loan officer, the size of the client, and the credit score of the client, affect the effect that loan officer absenteeism has on the credit characteristics. In table 7 we present the analysis for all the leaves, regardless of the reason for the leave. The baseline parameters are estimated for clients with average loans below the median size, credit score below the median size, and new relationships with their loan officers. The effects of loan officer absenteeism on these type of client go in the same direction as the effects presented in table 4, however the effects are much stronger. In particular for this category of clients, the probability of renewing their

loans with the bank decreases in 2.4% (or 54% as a fraction of the unconditional probability of renewing the loan), the probability of borrowing outside the bank increases in 3% (or 18% as a fraction of the unconditional probability of borrowing outside the bank), the probability of missing a payment increases in 7.4% (or 70% as a fraction of the unconditional probability of missing a payment), the probability of getting into default increases in 2.5% (or 140% increase as a fraction of the unconditional probability of getting into default), the interest rate on new loans increases in 0.12% monthly (or 7.3% as a fraction of the average monthly interest rate), the size of new loans decreases in $ 620,000 Chilean pesos, equivalent to approximately US$ 1,300 (or 23% decrease as a fraction of the average loan size), finally the average size of new outside loans increases in $ 134,000 equivalent to US$ 300 (or 15% as a fraction of the average borrowing outside the bank). Regarding the interaction effects, increasing the length of the relationship with the loan officer reduces the effect on the probability of default, this means that people who have been working with their loan officer for a long time do not increase their default rates as much as people that have new relationships with their loan officer. More specifically, for each additional month of relationship with your loan officer your increase in the probability of default if the loan officer leaves is 0.028% smaller. Borrowers with average loans above the median size, and poor credit score, experience weaker effects as a consequence of loan officer absenteeism in most of the credit characteristics. The increase in interest rates, and increase in borrowing outside the bank completely disappear; and the probability of renewing the loan with the

bank, the probability of missing a payment, and the probability of getting into default are smaller but still significant. Small companies with credit score above the median, experience almost no decrease in their probability of renewing their loan with the bank. Unlike other categories of firms, small firms with good credit score do not experience a deterioration in their repayment behavior when the loan officer is absent. Finally big companies with good credit score experience a stronger increase in their probability of borrowing outside the bank when the loan officer is absent. This category of firms also experience a stronger deterioration in their repayment behavior.

In table 8 we interact the effect of loan officer sickness leave with the length of the relationship with the loan officer, the average loan size of the company, and the credit score of the client. We observe that all the effects and interactions go in the same directions as the effects observed in table 7. However some of the effects of sickness absenteeism on credit characteristics are not statistically significant. In particular the decrease in the size of new loans with the bank, and the increase in the size of loans outside the bank are weaker and non statistically significant. The effect on interest rate is economically significant and even stronger than the effect observed for all leaves in table 7, however this effect has a high standard deviation and therefore is not statistically significant. The interactions of the effect of sickness absenteeism with the length of the relationship with the loan officer, the average loan size of the borrower, and the credit score of the borrower are similar to the effect of the interactions found in table 7.

In table 9 we study the interaction effects for layoffs, resignations, and pregnancy leaves. Only the effects for resignations leaves are significantly different from what we observed in tables 7 and 8. For resignation leaves the effect on the probability of renewing the loan is several times smaller than the effect for other type of leaves, more specifically the decrease in the probability of renewing the loan with the bank is 0.8% which represent only 30% of the change found for the other type of leaves in tables 7 and 8, furthermore this effect is only significant at the 10% level. Also the interaction effects for resignation leaves are weaker and non significant for most of the credit characteristics.

In table 10 we study if the effects of sick leaves on credit characteristics persist once the loan officer is back to work. Immediately after the loan officer comes back to work the probability that the client renews his loan with the bank goes back to the average before the leave, the same happens with the probability that the client borrows outside the bank. The only effect that is persistent after the loan officer is back to work is the increase in the probability of missing a payment. This probability remains almost unchanged in the 3 months after the loan officer is back.

In table 11 we study if the effects of pregnancy leaves on credit characteristics persist once the loan officer is back to work. The reduction in the probability that the client renews his loan with the bank decreases over time, furthermore the decrease is only statistically significant the first month after the loan officer is back to work, and loses significance in the second and third month after the loan officer is back in the bank. Also, during a pregnancy

absenteeism the probability that the client misses a payment or that he gets into default does not change. However once the loan officer is back to work after a pregnancy leave there is an increase of 1.5% in the probability that the client misses a payment (which represents an increase of about 15% as a fraction of the unconditional probability of missing a payment), and there is an increase of .7% in the probability that the client defaults on the loan, which represents an increase of 40% as a fraction of the unconditional probability of defaulting on the loan.

In tables 12 to 14 we study how the effect of the absenteeism changes with the length of the leave. Specifically we estimate the effect on the credit characteristics during the first month of leave, the second month of leave and the third month of leave. In table 12 we present the analysis for all leaves. We observe that the effect on the probability of renewing the loan with the bank is similar across all the months the loan officer is absent, the probability of missing a payment is also similar for the first, second, and third month the loan officer is absent. The probability of borrowing outside the bank is not significant the first and the third months of leave, but is significant during the second month of the leave. The probability of default is only significant for the third month of the leave. The size of the borrowing outside the bank is increasing in the length of the leave, during the first month it equals \$50,000 Chilean (equivalent to US\$ 100) but is not statistically significant, the second month it equals \$78,000 Chilean (equivalent to US\$ 150) and is significant at the 10% level, finally during the third month the increase equals \$96,000 Chilean (about

US$200) and is significant at the 10% level. The effect on the rest of the variables is not significant.

In table 13 we present the effect of the sickness absenteeism during the first, second, and third month the loan officer is absent. The only characteristics of the credit that are significantly affected are the probability of renewing the loan with the bank, the probability of borrowing outside the bank, and the probability of missing a payment. The effect on these three characteristics is increasing in the length of the leave. The probability of renewing the loan with the bank decreases in 0.68% the first month of the leave (equivalent to 16% as a fraction of the unconditional probability of renewal), it decrease in 0.85% the second month of leave, and it decreases 1.15% the third month of the leave. The level of borrowing outside the bank increases 2.2% the first month of the leave (equivalent to 14% as a fraction of the unconditional probability of borrowing outside the bank), increases 3.1% the second month of the leave, and increases 4.6% the third month of the leave. Finally the effect on the probability of missing a payment increases 0.6% the first month of the leave, not statistically significant, increases 1.7% the second month of the leave, significant at the 5% level, and increases 2.3% during the third month of the leave, significant at the 1% level.

