

The Value Of a Good Credit Reputation: Evidence From Credit Card Renegotiations

Andres Liberman*

January 6, 2016

Abstract

I exploit a natural experiment to estimate borrowers' willingness to pay for a good credit reputation. A lender in Chile offered lower installments to borrowers who were in default. Those who owed more than a fixed arbitrary cutoff were additionally offered a clean public repayment record. Using the cutoff in a fuzzy regression discontinuity design, I show that borrowers are willing to pay the equivalent of 11% of their monthly income for a good reputation. Borrowers use their reputation to take on more debt with other banks, but default more. Thus, renegotiations may impose informational externalities on other lenders.

Keywords: Credit Reputation, Renegotiation, Consumer Credit

JEL codes: G21, G23, D12, D14

Acknowledgements: I thank Daniel Wolfenzon, Daniel Paravisini, Wei Jiang, and Andrew Hertzberg for their invaluable comments, patience, encouragement, and support. I also thank Jose Miguel Cruz at the Centro de Finanzas of Universidad de Chile, Fernando Contardo and Ingrid Barahona at SINACOFI, and two officers at the data provider for giving me access to their data sets and for crucial clarifications. Finally, I thank an anonymous referee, Patrick Bolton, Emily Breza, Steve Figlewski, Juanita Gonzalez-Uribe, Mauricio Larrain, Holger Mueller, Mitchell Petersen, Tomasz Piskorski, Jonah Rockoff, Phillip Schnabl, Antoinette Schoar, Assaf Shtauber, Margarita Tsoutsoura, and seminar participants at Banco Central de Chile, Berkeley Haas School of Business, Boston College Carroll School of Management, Chicago Booth School of Business, Columbia Graduate School of Business, Duke Fuqua School of Business, MIT Sloan School of Management, New York Federal Reserve Bank, NYU Stern School of Business, London School of Economics, UCLA Anderson School of Management, UNC Kenan-Flagler Business School, Universidad de Chile, and Rochester Simon School of Business for comments and suggestions. Supported by the Chazen Institute of International Business at Columbia Business School. All errors and omissions are mine only.

*NYU Stern School of Business. Address: 44 West Fourth Street, New York, NY, 10012. Email address: aliberma@stern.nyu.edu. Telephone: (212) 998 0322. Fax: (212) 995 4233.

1. Introduction

Credit reputation, defined as public information on borrower repayment behavior, affects the allocation of consumer credit. Indeed, lenders are more willing to supply credit to borrowers who have a reputation of timely repayment. As a result, borrowers have an incentive to repay their debt to have a clean credit record.¹ Previous studies (Brown and Zehnder, 2007; De Janvry et al., 2010) and an abundance of anecdotal evidence (e.g., “Effect of Foreclosure on Credit Score” on CreditCardForum²) support this claim.

But there is no direct evidence on how much consumer credit borrowers care about their credit reputations. In particular, asking borrowers how much they would pay in exchange for a clean credit record is typically infeasible or unreliable. An alternative approach, which I pursue in this paper, is to infer borrowers’ willingness to pay for a clean credit record from debt repayment. However, uncollateralized borrowers may repay for a number of other reasons, such as to avoid non-pecuniary costs of default (e.g., moral and social costs). The empirical challenge associated with this approach is to isolate the amount borrowers repay to have a good credit reputation from what they pay for other reasons.

In this paper I exploit a natural experiment to estimate the willingness to pay for a good credit reputation of a group of consumer credit borrowers. To my knowledge, this is the first paper to estimate this measure.³ The natural experiment allows me to address the empirical challenge described above and resembles the following idealized setting. Consider two identical uncollateralized consumer credit borrowers, T and C (for “Treated” and “Control,” respectively) who are in default—i.e., have stopped making their payments—and, as a result, have a bad credit reputation as seen by other lenders. By revealed preference, either both

¹Eaton and Gersovitz (1981) and Diamond (1989), among others, provide models of debt repayment based on the value of a good credit reputation. Bulow and Rogoff (1989a,b) examine this motive for repayment in the context of sovereign lending. Pagano and Jappelli (1993) and Padilla and Pagano (2000) study the effects of information sharing on credit supply and on repayment behavior, respectively.

²See <http://creditcardforum.com/blog/effect-of-foreclosure-on-credit-score/>.

³Related papers have estimated this willingness to pay in other markets by observing how the prospect of a good reputation changes the incentives to obtain it over time via repeated interactions, e.g., Gorton (1996) (in the market for corporate debt) and Livingston (2005) (in the market for apples).

borrowers' willingness to pay to have a clean credit record is less than their full payment due, or they both face a binding liquidity constraint that prevents them from paying. Suppose the creditor offers both borrowers a renegotiation of their repayment terms that lowers their payments due, thereby helping to relax any liquidity constraint they may face. However, the offers differ in one respect: the lender also offers to restore T's public credit reputation, while C will still appear as in default to outside lenders, even if she repays. Because all other contract terms are held constant, the difference between the expected repayment of T and C after the renegotiation corresponds to their willingness to pay to have a good credit reputation.

The natural experiment, which closely resembles the above idealized experiment, was implemented by a large department store in Chile (The Store) that issues unsecured credit cards. Clients of The Store use the credit card to buy products or for cash advances and repay in fixed monthly installments. A borrower who misses one monthly installment is in default and receives a negative entry in the credit bureau—i.e., has a bad credit reputation. If the borrower pays the late installments any time before reaching 180 days in default, the negative entry is eliminated and no record of it is available to users of the credit bureau. However, after 180 days in default The Store writes off the debt and the negative entry remains as public information in the credit bureau for at least five more years, even if the borrower agrees to pay.⁴ The information in the credit bureau is primarily used by lenders to infer a borrower's creditworthiness, but it is also used informally and many times illegally in other settings (e.g., when evaluating job candidates or for long-term cellular phone contracts). Anecdotal evidence suggests that Chileans are well aware of the costs of having a bad credit reputation.⁵

⁴There is no personal bankruptcy law in Chile. Thus, the persistence of the negative entry in the credit bureau is similar to the long but limited duration feature of the signal of bankruptcy in public credit records in the U.S. (e.g., Musto, 2004).

⁵A July 23, 2011 article in the *The New York Times* about the Chilean consumer credit market indicates that: "A [bad credit score] usually means being blacklisted for jobs, mortgages or political office. If you [have a bad credit reputation], if you are not in hell, you are on the way there."