Finally in table 14 we present the effect of the layoffs, resignations, and pregnancy leaves for the first, second, and third months of leave. For layoffs the decrease in the probability of renewing the loan is similar across months and equals 1%, the increase in the probability of missing a payment is also similar across months and equals 1.5%. Finally the increase

in the interest rate is only significant the second and third months of the leave and equals 0.14% and 0.16% respectively. For resignation leaves the first month none of the studied variables experience a significant change, the second month there is a 0.84% decrease in the probability of renewing the loan with the bank, and a 1.1% increase in the probability of missing a payment, finally during the third month of leave there is a 1.9% increase in the probability of missing a payment. For pregnancy leaves the probability of renewing the loan with the bank during the second month decreases 0.5%, the rest of the variables do not show a significant change for pregnancy leaves.

IV Analysis

The analysis in all the tables shows in general similar effects of absenteeism on the credit characteristics of the client. With a few exceptions most of the absenteeism episodes generate a decrease in the probability of renewing the loan with the bank, an increase in the probability of borrowing outside the bank, and increase in the probability of missing payments, and an increase in the probability of getting into default. The effect on credit amounts are not significant, but most of the times goes in the same direction; it generates a decrease in the average loan size of new loans with the bank and an increase in the average size of new loans outside the bank.

Not all type of leaves have the same effects on credit characteristics. The sickness

absenteeism generates a significant decrease in the probability of renewing the loan with the bank, a significant increase in the probability of borrowing outside the bank, and a significant increase in the probability of missing a payment. Pregnancy absenteeism only affect the probability of renewing the loan with the bank, but has no significant effect on the level of outside borrowing, and the probability of missing payments. Resignation leaves only show a significant effect on the probability of missing a payment. Finally layoffs generate a significant decrease in the probability of renewing the loan with the bank, a significant increase in the probability of missing a payment, and a significant increase in the loan interest rates. It is not surprising that layoffs have such significant effects because changes in the characteristics of the loan officer portfolio are most likely the reason why the loan officer was fired in the first place.

When we interact the effect of loan officer leaves with the characteristics of the clients we see that client characteristics strongly affect the impact of loan officer absenteeism on the borrowers credit characteristics. The clients that are most severely affected by loan officer absenteeism are those with small average loan size, and poor credit score. This is not surprising since we expect these companies to strongly rely on soft information in order to borrow from financial institutions. Indeed a small company with poor credit score will be denied credit unless there is very favorable soft information. If the loan officer is absent, and soft information is lost or partially lost, the access to credit of these clients will be severely affected. The fact that we observe such strong effect of loan officer absenteeism on

some type of clients, suggest that soft information is not easily transferrable even among loan officers in the same financial institution. Clients with credit size above the median and credit score below the median are also strongly affected by loan officer absenteeism, however this category of companies are mainly affected in their access to credit (but not in repayment behavior). In particular this companies experience lower, but still significant, decrease in the probability of getting a loan from their original bank. On top of that this type of companies cannot replace this credit crunch with outside borrowing. We conjecture that this category of companies are very exposed to hold up by the bank. Because they have poor credit score they strongly rely on soft information, and the relatively bigger size makes it less probable that an outside financial institution will be willing to take the risk of borrowing to them unless they have soft information that is strong enough to offset the bad reputation in the formal records.

Finally we observe that companies with good credit score can offset the credit crunch from the original lender by borrowing outside the bank. These companies have good reputation, and most likely that explains why they can easily borrow outside the bank. This finding is quite interesting because it shows that in presence of good credit score, financial institutions will be willing to skip the analysis of soft information, when making a lending decision. Nonetheless, this category of companies show the strongest deterioration in repayment behavior when the original loan officer is absent. It is unlikely that this category of companies get their financial situation deteriorated as a consequence of the loan officer

leave, therefore we conjecture that the deterioration in the repayment behavior is not a reflection of a deterioration of the current financial situation, but rather a disclosure of an already deteriorated financial situation. As we mentioned in the setting section, loan officer are paid according the the amount they lend, and the default rate of their portfolio. This type of incentives make it specially appealing for the loan officer to suppress bad news about big companies. Indeed reporting bad news about these companies would strongly increase the default rate of the loan officer's portfolio, and also will result in a reduction of the lending to the firm, reducing the portfolio size of the loan officer. Both of these effects will negatively impact the variable part of the loan officer salary. In response to these incentive is highly likely that loan officer will keep lending to big companies even if their are in distress, "hiding" the real situation of the company. As a consequence the company will maintain its "high credit score" and keep getting funding from the bank, this mechanism is very similar to a Ponzi scheme. When the loan officer leaves, the incoming loan officer has incentives to disclose the real situation of the company. Not doing that would affect its future salary because they know that the Ponzi scheme will eventually collapse. This type of moral hazard between loan officers and the bank is extendedly described in Hertzberg, Liberty, and Paravisini (2010).

In tables 10 and 11 we explore how the effect of the loan officer absenteeism evolves once the loan officer is back in the bank. In table 10 we show the evolution for the sickness leaves. It is clear from the results that as soon as the loan officer is back to work the

probability of renewing the loan with the bank, and the probability of borrowing outside the bank go back to their pre-leave values. These results are not surprising, once the loan officer is back to work the bank can use the accumulated soft information right away (there is no reason for a lag), also once the probability of borrowing inside the bank recovers, there is no more need for the client to borrow outside the bank. The only effect that is persistent after the loan officer is back in the bank is the probability of missing a payment, this effect does not decrease even three months after the loan officer is back to work. One explanation for the persistence in the probability of missing a payment is that the cost of missing payments is concave in the number of missing payments, or in simple words after missing a payment, missing a second and third one is not that costly. An alternative explanation for the persistence in the probability of missing a payment is that when the client misses a payment he spends the money originally set aside to pay the loan, once he spends the money he starts having a cash deficit from which it is difficult to recover. In table 11 we show the evolution of the effects for pregnancy leave. It is apparent that the evolution of the credit characteristics for pregnancy leaves is quite different from the evolution we observe for sickness leaves. In the first place the reduction in the probability of getting a loan from the bank recovers much slower, one month after the loan officer is back from pregnancy leave the reduction in the probability of getting a loan from the bank is very similar to the reduction in the probability of getting a loan from the bank when the loan officer was on leave. We also observe that outside borrowing increases when the loan

officer comes back from a pregnancy leave, specifically three months after the loan officer is back to work the probability that the client borrows outside the bank increases in 2.6% (or 16% as a fraction of the unconditional probability of borrowing outside the bank). The probability of missing a payment and even the probability of entering default is economically and statistically significant once the loan officer is back from a pregnancy leave. The most likely explanation for this persistent effects, is that even after the loan officer is back to work, the effort she can put into the job is still impaired, this will be the case if they have to invest an important amount of time in their newborn care.