The natural experiment occurred as follows. All borrowers whose debts are written off—i.e., who are in default for more than 180 days—receive from The Store an offer via phone or email to renegotiate their debt. This policy allows all borrowers to pay their debt in lower installments after write off. Borrowers may reject this offer, in which case The Store may sue to recover the balance. However, The Store does not typically pursue judicial enforcement given the relatively high legal costs and small balances involved. In this setting, on February 2010, The Store began an unexpected monthly phone campaign with the purpose of offering a renegotiation to borrowers who were in default for more than 30 but *less* than 180 days. Borrowers who endogenously accepted this offer to renegotiate before write off also lowered their monthly installments and agreed to pay more installments. Importantly, because renegotiations were offered before write off, borrowers who accepted them also obtained a clean record at the credit bureau for as long as they paid their new installments on time.

My empirical strategy consists of measuring the repayment of borrowers who renegotiate before write off in excess of what their own counterfactual repayment would have been had they instead not renegotiated with The Store. This comparison closely resembles the idealized setting described above: just like borrower T in the idealized setting, delinquent borrowers who renegotiate before write off face a lower monthly payment and are able to obtain a clean slate with the credit bureau. On the other hand, just like borrower C in the idealized setting, borrowers who do not renegotiate before write off and remain in default can also lower their monthly payment after write off but cannot obtain a clean credit record.⁶

The remaining challenge is to estimate the repayment of borrowers who renegotiate before write off in excess of their own counterfactual repayment had they not renegotiated, which is not observable. Because renegotiating before write off is an endogenous outcome, the

⁶The counterfactual action of a borrower who renegotiates before write off could instead be to pay her late installments and “self-cure” out of default. Because the payment required to self-cure is higher than the renegotiated installment, borrowers who self-cure would end up paying relatively more. This reduces the estimate of the excess repayment induced by renegotiation before write off.

counterfactual repayment is not necessarily the average repayment of borrowers who do not renegotiate. Indeed, borrowers who renegotiate before write off may be different from those who do not in ways that are correlated with ex post repayment, a classic selection bias. One possible way to address this bias is to compare the repayment of borrowers before and after write off. But borrowers know that write off occurs after 180 days late. Thus, they endogenously choose to be late by more or less than 180 days, and the selection bias is not resolved. Instead, to overcome this bias I exploit the fact that, as part of The Store’s phone campaign, renegotiations before write off were only offered to borrowers whose outstanding balance was higher than an arbitrary and previously unknown cutoff of 50,000 Chilean pesos (roughly USD100). Not all borrowers above the cutoff renegotiate before write off: indeed, borrowers may instead remain in default or repay their late installments. As a result, the fraction of borrowers who renegotiate before write off is discontinuously higher for balances slightly above the cutoff.

I implement a fuzzy regression discontinuity design (fuzzy RD) that exploits the 50,000 pesos cutoff as a source of exogenous variation in the probability that a borrower renegotiates before write off to estimate the willingness to pay for a clean credit record. The outcome variable, which estimates a borrower’s expected repayment, is the sum of the discounted repayments to The Store after the renegotiation campaign starts, including payments made after write off.⁷ The fuzzy RD estimator corresponds to the difference in the average discounted repayment of all borrowers whose balance is above and below the cutoff, divided by the difference in the fraction of borrowers who renegotiate before write off above and below the cutoff (a Wald estimator).

I find that renegotiation before write off increases borrowers’ repayment to The Store by an amount equivalent to 11% of their monthly income. I interpret this amount as borrowers’

⁷The ex ante structure of installments due cannot be used to estimate expected repayment as it assumes no default. In my preferred specification, cash flows are discounted at the average implied internal rate of return of the renegotiations before write off (48% per year). Results are robust to a wide range of discount rates.

willingness to pay for a clean credit record. Further, by estimating the fuzzy RD specification with default as the outcome variable, I find that renegotiation before write off only delays default for four months. After this time, borrowers who renegotiate before write off are no more likely than their counterfactual to be in good standing at The Store, and thus to have a good public repayment record. Hence, the above estimate of 11% of monthly income measures borrowers’ willingness to pay for a temporary—i.e., four months—good credit reputation.

My results are inconsistent with an interpretation in which borrowers do not value their credit reputation and instead always repay their debt once a minimum level of subsistence consumption is met, a “liquidity constraint” story. Indeed, any liquidity constraint is relaxed by the renegotiation before write off as well as by the renegotiation after write off (i.e., for borrower T and for borrower C in the idealized setting). Under that interpretation, contrary to the evidence, borrowers who renegotiate before write off would not necessarily repay more than their counterfactual.⁸ The results are also inconsistent with alternative behavioral interpretations such as that the phone call acts as a nudge (Karlan et al., 2010; Cadena and Schoar, 2011; Kast et al., 2012) or that the lower renegotiated installments are viewed as a norm (Stewart, 2009; Navarro-Martinez et al., 2011), because both renegotiations before and after write off affect borrowers similarly along these dimensions.

I provide further support for my interpretation by analyzing the first-order benefit borrowers may obtain from a temporary good credit reputation: it gives an option to access formal credit markets. If this option is valuable, some borrowers will exercise it and take on more debt from other lenders. To examine this hypothesis I collect each individual’s aggregate bank debt, and match these data to The Store’s data set with the use of the unique national tax identifier. I find that borrowers above the cutoff increase their bank debt—specifically mortgage debt—relatively more than borrowers below the cutoff. This

⁸Since renegotiation after write off results in a larger installment reduction, a liquidity constraints story would actually imply that more borrowers would be able to pay after write off, reducing the excess repayment of the renegotiation before write off. This is the opposite of what I find.

evidence suggests that, as in the United States, the supply of mortgage debt depends on the borrower's credit reputation (e.g., Mian and Sufi, 2009; Keys et al., 2010).

The critical feature of the empirical setting that allows me to measure borrowers' willingness to pay for a good credit reputation is that, to users of the credit bureau, borrowers who renegotiate before write off become indistinguishable from those who have repaid their original installments.⁹ But, in this context, credit reputation becomes a noisier signal of the borrower's true creditworthiness. Thus, other creditors may end up lending to a less creditworthy pool of borrowers. Consistent with this hypothesis, I find that ex post bank default rates increase more for borrowers above the cutoff relative to borrowers below it. A renegotiation before write off can then be understood as a form of collusion between The Store and borrower that imposes a negative informational externality on a third party, such as banks.

This result suggests that some renegotiations, in this case those that occur before write off, may be ex post welfare decreasing, a point that has received little attention in the literature. Instead, the literature typically assumes that renegotiation is not only privately beneficial to the contracting agents but also ex post efficient. An exception is Aghion and Bolton (1987), who study how privately optimal bilateral contracts may reduce welfare. Likewise, Musto (2004) documents a similar pattern for borrowers whose credit reputation improves as they emerge from bankruptcy: they borrow more and then default more. The results also imply that lenders may benefit from offering modifications that allow delinquent borrowers to improve their credit reputations upon repayment. This relates to previous literature that has found that, in general, renegotiation of delinquent mortgage debt has not been a successful policy tool following the 2008 financial crisis, as measured by low take-up and unchanged recovery rates.¹⁰ However, the overall welfare effect of offering these modifications

⁹If renegotiations before write off were observable by other lenders, reputations could not be restored and borrowers who renegotiate would have no incentive to pay more to The Store. In this equilibrium, credit reputation would presumably be more valuable, but not measurable with the natural experiment I exploit.

¹⁰Among others, Piskorski et al. (2010) and Agarwal et al. (2011) argue that securitization reduces incentives for lenders to renegotiate, and Adelino et al. (2013) shift the blame of this failure to features particular

is unclear, as these bilateral modifications may impose an informational externality on other lenders. Further, mortgage credit markets are significantly different from The Store’s type of credit (e.g., mortgages are collateralized and open to securitization). Finally, the general equilibrium effects of modifying a cost of default, in this case, of having a bad credit record, are out of the scope of my analysis.

The rest of the paper is organized as follows. Section 2 presents the empirical setting. Section 3 measures the willingness to pay for a temporary good credit reputation. Section 4 shows the effects of the temporary good credit reputation on the access to credit with other lenders, along with the informational externality. Section 5 concludes.

2. Empirical setting

2.1. The department store industry in Chile

The Store is one of three large department store chains operating in Chile. These stores issue installment credit cards that represent approximately 41% of the 11.6 million credit cards issued in Chile by number—the balance being bank issued revolving—debt credit cards.¹¹ Clients use the cards to buy products on credit (typically only for products sold by the issuer) and to take short-term cash advances. Repayment is structured into fixed monthly installments that include capital and interest. The interest rate depends on the product bought and on the number of monthly installments (in particular, it does not depend on the borrower’s ex ante credit risk), and, as of March 2010, it ranged from 20% to 50% yearly.¹²

to mortgage markets. Mayer et al. (2014) argue that the strategic behavior of borrowers anticipating a renegotiation may be more costly than its potential benefits. More consistent with my results, Fuster and Willen (2012) find a strong effect of mortgage payment size on repayment behavior, but not related to ex post renegotiations.

¹¹Figure taken from <http://www.retailfinanciero.org> as of 1Q 2012.

¹²Information obtained from the Chilean banking and financial institutions regulator, SBIF, at www.sbif.cl, as of March 2010.

When a borrower does not pay an installment in full on time, The Store adds fees to the outstanding balance and cancels the borrower's credit line. The restriction on new credit is relaxed if the late installment is paid within 180 days. After 180 days without payment, the debt is written off. The debt is unsecured, so The Store cannot recover a product sold on credit. The Store may enforce debt collection judicially, but it typically does not given the high legal costs and low balances involved.

2.2. Credit information in Chile

Department stores and other non-bank lenders voluntarily report their credit information in Chile to a private credit bureau. These lenders report only whether a borrower is in default, and this information is updated weekly. In particular, other lenders cannot observe the balance of a department store borrower who is in good standing.

The Store notifies the credit bureau that a borrower is in default if one installment is not paid in full on time. A borrower who is written off receives a serious default notification that lasts for up to five years. This long-term notification is maintained even if the borrower pays off her balance. On the other hand, a borrower who pays the delinquent fraction of her debt before write off has her entry removed from the credit bureau, and no record of this entry remains in the system. The credit bureau shares this information through financial information aggregators. These companies match the individual-level data using the unique national tax identifier. As of the time of this study, anyone can access a borrower's credit report by paying a fee.

Credit-granting institutions use the information in the Chilean credit bureaus to evaluate new credit applications (Cowan and De Gregorio, 2003). This information sharing arrangement is similar to those found in developed countries like the U.S., where evaluating an applicant's credit history is a prevalent practice (e.g., Barren and Staten, 2003; Hunt, 2006). The law restricts the use of information in the credit bureau to credit decisions. However,

the extent to which non-financial institutions use this information is unclear. Anecdotal evidence suggests that this is a real concern for Chileans. For example, people with a bad credit reputation may be denied job opportunities or long-term phone contracts.¹³ This externality may add to the borrower’s concern for having a good credit reputation.

2.3. The renegotiation campaign

Formally, delinquent borrowers at The Store have always been able to renegotiate before write off. However, at the time of this study, renegotiations before 180 days late were only allowed for borrowers whose outstanding balance, computed as the sum of all remaining installments including capital and interest, was more than 50,000 pesos (approximately USD100).¹⁴ Renegotiations before write off can be initiated by the borrower, but, according to management, are almost always initiated by The Store.¹⁵

In February 2010, The Store started a monthly renegotiation campaign targeting borrowers who, as of the last day of the previous month, met three selection criteria:

1. Were late by more than 30 days and less than 180 days,
2. had first used The Store credit card at least six months earlier, and
3. had renegotiated at most once during the last year and twice in the last three years.

I refer to the subsample of borrowers with a positive balance as of January 2010 who satisfy these three selection criteria as the “renegotiation offer sample.” The renegotiation offer

¹³Barren and Staten, 2003 argue that in the United States, consumer reporting agencies may release credit files only for permissible purposes, defined to be those “in conjunction with a variety of voluntary, consumer initiated transactions.” In practice, employers may ask for the job applicant’s permission to access her credit report, in effect allowing discrimination based on this measure. More generally, these external costs may be related to the “threat of direct sanctions” that sustain repayment in Bulow and Rogoff’s (1989a) model.