In tables 12 to 14 we study how the effect of loan officer absenteeism on the characteristics of the loan evolves during the first, second, and third month the loan officer is absent from the bank. When we study all the leaves together there is no clear pattern. However when we only study the effect of sickness leaves we observe that all the effects on credit characteristics intensify as the leave gets longer. The increase in the probability of borrowing outside the bank has a intuitive explanation; if the new loan officer cannot process a client's loan, the client may have the cash to cover his cash needs for one month, however he may not have the cash to cover 2 or 3 months, therefore if the length of the leave increases, he will eventually need to find alternative sources of cash. It is interesting to note that the increase in the probability of borrowing outside the bank is not present for the other type of leaves like pregnancy, layoffs, and resignations. What makes a sickness leave different from other type of leaves? An important difference is that during a sickness leave there is uncertainty about

when andor whether the loan officer is going to come back. Therefore the client may be willing to wait and see if his loan officer's leave is only short term. Other types of leave do not have this characteristic, in particular for pregnancy leaves the client knows that the loan officer is going to be absent for a long period of time, and for layoffs and resignations the client knows that the loan officer is never going to come back, therefore if he experiences problems borrowing from the new loan officer, he will approach a different bank right away. We also observe that the probability of missing a payment and the probability of defaulting on the loan increase for sickness leaves but does not increase for other type of leaves. Again we want to understand what makes the sickness leave different regarding the probability of missing a payment. One explanation can be that for the sickness leaves the bank expects that the loan officer will come back soon, therefore it has no incentives to invest in training a new loan officer, as a consequence the probability of a client missing a payment or defaulting on his loan will be increasing in the length of a sickness leave. On the contrary, when there is a layoff, a resignation, or a pregnancy leave the bank already knows the leave is going to be long term and therefore has incentives to invest in training a new loan officer as soon as possible, therefore even though the probability of missing a payment and the probability of defaulting on the loan will initially go up, it will eventually decrease as the new loan officer gets the required training andor the the required soft information about the client. In short the sickness leave is quite different form other type of leaves, in the first place it is exogenous and unexpected, on the second place there is uncertainty about when the loan

officer is coming bank, this two differences are most likely the reason why the effect of this type of leave on credit characteristics is quite different from the effect of other type of leaves.

V Conclusion

In this paper we show that the interaction between loan officers and the businesses they lend to has important implication for the credit availability and the repayment behavior of entrepreneurs. We use loan officer absenteeism to measure the relevance of this information. We show that when the loan officer is absent, and therefore the client has to work with a less informed loan officer, there is a significant reduction in the probability of getting a loan from the bank, a significant increase in the probability that the client borrows outside the bank, and a significant increase in the probability that the client misses a payment or even that he gets into default.

However these effects are not the same for all clients. In particular our findings strongly depend on the average loan size and the credit score of the client. Small clients, and clients with good credit score have the strongest increase in the probability of borrowing outside the bank when their original loan officer is absent. This suggests that small clients and clients with good reputation have lower asymmetric information problems and therefore have more flexible access to outside financing. On the flipside big companies with poor credit score do not show an increase in their probability of borrowing outside the bank. This supports the

view that banks can build monopoly power over the time by collecting information about the client that is difficult to transfer.

We also find that the deterioration in the repayment behavior is strongest for small clients with poor credit score, and big clients with good credit score. This first of these findings is intuitive, small clients with poor credit score may need stronger monitoring to control their repayment behavior. The second of these findings is less intuitive but is consistent with the findings in Hertzberg, Liberty, and Paravisini (2010); loan officers will have incentives to suppress bad information about their clients because that would negatively affects the variable portion of their salary. By suppressing this information they help big firms in financial distress to keep above average credit scores. When the loan officer has to leave, the incoming loan officer has strong incentives to disclose this situation.

In short this study finds evidence that soft information strongly affects small companies access to credit and repayment behavior, and that loan officer play a crucial role in collecting and reporting this soft information.

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Tables

Table 1

Number of Loan Officers that Took Leaves, and Total Number of Leave Episodes, and Total Number of Months off Duties

	number of officers on leave	number of leave episodes	number of periods on leave	average leave length
sick	32	43	91	2.12
pregnancy	33	35	158	4.51
layoff	26	26		
resignation	15	15		

Table 2

Summary Statistics Loan Officers

	N	mean	sd	median
sex (0=man)	370	0.51	0.50	
age (years)	370	32.6	4.7	31.8
married (0=yes)	370	0.42	0.49	
number of children	370	0.77	0.90	1
experience (years)	370	3.7	2.6	3.2
area (1=city)	293	0.64	0.48	
total clients	480	569	207	576
active clients (loan > US$ 20)	480	339	112	341
clients with outside loans	480	314	119	312
average per client credit at bank	475	2,591,987	707,497	2,548,706
average per client credit outside bank	475	1,399,072	413,593	1,432,527
client probability of renewal (per month)	475	0.043	0.011	0.042
client probability of getting credit outside	475	0.165	0.039	0.166
maturity of new loans	475	27.73	5.51	27.16
interest rate (monthly)	475	1.72	0.34	1.78
grace period	475	108	75	66
size of new loans	475	1,944,016	614,054	1,898,236