¹⁴The Store had not specifically approached borrowers with loan balances relatively close to the cutoff before February 2010, as the fraction of renegotiations before this date is practically non-existent for balances below USD200. This suggests that the balance cutoff was unknown to borrowers.

¹⁵This suggests that most borrowers are not aware that they may, in fact, initiate a renegotiation. Another interpretation of this fact is that The Store has the discretion to report a borrower to the credit bureau. To the extent that borrowers believe that a borrower-initiated renegotiation before write off would not remove their negative entry, the incentive to renegotiate is reduced.

sample represents 13.6% of the total number of borrowers with a positive balance as of January 2010 (the full sample).¹⁶ Cross-sectional means and standard deviations of selected variables as of January 2010 for the full sample (columns 1 and 2) and for the renegotiation offer sample (columns 3 and 4) are shown in Panel A of Table 1. Relative to the full sample, borrowers in the renegotiation offer sample have on average a higher balance (588,000 pesos vs. 397,000 pesos—roughly US\$1,200 vs. US\$800), are slightly younger (42 years old vs. 45 years old), started using The Store credit card 17 months later (tenure at The Store of 79 months vs. 96 months), and have a higher default rate (45% vs. 6%).

[INSERT TABLE 1 HERE]

At the time of application for a Store credit card, borrowers in the renegotiation offer sample report an average (median) monthly income of approximately 285,000 pesos (201,000 pesos), lower than the full sample average (median) of 342,000 pesos (250,000 pesos) and the Chilean median of 360,000 pesos.¹⁷ Finally, by construction, all borrowers in the renegotiation offer sample have at least one unpaid installment, and, owe immediately 47% (35%) of their outstanding balance on average (median).

During February 2010, The Store called a subset of borrowers in the renegotiation offer sample who owed more than 50,000 pesos (the cutoff) to offer a renegotiation of the terms of repayment. The cutoff was not revealed to borrowers. The campaign was repeated in subsequent months, each month selecting borrowers who were eligible as of the previous month. Thus, borrowers in the renegotiation offer sample could receive an offer to renegotiate before write off in a subsequent month if they were again eligible during that month. In particular, approximately 10% of all borrowers in the renegotiation offer sample whose balance as of January 2010 was lower than the cutoff—who were initially ineligible for the offer—become

¹⁶Because of a confidentiality agreement with The Store, I cannot disclose the number of borrowers for any of the samples.

¹⁷Figure taken from the Chilean statistics bureau, www.inec.cl. United States 2010 median annual household income was USD49,277, roughly 1.0 MM pesos per person per month (figure taken from Census Bureau).

eligible in future months.¹⁸

Because of a capacity constraint, not all eligible borrowers were contacted by The Store. The data do not show which borrowers were called, but according to The Store’s management, approximately 30% of all eligible borrowers were contacted before write off. The remaining borrowers were either (i) not called, (ii) not available to answer the phone at the time of the call, or (iii) had provided a wrong or non-existent phone number. This fact does not affect the empirical strategy because I do not compare the behavior of borrowers who were contacted with that of those who were not contacted by The Store. Rather, this fact implies that the estimates obtained through my analysis may apply only to a selected group of borrowers and not to the entire sample.¹⁹

2.3.1. *The discontinuity in the fraction of borrowers who renegotiate before write off*

Fig. 1 shows the fraction of borrowers in the renegotiation offer sample who renegotiate their debt before write off within six months of the start of the campaign, in bins of outstanding balances of 10,000 pesos (USD20). Visual inspection reveals this fraction is discontinuously higher for borrowers whose balance as of January 2010 is higher than the cutoff than for borrowers whose balance is lower than the cutoff. The figure also shows the ordinary least squares (OLS) fitted values and 90% confidence intervals of the regression:

$$renegotiation = \omega + \pi_{above} + f(amount - 50,000) + \eta, \quad (1)$$

where *renegotiation* is a dummy that equals one if a borrower renegotiates before write off within six months, *above* is a dummy that equals one if a borrower’s initial balance is higher

¹⁸To get a better sense of this magnitude, I also estimate at 10% the fraction of borrowers who are initially ineligible and become eligible in later months if the campaign cutoff were instead 60,000 pesos (USD120). This suggests that borrowers do not manipulate their eligibility status, at least over and above what would be expected for borrowers with balances within 10,000 pesos of the cutoff.

¹⁹In the Online Appendix I explore how this selection may affect the interpretation of the results.

than the cutoff, and $f()$ is a 4th degree polynomial.²⁰ The polynomial f , depicted graphically as the smooth line on both sides of the cutoff, controls for any underlying relationship between the fraction of borrowers who renegotiate before write off and the initial balance (*amount*). The coefficient π , which in the plot corresponds to the difference in the vertical axis between the points where the left and right polynomials intersect the cutoff, is a measure of the size of the discontinuity. As per visual inspection, the discontinuity is large and significant six months after selection.²¹

[INSERT FIGURE 1 HERE]

Table 2 reports the OLS estimates of coefficient π and the constant ω of regression (1) for renegotiations before write off that occur within one, three, six, 12, and 20 months after the campaign starts, respectively. The point estimates imply that the phone campaign increases the fraction of borrowers who renegotiate before write off by 12% during the next six months. The coefficient π is significant at the 1% level and remains roughly constant thereafter, suggesting that the differential impact of the phone campaign is strongest in the first six months.

[INSERT TABLE 2 HERE]

2.3.2. *Terms of the renegotiation offer*

Phone callers are instructed to read from a script that details the renegotiation offer. These phone calls are recorded and monitored by management and follow a strict regulation

²⁰The polynomial is evaluated on *amount* – 50000 pesos so that the coefficient on *treated* corresponds to the effect of the renegotiation at the cutoff. I run all the main regressions on a subsample of borrowers in the renegotiation offer sample whose balance as of January 2010 is between 10,000 and 200,000 pesos. In the Online Appendix I present as a robustness test results using alternative parametrizations of $f()$ and different subsamples within the renegotiation offer sample. Standard errors are clustered at the “comuna” level, a Chilean geographical division comparable to a U.S. county (332 comunas in this subsample).

²¹The positive and convex relationship for balances below the cutoff shows that borrowers who were initially ineligible for the renegotiation campaign may become eligible in later months. The positive and concave relationship for balances above the cutoff can be explained by the fact that phone callers have minimum renegotiation targets to meet, in effect giving them an incentive to first target borrowers with larger balances. These two facts make it harder to find a discontinuity in the fraction of renegotiated borrowers at the cutoff.

based on consumer protection laws, which minimizes the concern that borrowers may be unduly threatened or coerced into repayment. The offer has the following terms:

1. Number of monthly installments chosen by the borrower, with a maximum that varies according to balance due (longer for higher balances), with no grace periods,
2. interest rate on outstanding balance is a function of the number of days late,
3. borrower is immediately zero days late with The Store and in good standing with the credit bureau, and
4. borrower is banned from taking on new credit at The Store until the full renegotiated balance is paid.

The first two terms imply that the renegotiation offer is equivalent to a debt rescheduling, with a higher outstanding balance spread out into more monthly installments, each with a lower required payment. Note that The Store does not offer to forgive any principal owed, and that borrowers can choose their repayment plan (i.e., it is not a take-it-or-leave-it offer). The third term brings the borrower in good standing with The Store and with the credit bureau. The final term restricts access to new credit from The Store until the entire balance is paid off.

Table 3 shows summary statistics of the terms of repayment for renegotiations before write off that occur within six months after the start of the campaign, for borrowers whose initial balance is between 50,000 and 100,000 pesos (i.e., for borrowers whose balance is at most 50,000 pesos from the cutoff and are eligible for a renegotiation). Relative to before the renegotiation, monthly installments are reduced on average (median) by 33.5% (41.7%). Note that the first payment due is reduced even more as, on average, delinquent borrowers already owe three accumulated installments. The average number of installments increases from 6.3 before the renegotiation to 11.7 after the renegotiation. Outstanding balances, calculated as the sum of all remaining installments, increase on average (median) by 31.5% (34.3%).

Clients who renegotiate before write off pay on average 5.9% of the balance up front, but 64.1% of all borrowers pay zero up front. By equating the value of the discounted payment structure and the current outstanding balance, I estimate an implied monthly interest rate (an internal rate of return) of 4.0% (3.1%) for these contracts, equivalent to an implied yearly interest rate of 48% (36.3%).²²

[INSERT TABLE 3 HERE]

2.3.3. *Renegotiation after write off*

The Store writes off the debt of borrowers who are late by more than 180 days. Within the renegotiation offer sample, 62% of all borrowers have their balance written off at some point during the 20 months after January 2010. Borrowers go on to repay 53.9% of their balance at the time of write off, conditional on any positive repayment (36% of all borrowers who are written off pay some positive amount after write off). Given that reputations are fixed for at least five years, this suggests that other motives, such as social or moral norms, are relevant for repayment in this setting. The renegotiation campaign significantly reduced the fraction of borrowers who end up in write off.²³

After write off all borrowers are contacted with an offer to lower their payments. The offer consists of a phone call or an email that notifies borrowers that they are late by more than 180 days and that their negative entry will remain in the credit information system for a long period (five years). Borrowers are subsequently offered a payment plan for their balance. Importantly, these phone calls follow regulation based on consumer protection laws in the same manner as the calls made for the renegotiation campaign.

The renegotiation upon write off is similar to the renegotiation campaign, in the sense that borrowers choose to pay a lower amount per month. For example, the average monthly

²²Ex ante contract terms do not necessarily represent what borrowers were planning to pay because they may have planned to default. However, this rate gives an order of magnitude of the actual discount rates these borrowers face.

²³In the Online Appendix I show the same graph as Fig. 1 but using write off as the outcome.

payment of borrowers whose balance as of January 2010 is between 40,000 and 50,000 pesos and who are written off in the six months after January 2010 is approximately 1,000 pesos (including borrowers who repay zero). This is much lower than the installment due as of January 2010 of roughly 12,000 pesos. However, the modifications also differ in that there is debt forgiveness after write off. If borrowers choose to make payments in full or if they are liquidity constrained, the modification after write off makes it relatively easier for borrowers to pay back The Store. Hence, absent a reputational motive for repayment, we would expect to see more repayment following a renegotiation after write off than after a renegotiation before write off.

3. Measuring the willingness to pay for a good credit reputation

3.1. Empirical implementation

The outcome of interest, ex post debt repayment, is not directly observable in the data. I construct this variable using the available data on monthly balances and transactions in the following manner. Each monthly net payment, $payments_t$, is calculated as the sum of outstanding balance reductions (payments in good standing including capital and interest), plus recoveries or payments made after write off, plus upfront payments in renegotiations, minus the value of new credit (products and cash advances),

$$payments_t = 1(\Delta balance_t < 0)(-\Delta balance_t) + 1(writeoff_t = 1)recoveries_t + 1(renegotiation_t = 1)upfront_t - 1(newcredit_t > 0)newcredit_t. \quad (2)$$

The main outcome variable, $npv(r)$, is the sum of the present value of the monthly payments normalized by the initial balance as of January 2010,

$$npv = \frac{1}{balance_{Jan2010}} \sum_{t=1}^{20} \frac{payments_t}{(1+r)^t}, \quad (3)$$

which is a function of the implied yearly discount rate r . The normalization by initial balance is made for convenience and ease of exposition, and is consistent with The Store’s view of renegotiation as a tool to increase collections. Importantly, estimates obtained via the fuzzy RD analysis may be easily converted into a monetary amount by multiplying them by the cutoff balance (50,000 pesos).

The npv measure considers repayment to The Store *net* of new credit because borrowers may endogenously choose to not renegotiate before write off and pay their delinquent amount in order to obtain new credit at The Store. In particular, this implies that the value of any new credit will be captured in the npv measure as the difference between the principal of the loan (i.e., the value of the good being purchased on credit) and the discounted ex post repayments, which include interest.²⁴

In my preferred specification I discount cash flows with yearly discount rate of 48%, equal to the average ex ante internal rate of return of the renegotiation before write off (i.e., assuming no default). Using this discount rate, the average and median npv are 36% and 28%, respectively. The minimum and maximum npv are roughly equal to -2 and +2 times the initial balance, respectively.²⁵ Note as a reference point that, as per the Fed’s Consumer Credit report, typical interest rates for consumer credit in the US are in the range of 10%–

²⁴Nevertheless, because the sample is right-truncated after 20 months, this could bias the results if some borrowers are able to obtain credit at The Store in latter months of the sample and their repayment is not observed. In the Online Appendix I examine and reject this possibility.