Table 3

Summary Statistics Entrepreneurs

	N	mean	sd	median
age	1191403	48.33	11.86	48.42
sex (0=man)	2817380	0.383	0.486	
married (0=yes)	1379013	0.278	0.448	
relation. length (monthly)	2827015	14.6	10.28	12
prob. miss payment	2827015	0.11	0.31	
prob. default	2827015	0.018	0.133	
prob. loan renewal	2827015	0.044	0.205	
prob. outside borrowing	2827015	0.162	0.368	
total bank credit	2827015	2570137	3482061	1209988
outside credit (1=yes)	2827015	0.656	0.475	
total outside credit	2827015	1378046	2949246	194069
new loan average size	124249	1945117	2632847	1025044
new loan maturity (months)	124249	27.47	25.27	20
interest (monthly %)	124249	1.64	0.59	1.8
grace period (days)	120358	120	132	59
savings (1=yes)	2827015	0.393	0.488	
total savings	2827015	91434	1640308	0

Table 4: Effect of all leaves on credit characteristics

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04403	0.16328	0.10521	0.01808	1.63662***	27.46	2715982	915205
(not from regression)	(0.20516)	(0.36962)	(0.30682)	(0.13325)	(0.58806)	(25.34318)	(3489649)	(2237101)
Constant	0.30702***	0.28967***	0.15965***	0.11493***	1.92789***	27.27***	2899118***	1349590***
	(0.00695)	(0.00499)	(0.00367)	(0.00401)	(0.05567)	(1.16548)	(181750.1)	(210126.3)
after dummy	-0.00813***	0.00353	0.01069***	0.00204*	0.02131	0.61	-43120	53888*
	(0.00151)	(0.00397)	(0.00299)	(0.00111)	(0.03538)	(1.16971)	(125254.4)	(27883.06)
experience loan officer	0.00001	0.00002	-0.00018**	-0.00004	0.00098	0	-3015	-2410**
	(0.00004)	(0.00007)	(0.00009)	(0.00004)	(0.00071)	(0.02465)	(3253.84)	(941.5085)
sex loan officer	-0.00064	0.0015	-0.00004	-0.0003	0.01628	-0.22	-82289	-5813
	(0.00082)	(0.00126)	(0.00139)	(0.00067)	(0.0136)	(0.41557)	(62439.37)	(16285.16)
relationship length	0.00003	0.00006	0.00079***	0.00022***	-0.00013	0.02	6172	7443***
	(0.00005)	(0.00008)	(0.0001)	(0.00004)	(0.00093)	(0.02733)	(4208.832)	(1249.483)
N obs	2491699	2491699	2491699	2491699	109776	109776	109776	406791
R-squared	0.08427	0.19978	0.41854	0.26865	0.71216	0.49	0.7034	0.62

Table 5: Effect of sick leaves on credit characteristics

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04371	0.16141	0.10759	0.01845	1.64989***	27.66	2751597	913785
(not from regression)	(0.20446)	(0.36791)	(0.30986)	(0.13459)	(0.59443)	(25.49547)	(3536996)	(2235539)
Constant	0.3568***	0.21524***	0.04568***	0.08621***	1.98132***	27.15***	2817086***	1430711***
	(0.00718)	(0.00586)	(0.004)	(0.00401)	(0.05482)	(1.1127)	(183467)	(219623.6)
after dummy	-0.00892***	0.02013**	0.01741***	0.00163	-0.01211	2.72	77186	6286
	(0.00206)	(0.00798)	(0.00527)	(0.0021)	(0.05225)	(2.366)	(271047.9)	(47805.48)
experience loan officer	-0.00001	-0.00006	-0.00025***	-0.00003	0.0003	0.01	-2779	-1867*
	(0.00004)	(0.00008)	(0.0001)	(0.00004)	(0.00073)	(0.02523)	(3763.415)	(1048.262)
sex loan officer	-0.00069	0.00133	-0.00093	-0.00036	0.0144	-0.44	-88758	-7268
	(0.00079)	(0.00119)	(0.00148)	(0.00074)	(0.01511)	(0.42866)	(68277.68)	(17679.92)
relationship length	0.00004	0.00008	0.00083***	0.00022***	-0.00014	0.03	7710*	7306***
	(0.00005)	(0.00009)	(0.0001)	(0.00004)	(0.00098)	(0.02718)	(4601.861)	(1307.559)
N obs	2337302	2337302	2337302	2337302	102166	102166	102166	377107
R-squared	0.08468	0.2055	0.42811	0.279	0.71906	0.49	0.7075	0.62

Table 6: Effect of layoffs, resignations, and pregnancy leaves on credit characteristics

	Fired				Resigned			
	loan renewal	outside loan	missed payment	interest rate	loan renewal	outside loan	missed payment	interest rate
unconditional mean	0.04394	0.16234	0.10688	1.64436***	0.04386	0.16183	0.10709	1.65054***
(not from regression)	(0.20497)	(0.36877)	(0.30896)	(0.59074)	(0.20478)	(0.3683)	(0.30923)	(0.59302)
Constant	0.35689***	0.21558***	0.04514***	1.96309***	0.3581***	0.2151***	0.04698***	1.9779***
	(0.00734)	(0.00591)	(0.00424)	(0.05654)	(0.00745)	(0.00601)	(0.00423)	(0.056)
after dummy	-0.01157***	-0.01141	0.01407**	0.1037**	-0.00301	-0.00301	0.01175***	0.0585
	(0.00257)	(0.00805)	(0.00605)	(0.0439)	(0.00459)	(0.0086)	(0.00408)	(0.09514)
experience loan officer	0.00001	-0.00006	-0.00027***	0.00038	0	-0.00007	-0.00028***	0.00039
	(0.00005)	(0.00009)	(0.0001)	(0.00078)	(0.00005)	(0.00008)	(0.0001)	(0.00077)
sex loan officer	-0.00116	0.00172	-0.00094	0.01704	-0.00081	0.00145	-0.00137	0.0116
	(0.00084)	(0.00133)	(0.00146)	(0.01648)	(0.00086)	(0.00127)	(0.00156)	(0.01691)
relationship length	0.00004	0.00008	0.00083***	0.0001	0.00004	0.00007	0.00085***	0.00013
	(0.00005)	(0.00009)	(0.00011)	(0.001)	(0.00006)	(0.00009)	(0.00011)	(0.00104)
N obs	2261347	2261347	2261347	99364	2217657	2217657	2217657	97258
R-squared	0.08531	0.20314	0.42668	0.71512	0.08488	0.20447	0.42978	0.71629

Table 6 (continuation): Effect of layoffs, resignations, and pregnancy leaves on credit characteristics