²⁵Payments are measured in monthly terms, so implied yearly discount rates are calculated as $12 \times$ monthly rate. I use one discount rate for all borrowers. Typical outliers of the npv variable are borrowers with very small (or large) balances who pay very large (or small) amounts, respectively, or who take on very large loans (i.e., more than ten times their balance). Because of this, I winsorize the outcome variable at the 1st and 99th percentiles. The results are robust to choices of the winsorization percentiles and to an unconditional trimming of the largest and smallest percentiles.

20%, while The Store extends credit at 20% to 50% yearly.²⁶ Thus, my preferred estimates are calculated using a discount rate that is in the high end of the range of consumer credit rates in Chile.

3.2. *The fuzzy regression discontinuity design*

Here I describe the empirical approach to measure the causal effect of renegotiation before write off on repayment. As is explained above, this causal effect captures borrowers' willingness to pay for a good credit reputation. Consider the regression model,

$$npv = \alpha + \beta \text{renegotiation} + \epsilon, \quad (4)$$

where *renegotiation* is a dummy variable that equals one if the borrower renegotiates before write off. Note first that an OLS estimate of β does not necessarily measure the causal effect of renegotiation before write off. This is because borrowers who renegotiate before write off may differ in some unobserved way from those who do not. For example, borrowers who renegotiate before write off may be those with higher incomes. Thus, they would have paid more to The Store even without a renegotiation of their debt, and OLS may result in biased estimates of the causal effect of renegotiation before write off.

I exploit the 50,000 pesos cutoff to estimate the causal effect of renegotiation before write off on repayment. Intuitively, the idea is to compare the repayment of borrowers whose balance as of January 2010 is slightly higher than the cutoff with borrowers whose balance is slightly lower than the cutoff, and to assign any difference in this repayment to the renegotiation before write off. I implement this comparison through a fuzzy RD design (Imbens and Lemieux, 2008; Lee and Lemieux, 2010; Roberts and Whited, 2013). In order to conclude that any difference in the *npv* (48%) of borrowers above and below the cutoff is caused by the renegotiation before write off, I assume that these two groups are statistically

²⁶See <http://www.federalreserve.gov/releases/g19/Current/>.

indistinguishable before the campaign. In the fuzzy RD setting, this is equivalent to assuming that the cross-sectional distribution of the unobserved residual is continuous at the 50,000 pesos cutoff.

Following Lee and Lemieux (2010), I test whether the data reject the identification assumption by examining the distribution of borrowers and the cross-sectional distribution of predetermined variables at the cutoff. First, the distribution of borrowers is relatively smooth around the cutoff, as is verified by visual inspection of the histogram shown in Fig. 2. More formally, McCrary (2008) provides a statistical test of continuity in the density of borrowers at the cutoff: the estimated test statistic is not statistically different from zero and would be found in the interval $[-0.108, 0.180]$ with a 95% probability.²⁷

[INSERT FIGURE 2 HERE]

Second, Fig. 3 shows plots of the averages for age, tenure at The Store, monthly reported income, and a dummy for 90 or more days in default, all as of January 2010, grouped in bins of 10,000 pesos (USD20) of the initial balance. The plots also show the fitted values from the borrower-level regression of each of these variables on the polynomial f and the *treated* variable. Visual inspection suggests there are no statistical discontinuities in the cross-sectional distributions of any of these variables around the cutoff. Together with the balance histogram, this result provides support for the identification assumption.

[INSERT FIGURE 3 HERE]

By substituting Eq. (1) into the regression model (4) and relabeling coefficients and the functional form \tilde{f} , I obtain the fuzzy RD reduced form:

$$npv = \alpha_0 + \beta \times \pi \times above + \tilde{f}(amount - 50,000) + \chi. \quad (5)$$

²⁷Generated with the code developed and made public by Justin McCrary, see <http://emlab.berkeley.edu/~jmccrary/DCdensity/>.

Note that, in its simplest form, the fuzzy RD setting implements a Wald estimator for β . This estimator is equal to the coefficient of *above* in regression (5), $\beta \times \pi$, divided by the coefficient on *above* in regression (1), π . Thus, the fuzzy RD procedure is akin to a setting where, conditional on $\tilde{f}(\text{amount} - 50,000)$, *above* is an instrumental variable for *renegotiation* (Hahn et al., 2001). I estimate this regression in the cross-section of borrowers in the renegotiation offer sample using a two-stage least squares (2SLS) procedure where (1) is the first stage and (4) is the second stage.

An outstanding balance that is higher than the cutoff means a borrower is more likely to be offered a renegotiation before write off, but borrowers still endogenously choose whether to accept the offer. Following Lee and Lemieux, 2010, I assume that crossing the 50,000 pesos cutoff does not affect repayment other than through the change in the probability of receiving an offer to renegotiate before write off (excludability), and that all borrowers who would find it worthwhile to renegotiate before write off below the cutoff would also find it worthwhile to renegotiate before write off above the cutoff (monotonicity). Then, β estimates the causal effect of renegotiation before write off on “compliers” of this instrument—a local average treatment effect (LATE). Compliers of this instrument are borrowers who renegotiate before write off because they owe more than the cutoff.²⁸

3.3. Results: the willingness to pay for a good credit reputation

Fig. 4 shows the average *npv* in bins of 10,000 pesos and the fitted values of the reduced form-regression (5). Visual inspection reveals the discontinuity in ex post repayments induced by the renegotiation campaign: *npv* is significantly higher for borrowers whose balance as of January 2010 is right above the cutoff relative to borrowers right below it. Given the identification assumption, the discontinuity in the average repayment at the cutoff for all

²⁸The excludability assumption is supported by the fact that no other Store policy changes discontinuously at a 50,000 pesos balance. The estimated fuzzy RD coefficients are also local in the sense that the LATE interpretation applies only to the sub-population of compliers with outstanding balances close to the cutoff. See Angrist and Pischke (2008), Chapter 6, for details.

borrowers in the renegotiation offer sample (i.e., the reduced-form estimate) is attributed to the renegotiation before write off, which causally increases ex post repayment.²⁹

[INSERT FIGURE 4 HERE]

I formalize the intuition conveyed by the graph with regression tests. Column 1 in Table 4 reports the coefficients of a simple OLS estimation of regression on a sample of borrowers in the renegotiation offer sample whose balance as of January 2010 is between 50,000 pesos and 200,000 pesos (borrowers who are eligible for a renegotiation). The coefficient β^{OLS} equals 0.3052 and is significant at the 1% level: borrowers who renegotiate before write off pay a relatively larger fraction of their balance than borrowers who do not.

[INSERT TABLE 4 HERE]

Column 2 in Table 4 reports the results of the fuzzy RD regression (5). The coefficient β equals 0.3182 and is statistically significant at the 5% level. To get a sense of the magnitude of this effect, this result implies that renegotiation before write off causes borrowers whose balance is equal to 50,000 to pay an extra amount equivalent to 11% their median monthly income.³⁰ The result is also remarkably similar to the OLS estimate. This fact is consistent with a setting in which, conditional on borrower eligibility, the offer to renegotiate is randomly assigned and always accepted.

A lower monthly payment induces borrowers to start making payments in full in order to obtain a good credit reputation. Had they not been offered a renegotiation, borrowers could have also renegotiated after write off and reduced their monthly payment. Critically, borrowers can no longer obtain a clean credit record after write off. By comparing the

²⁹The Online Appendix shows four additional fuzzy RD regressions assuming “placebo” discontinuities at other cutoffs close to 50,000 pesos, using the same specification and interval width as is presented here. In all cases, the results show no discontinuity at these cutoffs.

³⁰The median income of borrowers whose balance is within 10,000 pesos of the cutoff is 150,000 pesos, so $\frac{0.318 \times 50,000}{150,000} = 0.11$.

repayment of borrowers above and below the cutoff through the fuzzy RD, I disentangle what fraction of these repayments is made to have a good credit reputation.

Note that this estimate is most likely a lower bound on the maximum willingness to pay for a good credit reputation because some borrowers would presumably have been willing to pay higher renegotiated installments for the same period of time. Further, the presence of borrowers in the sample who were liquidity constrained and unable to repay even after the renegotiation lowered their required repayment also biases this coefficient to zero.

3.4. *How long does the good credit reputation last for?*

Borrowers who renegotiate acquire a good credit reputation for as long as they remain in good standing. To estimate the length of this period, I estimate the fuzzy RD regression using $default(m)$ as the outcome. This variable is defined as a dummy that equals one if the borrower is at least 30 days late in her payments to The Store m months after January 2010.³¹ The results are reported in columns 3, 4, 5, and 6 of Table 4 for $m = 1, 4, 5$, and 12, respectively. I show results for these specific values of month m to illustrate the general pattern of default rates after the renegotiation campaign starts. One month after the campaign starts, renegotiation causally reduces the default rate by 60%, but the causal effect on default becomes statistically insignificant after month four. This evidence is consistent with Haughwout et al., 2009, who document a high re-default rate for subprime borrowers who modify their mortgages in the United States.

I interpret this result as follows. Renegotiation before write off mechanically reduces default in the first months of the campaign because delinquent borrowers are immediately transitioned to zero days late at The Store. Then, borrowers choose to pay some monthly installments and remain in good standing, which gives them a good credit reputation. The

³¹I use 30 days as The Store reports delinquent borrowers to the credit bureau even before this period. Results using different default windows (60, 90, 120, and 180 days) share the same pattern but vary in the length of the period of good reputation.

evidence suggests that borrowers only buy a temporary good credit reputation that lasts, on average, for at most four months. The estimated coefficient on the value of a good credit reputation should then be understood relative to this time period: on average, borrowers are willing to pay 11% of their monthly income for four months of good credit reputation.

3.5. *Robustness: discount rates*

Table 5 studies how the causal effect of renegotiation before write off varies with the discount rate. The estimated coefficient β varies from 16% when the implied yearly discount rate is 96% yearly, to 37% with a discount rate of 36% per year. The coefficients are significantly different from zero at least at a 10% significance level for yearly discount rates below 84%.

It is not surprising that statistical significance is lost for relatively high discount rates. Renegotiations reduce initial payments but increase the number of installments. Higher discount rates put relatively more weight on the initial, lower payments. This results in positive but insignificant estimates when the implied yearly discount rates are equal to 84% or higher. As such, the results hold under the implicit assumption that if one discount rate may be applied to all borrowers, this rate is no larger than 84%.³²

[INSERT TABLE 5 HERE]

4. Access to credit with other lenders

A test of whether a good credit reputation has value is if borrowers make use of it (or, “cash in” on their reputation) by increasing their debt with other lenders. I collect an

³²Borrowers who renegotiate may have a higher discount rate than those who do not. For example, borrowers who renegotiate may have a relatively higher propensity or need to consume in the short run. However, my results also hold when the monthly discount rate of borrowers who renegotiate within six months is increased by a spread of 50–100 basis points (bps) (a yearly spread of 6%–12%) relative to borrowers who do not renegotiate.

individual-level data set of bank debt aggregated across all banks in Chile for borrowers in the renegotiation offer sample. I use these data to test whether acquiring a good credit reputation through a renegotiation before write off allows borrowers to increase their bank debt. In principle, the same fuzzy RD design from previous sections could be used to measure this effect. However, this is not possible given the structure of the data. Due to privacy concerns, the bank debt data were provided to me at the borrower-level, but with invented identification numbers. Therefore, the data are not matched to other borrower characteristics, and in particular, to the outstanding balance at The Store as of January 2010.

Because a fuzzy RD strategy is infeasible, I base my identification on a differences-in-differences approach. This strategy rests on the assumption that borrowers who as of January 2010 owed more than the cutoff by a sufficiently small amount, for example, 10,000 pesos (USD20), would have had time trajectories of the outcome variables that are similar to borrowers who owed less than the cutoff, absent the renegotiation campaign. I refer to the group of borrowers in the renegotiation offer sample who as of January 2010 owe between 50,000 and 60,000 pesos as the Above group, and borrowers who as of January 2010 owe between 40,000 and 50,000 pesos as the Below group.³³ I obtain, through SINACOFI, an aggregator and distributor of financial information, two separate data sets, one for the Above group and another for the Below group, with individual-level bank debt data for the months of December 2009, December 2010, March 2011, and April 2011. If the identification assumption is valid, the outcomes of the Below group provide a valid counterfactual for the Above group.³⁴

To motivate the identification assumption, Table 6 reports the cross-sectional means and

³³The results using a window of 5,000 pesos (USD10) around the cutoff are quantitatively and qualitatively similar, although some statistical power is lost.