	Pregnancy			
	loan renewal	loan outside	missed payment	interest rate
unconditional mean	0.04361	0.16156	0.10756	1.64913***
(not from regression)	(0.20422)	(0.36804)	(0.30982)	(0.59434)
Constant	0.35481***	0.21436***	0.04309***	1.95307***
	(0.00719)	(0.00588)	(0.00411)	(0.05423)
after dummy	-0.00817***	0.00594	0.00593	0.02955
	(0.00226)	(0.004)	(0.00569)	(0.04855)
experience loan officer	0.00003	-0.00002	-0.00015	0.00072
	(0.00004)	(0.00008)	(0.0001)	(0.00078)
sex loan officer	-0.00018	0.00151	-0.00012	0.01434
	(0.00084)	(0.00124)	(0.00153)	(0.01572)
relationship length	0.00001	0.00008	0.00081***	0.00016
	(0.00005)	(0.00008)	(0.0001)	(0.00098)
N obs	2330763	2330763	2330763	101631
R-squared	0.0839	0.20611	0.42879	0.71308

Table 7: Effect of size, credit score, and length of the relationship on credit characteristics during all loan officer leaves

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04403	0.16328	0.10521	0.01808	1.63662***	27.45507	2715982	915204.5
(not from regression)	(0.20516)	(0.36962)	(0.30682)	(0.13325)	(0.58806)	(25.34318)	(3489649)	(2237101)
constant	0.30698***	0.28974***	0.15932***	0.11475***	1.92976***	27.10082***	2878580***	1340380***
	(0.00695)	(0.00498)	(0.00367)	(0.00401)	(0.05507)	(1.17684)	(182752)	(210749)
after dummy	-0.0239***	0.03005***	0.07353***	0.02492***	0.11895**	1.5139	-624852.8***	136537.8*
	(0.00292)	(0.00917)	(0.00648)	(0.00314)	(0.05259)	(1.93153)	(187649.1)	(76328.62)
experience loan officer	0.00001	0.00002	-0.00017**	-0.00003	0.00097	0.00126	-2857.909	-2350.109**
	(0.00004)	(0.00007)	(0.00009)	(0.00004)	(0.00071)	(0.02463)	(3244.277)	(941.5164)
sex loan officer	-0.00069	0.00157	-0.00001	-0.0003	0.0164	-0.2339	-83112.91	-6232.28
	(0.00082)	(0.00126)	(0.00138)	(0.00066)	(0.0136)	(0.41653)	(62246.22)	(16284.29)
relationship length	0.00004	0.00007	0.00077***	0.00022***	-0.00013	0.02233	6262.09	7591.848***
	(0.00005)	(0.00008)	(0.0001)	(0.00004)	(0.00092)	(0.02752)	(4254.532)	(1245.845)
after dummy x rel length	0.00002	-0.0004	-0.00042	-0.00028***	-0.00044	-0.1858*	-1103.287	-4679.477
	(0.00012)	(0.00032)	(0.00027)	(0.00007)	(0.00355)	(0.09946)	(9169.122)	(3186.647)
after dummy x size	0.0147***	-0.04156***	-0.0328***	-0.01442***	-0.14944***	3.42215	1143999***	95538.62
	(0.003)	(0.00951)	(0.00659)	(0.00296)	(0.04972)	(2.15635)	(252045.1)	(78148.7)
after dummy x score	0.0163***	0.0071	-0.10429***	-0.03339***	-0.00229	-0.04076	-266888.8*	-187979.5***
	(0.00391)	(0.00785)	(0.00692)	(0.00304)	(0.06181)	(1.21149)	(148028.3)	(59038.65)
af. dummy x size x score	-0.0042	0.01395*	0.03062***	0.0165***	0.04453	-0.62221	-273790.9	12906.84
	(0.00415)	(0.0075)	(0.00692)	(0.00306)	(0.07565)	(3.01803)	(335779.6)	(84032.4)
nobs	2489665	2489665	2489665	2489665	109744	109744	109744	406598
adjr2	0.08463	0.20006	0.41842	0.26773	0.71236	0.48818	0.70352	0.61783

Table 8: Effect of size, credit score, and length of the relationship on credit characteristics during sickness leaves

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04371	0.16141	0.10759	0.01845	1.64989***	27.66478	2751597	913784.9
(not from regression)	(0.20446)	(0.36791)	(0.30986)	(0.13459)	(0.59443)	(25.49547)	(3536996)	(2235539)
constant	0.35685***	0.21532***	0.04522***	0.08664***	1.98074***	27.13034***	2815215***	1430315***
	(0.00718)	(0.00588)	(0.004)	(0.004)	(0.05473)	(1.11101)	(183322.7)	(219385)
after dummy	-0.02443***	0.06536***	0.06746***	0.02051***	0.13194	1.95834	-462730	180087.4
	(0.0047)	(0.02165)	(0.01331)	(0.00626)	(0.10261)	(4.42216)	(394203.9)	(162013.1)
experience loan officer	-0.00002	-0.00006	-0.00025***	-0.00003	0.0003	0.00864	-2744.956	-1897.896*
	(0.00004)	(0.00008)	(0.00009)	(0.00004)	(0.00073)	(0.02521)	(3759.576)	(1049.806)
sex loan officer	-0.00072	0.00135	-0.00091	-0.00037	0.0144	-0.45508	-88026.69	-7752.708
	(0.00079)	(0.00118)	(0.00147)	(0.00073)	(0.01511)	(0.4293)	(68276.3)	(17730.36)
relationship length	0.00004	0.00008	0.00081***	0.00022***	-0.00015	0.0368	7735.458*	7361.532***
	(0.00005)	(0.00009)	(0.0001)	(0.00004)	(0.00099)	(0.02724)	(4628.026)	(1317.148)
after dummy x rel length	-0.00016	-0.00027	-0.00002	-0.00029**	-0.002	-0.23842	-4114.722	-5901.263
	(0.00012)	(0.00052)	(0.00052)	(0.00013)	(0.00605)	(0.26854)	(22696.76)	(7012.098)
after dummy x size	0.01619***	-0.07171***	-0.02069	-0.01069**	-0.1372	8.10129*	1340772**	-106672.8
	(0.00542)	(0.02066)	(0.0132)	(0.00514)	(0.09246)	(4.37295)	(649848.9)	(140676.5)
after dummy x score	0.01238*	-0.00803	-0.10666***	-0.02709***	-0.02747	0.44288	-195753.4	-264054.3**
	(0.00654)	(0.01095)	(0.01516)	(0.00598)	(0.05497)	(1.42697)	(324467.5)	(115579.1)
aft. dummy x size x score	0.00843	0.03072***	0.02207*	0.01093*	-0.05986	-3.38635	-666887.5	302274.7*
	(0.00895)	(0.01117)	(0.0132)	(0.00568)	(0.12053)	(3.84294)	(882738.4)	(156523.6)
nobs	2335540	2335540	2335540	2335540	102141	102141	102141	376953
adjr2	0.08502	0.20576	0.42779	0.27807	0.71914	0.48912	0.70726	0.62366

Table 9: Effect of size, credit score, and length of the relationship on credit characteristics during layoffs, resignations and pregnancy leaves

	fired				resigned			
	loan renewal	outside loan	missed payment	interest rate	loan renewal	outside loan	missed payment	interest rate
unconditional mean	0.04394	0.16234	0.10688	1.64436***	0.04386	0.16183	0.10709	1.65054***
(not from regression)	(0.20497)	(0.36877)	(0.30896)	(0.59074)	(0.20478)	(0.3683)	(0.30923)	(0.59302)
constant	0.35689***	0.21557***	0.04465***	1.96344***	0.35813***	0.21524***	0.0467***	1.97858***
	(0.00734)	(0.00593)	(0.00422)	(0.0564)	(0.00744)	(0.00604)	(0.00422)	(0.05598)
after dummy	-0.02645***	0.01949	0.07161***	0.17055	-0.00833*	-0.01847	0.05831***	-0.05791
	(0.00641)	(0.01653)	(0.01484)	(0.15338)	(0.00483)	(0.02071)	(0.0178)	(0.11706)
experience loan officer	0.00001	-0.00006	-0.00026***	0.00038	-0.00001	-0.00007	-0.00028***	0.00038
	(0.00005)	(0.00009)	(0.0001)	(0.00078)	(0.00005)	(0.00008)	(0.0001)	(0.00077)
sex loan officer	-0.00117	0.00169	-0.00093	0.01706	-0.00078	0.00139	-0.00135	0.01188
	(0.00084)	(0.00133)	(0.00146)	(0.01646)	(0.00086)	(0.00127)	(0.00156)	(0.01692)
relationship length	0.00004	0.00009	0.00083***	0.0001	0.00004	0.00007	0.00084***	0.00011
	(0.00005)	(0.00009)	(0.00011)	(0.001)	(0.00006)	(0.00009)	(0.00011)	(0.00104)
after dummy x rel length	-0.00002	-0.00097	-0.00024	-0.00006	0.00035	-0.00045	-0.00001	0.00716**
	(0.00021)	(0.00073)	(0.00058)	(0.00323)	(0.00025)	(0.00049)	(0.00036)	(0.00289)
after dummy x size	0.01553***	-0.03256***	-0.02504*	-0.09424	-0.00205	0.02184	-0.02846	0.0049
	(0.00597)	(0.01073)	(0.01325)	(0.1288)	(0.00557)	(0.02424)	(0.01995)	(0.12765)
after dummy x score	0.02016**	-0.00457	-0.09819***	-0.04428	0.00467	0.02759	-0.07975***	0.00031
	(0.00841)	(0.0086)	(0.0136)	(0.16364)	(0.00689)	(0.01936)	(0.02177)	(0.13951)
aft. dummy x size x score	-0.01414*	0.02309*	0.02602**	0.05767	0.00467	-0.01843	0.02747	-0.00635
	(0.00845)	(0.0129)	(0.01249)	(0.20925)	(0.00689)	(0.01902)	(0.02177)	(0.1484)
nobs	2259657	2259657	2259657	99338	2215989	2215989	2215989	97231
adjr2	0.08561	0.20336	0.42629	0.71511	0.08518	0.20469	0.42931	0.71631

Table 9 (continuation): Effect of size, credit score, and length of the relationship on credit characteristics during layoffs, resignations and pregnancy leaves

	pregnancy			
	loan renewal	outside loan	missed payment	interest rate
unconditional mean	0.04361	0.16156	0.10756	1.64913***
(not from regression)	(0.20422)	(0.36804)	(0.30982)	(0.59434)
constant	0.3549***	0.21464***	0.04244***	1.954***
	(0.00718)	(0.0059)	(0.0041)	(0.05421)
after dummy	-0.02245***	0.00306	0.06679***	0.1078
	(0.00501)	(0.0088)	(0.00946)	(0.08067)
experience loan officer	0.00003	-0.00002	-0.00015	0.00072
	(0.00004)	(0.00008)	(0.0001)	(0.00078)
sex loan officer	-0.00021	0.00164	-0.00007	0.01477
	(0.00084)	(0.00124)	(0.00153)	(0.01574)
relationship length	0.00001	0.00007	0.00081***	0.00013
	(0.00005)	(0.00008)	(0.0001)	(0.00099)
after dummy x rel length	0.00014	0.00079	-0.00043	0.00237
	(0.00018)	(0.00051)	(0.00036)	(0.00283)
after dummy x size	0.01166**	-0.02002*	-0.03324***	-0.17869**
	(0.00536)	(0.01186)	(0.01199)	(0.08271)
after dummy x score	0.00749	0.02131	-0.09648***	-0.03789
	(0.00577)	(0.01569)	(0.01388)	(0.0978)
aft. dummy x size x score	0.00318	-0.01168	0.02894*	0.10841
	(0.0064)	(0.01204)	(0.01497)	(0.13256)
nobs	2329025	2329025	2329025	101602
adjr2	0.08419	0.20633	0.42844	0.71316

Table 10: Effect after the loan officer returns from a sick leave

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04373	0.16149	0.10777	0.01848	1.65058***	27.65249	2749276	912841.5
(not from regression)	(0.20449)	(0.36798)	(0.3101)	(0.13468)	(0.59541)	(25.47232)	(3536872)	(2233656)
constant	0.35681***	0.21508***	0.04594***	0.08635***	1.98402***	27.14791***	2824359***	1408292***
	(0.0072)	(0.00582)	(0.00396)	(0.004)	(0.0538)	(1.0979)	(181928.3)	(215186.7)
after dummy	-0.00831***	0.01923**	0.01642***	0.00118	0.00259	1.55277	58405.97	14249.36
	(0.00211)	(0.00749)	(0.005)	(0.00193)	(0.04682)	(2.40363)	(241374.3)	(49232.71)
after 1 month dummy	-0.00028	0.00707	0.01664***	0.00228	0.09147	0.82768	-3655.331	-39999.89
	(0.00245)	(0.00827)	(0.00515)	(0.00211)	(0.06806)	(2.2154)	(352066.1)	(47732.04)
after 2 month dummy	-0.00501	-0.00354	0.01347*	0.00309	0.02372	-2.99175	180048.9	56005.8
	(0.00542)	(0.01014)	(0.00693)	(0.00267)	(0.05369)	(4.64379)	(269712.9)	(100942.6)
after 3 month dummy	0.00064	-0.00577	0.01745**	0.00034	-0.00717	-0.26809	413611.9	107800.8
	(0.00462)	(0.01278)	(0.00855)	(0.0026)	(0.09006)	(1.96211)	(445261.4)	(68563.58)
experience loan officer	-0.00001	-0.00006	-0.00025***	-0.00003	0.0003	0.00976	-2543.981	-1826.71*
	(0.00004)	(0.00008)	(0.00009)	(0.00004)	(0.00073)	(0.02504)	(3731.019)	(1036.188)
sex loan officer	-0.00061	0.00111	-0.00109	-0.00044	0.01439	-0.42424	-95142.79	-6266.868
	(0.00078)	(0.00117)	(0.00148)	(0.00073)	(0.0149)	(0.42198)	(66975.97)	(17313.71)
relationship length	0.00003	0.00008	0.00082***	0.00022***	-0.00013	0.03326	7486.817*	7304.683***
	(0.00005)	(0.00009)	(0.0001)	(0.00004)	(0.00097)	(0.027)	(4539.129)	(1278.696)
nobs	2357527	2357527	2357527	2357527	103089	103089	103089	380541
adjr2	0.08495	0.20606	0.42886	0.27991	0.71991	0.48786	0.70789	0.62411

Table 11: Effect after the loan officer returns from a pregnancy leave

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04366	0.16155	0.10767	0.0185	1.64954***	27.59469	2758788	920937.8
(not from regression)	(0.20433)	(0.36804)	(0.30996)	(0.13474)	(0.59492)	(25.34934)	(3534180)	(2248499)
constant	0.3548***	0.21461***	0.04284***	0.08684***	1.95373***	27.4067***	2829961***	1419996***
	(0.00714)	(0.00588)	(0.00407)	(0.00401)	(0.05379)	(1.1626)	(184170.6)	(211774.3)
after dummy	-0.00775***	0.00588	0.00504	0.00129	0.03579	1.31838	-37913.58	58172.54
	(0.00236)	(0.00391)	(0.00531)	(0.00181)	(0.04613)	(2.2516)	(189968.3)	(54636.15)
after 1 month dummy	-0.00748*	-0.00384	0.01736**	0.00564**	0.02356	0.77398	342947.8	41287.5
	(0.00448)	(0.00806)	(0.00814)	(0.00227)	(0.06942)	(2.41737)	(295669.8)	(86894.24)
after 2 month dummy	-0.00628	0.01069	0.01814***	0.00904***	0.06525	0.39476	371006.3	128844.8
	(0.00416)	(0.00888)	(0.00627)	(0.00311)	(0.0526)	(2.68723)	(345999.1)	(82750.55)
after 3 month dummy	-0.00432	0.02637**	0.01326*	0.00705*	0.04631	0.16628	641575.8**	173496.2
	(0.00441)	(0.01109)	(0.00678)	(0.00401)	(0.04773)	(2.63681)	(287109.6)	(109426.6)
experience loan officer	0.00003	-0.00001	-0.00014	-0.00002	0.0007	0.00228	-69.10366	-1784*
	(0.00004)	(0.00008)	(0.00009)	(0.00004)	(0.00076)	(0.02697)	(3647.755)	(1012.992)
sex loan officer	0.00005	0.00136	-0.00019	-0.00072	0.01272	-0.31896	-45065.18	-3803.688
	(0.00082)	(0.00123)	(0.00151)	(0.00068)	(0.01549)	(0.45126)	(70238.73)	(18285.45)
relationship length	0.00001	0.00006	0.00081***	0.00024***	0.00015	0.03946	7127.023	7288.222***
	(0.00005)	(0.00008)	(0.0001)	(0.00004)	(0.00097)	(0.02881)	(4501.091)	(1316.097)
nobs	2348799	2348799	2348799	2348799	102534	102534	102534	379287
adjr2	0.08419	0.20604	0.42885	0.2791	0.71368	0.47582	0.70601	0.62512

Table 12: Effect on credit characteristics during the first, second, and third month of loan officer absenteeism (all leaves combines)

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04403	0.16328	0.10521	0.01808	1.63662***	27.45507	2715982	915204.5
(not from regression)	(0.20516)	(0.36962)	(0.30682)	(0.13325)	(0.58806)	(25.34318)	(3489649)	(2237101)
constant	0.3065***	0.28995***	0.16035***	0.11506***	1.92917***	27.2341***	2894179***	1352331***
	(0.00694)	(0.005)	(0.00363)	(0.004)	(0.0555)	(1.17861)	(181483)	(210034.1)
after 1 month dummy	-0.00625***	-0.00107	0.0064***	0.00161	-0.01838	2.42234	-21679.42	49494.05
	(0.00209)	(0.00663)	(0.00242)	(0.00112)	(0.04246)	(1.79457)	(142602.5)	(42692.83)
after 2 month dummy	-0.00822***	0.01199*	0.01102***	0.00106	0.05878	-0.32262	-6384.591	77751.48*
	(0.00196)	(0.00685)	(0.00332)	(0.00122)	(0.049)	(2.12774)	(280245.9)	(40081.55)
after 3 month dummy	-0.00786***	-0.00229	0.01108***	0.00304*	0.0475	1.33587	10109.81	95645.25*
	(0.00225)	(0.00729)	(0.00393)	(0.00168)	(0.04289)	(2.95025)	(249566.4)	(52779.71)
experience loan officer	0.00001	0.00002	-0.00018**	-0.00003	0.00099	-0.00025	-2997.976	-2364.955**
	(0.00004)	(0.00007)	(0.00009)	(0.00004)	(0.00071)	(0.02456)	(3257.433)	(941.9476)
sex loan officer	-0.00071	0.00154	0.00007	-0.00028	0.01635	-0.22384	-82920.46	-5866.329
	(0.00081)	(0.00126)	(0.0014)	(0.00067)	(0.01362)	(0.41563)	(62455.95)	(16304.38)
relationship length	0.00004	0.00006	0.00078***	0.00022***	-0.00013	0.0164	6180.132	7397.665***
	(0.00005)	(0.00008)	(0.0001)	(0.00004)	(0.00092)	(0.02728)	(4214.646)	(1250.773)
nobs	2491699	2491699	2491699	2491699	109776	109776	109776	406791
adjr2	0.08426	0.19979	0.41853	0.26865	0.71219	0.48828	0.70343	0.61872

Table 13: Effect on credit characteristics during the first, second, and third month of loan officer sickness absenteeism

	loan renewal	outside borrowing	missed payment	default	interest rate	maturity	bank credit	outside credit
unconditional mean	0.04371	0.16141	0.10759	0.01845	1.64989***	27.66478	2751597	913784.9
(not from regression)	(0.20446)	(0.36791)	(0.30986)	(0.13459)	(0.59443)	(25.49547)	(3536996)	(2235539)
constant	0.35694***	0.21502***	0.04532***	0.08618***	1.9811***	27.18259***	2821585***	1431105***
	(0.00719)	(0.00586)	(0.00401)	(0.00401)	(0.05492)	(1.11549)	(182808.3)	(219701.1)
after 1 month dummy	-0.00681**	0.02179**	0.00686	0.00182	-0.07167	4.80426	6424.428	59478.81
	(0.00328)	(0.00962)	(0.00499)	(0.00216)	(0.05314)	(3.18082)	(227990.6)	(71796.66)
after 2 month dummy	-0.00851**	0.031**	0.01673**	0.00112	-0.04324	2.62568	462512.3	2833.773
	(0.00351)	(0.0153)	(0.00657)	(0.00304)	(0.09036)	(4.76332)	(790148.4)	(66858.49)
after 3 month dummy	-0.01147**	0.04596***	0.02271***	0.00033	0.02968	-1.29329	-324936.3	-32600.49
	(0.00475)	(0.01589)	(0.00837)	(0.00234)	(0.09868)	(1.87661)	(1058192)	(86304.8)
experience loan officer	-0.00002	-0.00005	-0.00024***	-0.00003	0.00031	0.00936	-2778.372	-1884.318*
	(0.00004)	(0.00008)	(0.00009)	(0.00004)	(0.00073)	(0.0252)	(3762.114)	(1048.444)
sex loan officer	-0.00076	0.00143	-0.00075	-0.00035	0.01468	-0.44002	-88303.13	-7539.521
	(0.00079)	(0.00119)	(0.00149)	(0.00074)	(0.0151)	(0.4285)	(68195.6)	(17674.09)
relationship length	0.00004	0.00008	0.00082***	0.00022***	-0.00015	0.03494	7712.624*	7317.224***
	(0.00005)	(0.00009)	(0.0001)	(0.00004)	(0.00098)	(0.02718)	(4601.386)	(1306.964)
nobs	2337302	2337302	2337302	2337302	102166	102166	102166	377107
adjr2	0.08467	0.20551	0.4281	0.279	0.71908	0.48931	0.7075	0.62446

Table 14: Effect on credit characteristics during the first, second, and third month of loan officer layoffs, resignation, and pregnancy absenteeism

	layoff			resignation			pregnancy		
	loan renewal	missed payment	interest rate	loan renewal	missed payment	interest rate	loan renewal	missed payment	interest rate
unconditional mean	0.04394	0.10688	1.64436***	0.04386	0.10709	1.65054***	0.04361	0.10756	1.64913***
(not from regression)	(0.20497)	(0.30896)	(0.59074)	(0.20478)	(0.30923)	(0.59302)	(0.20422)	(0.30982)	(0.59434)
constant	0.35689***	0.04516***	1.96509***	0.35809***	0.04698***	1.9778***	0.35502***	0.04294***	1.95357***
	(0.00734)	(0.00424)	(0.0563)	(0.00745)	(0.00423)	(0.05599)	(0.00719)	(0.00411)	(0.05414)
after 1 month dummy	-0.00983***	0.01434***	0.02767	-0.00216	0.00388	0.06883	-0.00404	0.00426	0.01347
	(0.00333)	(0.0052)	(0.07437)	(0.00617)	(0.00386)	(0.12487)	(0.00302)	(0.00463)	(0.07587)
after 2 month dummy	-0.01204**	0.01635**	0.14042***	-0.00841*	0.01093**	0.06374	-0.00473*	0.00501	0.10118
	(0.00476)	(0.0073)	(0.05155)	(0.00488)	(0.00551)	(0.09002)	(0.00263)	(0.00603)	(0.11293)
after 3 month dummy	-0.00957**	0.01676*	0.11346*	-0.00223	0.01868**	0.09509	-0.00543	0.00267	-0.01194
	(0.00484)	(0.00876)	(0.06597)	(0.00604)	(0.00746)	(0.11874)	(0.00336)	(0.00627)	(0.06651)
experience loan officer	0.00001	-0.00027***	0.00037	0	-0.00028***	0.0004	0.00003	-0.00015	0.00072
	(0.00005)	(0.0001)	(0.00078)	(0.00005)	(0.0001)	(0.00077)	(0.00004)	(0.0001)	(0.00078)
sex loan officer	-0.00112	-0.00099	0.0167	-0.0008	-0.00137	0.01155	-0.0003	-0.00005	0.0145
	(0.00084)	(0.00146)	(0.01647)	(0.00086)	(0.00156)	(0.01692)	(0.00084)	(0.00154)	(0.01573)
relationship length	0.00005	0.00083***	0.0001	0.00004	0.00085***	0.00013	0.00001	0.00081***	0.00016
	(0.00005)	(0.00011)	(0.001)	(0.00006)	(0.00011)	(0.00104)	(0.00005)	(0.0001)	(0.00098)
nobs	2261347	2261347	99364	2217657	2217657	97258	2330763	2330763	101631
adjr2	0.0853	0.42668	0.71508	0.08488	0.42978	0.71628	0.08389	0.42879	0.71309