³⁴The diffs-in-diffs identification strategy is essentially a “discretization” of the regression discontinuity design, where the latter can be understood as the limiting case of the former when the interval width converges to zero. The fuzzy RD strategy is thus “better” than the diffs-in-diffs because the “Below” group, in this case borrowers below the cutoff, is identical to the “Above” group, borrowers above the cutoff.

standard deviations of some variables in The Store data set as of January 2010 and in the bank data set as of December 2009, for the Above and Below groups and for both groups combined (denoted as the Full Sample). Both groups should, in theory, be quite similar before the renegotiation offer given that they differ on average by only USD20 in their balance at The Store. Indeed, as per the t-stats reported in the last column of Table 6, the means of almost all variables are not statistically different between the Above and Below groups. Three variables are statistically different between both groups: internal credit score at The Store (difference equals 4% of that variable’s standard deviation), mortgage debt balance (4.8% of standard deviation), and fraction of borrowers in default (2.4% of standard deviation). But these differences are not economically important relative to their standard deviations, suggesting they would hardly result by themselves in a differential change in access to bank debt in the future.

[INSERT TABLE 6 HERE]

Nevertheless, the concern with a differences-in-differences identification strategy is not that borrowers above and below the cutoff are different ex ante but that they have different time trends in outcomes. I study this using variables from the data provided by The Store for which the longer time series is available—no earlier time series data are available for the bank debt data. Fig. 5 shows time series plots of the average balance at The Store, days late, internal credit score, and fraction of borrowers who are late by more than 90 days, displayed separately for Above and Below groups for six months before selection into the renegotiation offer sample. Visual inspection reveals that the graph lines of both groups are parallel for all four variables. This suggests that the Below group provides a valid counterfactual for the Above group, notwithstanding the ex ante cross-sectional differences.

[INSERT FIGURE 5 HERE]

The effect of the renegotiation offer on bank debt can be tested using a specification with fixed effects and time trends for each month where data are available,

$$Debt_{it} = \alpha_i + \xi_t + \omega post_t + \beta above_i \times post_t + \epsilon_{i,t}, \quad (6)$$

where $above_i$ equals one if borrower i is in the Above group and $post_t$ equals one if t is month December 2010, March 2011, or April 2011. The coefficient of interest is β , the interaction of $post_t$ and $above_i$, which measures the differential change in debt for Above borrowers relative to Below borrowers after the renegotiation campaign. α_i and ξ_t are borrower and month fixed effects. Individual fixed effects are included to increase the precision of the estimates, as they are irrelevant if the identification assumption holds.

4.1. *Results: the effect of an improved reputation on the access to external credit*

Columns 1 through 4 of Table 7 report the regression results of the differences-in-differences specification (6) when the outcomes are total debt in good standing, consumer debt, commercial debt (i.e., debt used for commercial purposes), and mortgage debt. The effect on total bank debt in good standing (column 1) is positive and significant. Thus, bank debt in good standing is roughly 210,000 pesos (USD500) or 6% higher for the Above group relative to the Below group after the renegotiation campaign. Note that the average trend after the campaign is negative for Below borrowers (a decrease of 81,000 pesos as per the coefficient on $post$), whereas Above borrowers on average reverse the trend and increase their average debt in good standing (the sum of $post$ and $post \times treated$ is 129,000 pesos).

[INSERT TABLE 7 HERE]

Columns 2 through 4 of Table 7 show that the increase in debt is driven only by mortgages: on average, Above group borrowers increase their mortgage debt by approximately 206,000

pesos more than the Below group borrowers (approximately a 10% increase). Note that consumer debt (column 2) is insignificantly higher for the Above group. This suggests that, on average, borrowers are not taking out a new consumer loan to pay back the renegotiated balance at The Store. Finally, columns 5 and 6 examine whether the effect on mortgage debt is driven by existing borrowers taking on new debt, or by new bank borrowers. The reputation story hinges on the notion that banks may not distinguish good and bad quality borrowers after the renegotiation. Thus, the effect on mortgages should be noticeable for borrowers who did not have a mortgage before the campaign. Column 5 shows a significant effect on mortgage debt for borrowers who did not have a mortgage in the preperiod, while column 6 shows that this effect is not statistically significant for borrowers who did have a mortgage.³⁵

These results are consistent with the notion that borrowers value a good credit reputation because it allows them to access credit markets in the future. Note that borrowers who renegotiate before write off cannot consume on credit at The Store until their full renegotiated balance is paid off, which suggests an intertemporal trade off of consumption at The Store for access to credit. This trade off is of first-order importance for a consumer planning to buy a house. Borrowers may be able to substitute consumption at The Store through other department stores, but this margin cannot be tested in this study.

Note that the results are equilibrium outcomes obtained under the new information regime. A better test of the effect that a clean credit record has on credit supply would focus on the interest rates borrowers obtain after the renegotiation. These rates are unfortunately not available in the bank debt data. My interpretation of the results assumes that credit supply is positively affected by reputation, either through an effect on the extensive margin (i.e., providing access to borrowers who could not borrow before) or on the intensive margin (i.e., through a reduction in interest rates).

³⁵Home equity lines of credit (HELOCs) and refinancing are not common in the Chilean mortgage market.

4.1.1. A comment on the magnitude

The reported increase in bank debt is quantitatively higher than The Store campaign cutoff. But the time-zero value of a good credit reputation represents an option to obtain access to formal credit and better terms of repayment. Thus, observed differences in equilibrium quantities do not necessarily correspond to the value that borrowers obtain from a good credit reputation. For example, a good credit reputation may allow borrowers to obtain a lower interest rate in their mortgage through a formal lender. Therefore, their willingness to pay would be (at least) the amount of the mortgage loan multiplied by the reduction in interest rates (which are not available in the data). Further, the signal of creditworthiness also depends on the repayment status of all the debts outstanding that individuals may have. I do not observe total debt with all lenders, but the assumption is that both Below and Above groups have similar levels and equivalent trends of total debt outstanding before the renegotiation. Finally, borrowers use their reputation to take a mortgage. Because of indivisibilities in housing investment, mortgage loans are relatively large. This naturally renders relatively large differences in the average level for both groups of borrowers.

If this effect is large, then why don't more borrowers renegotiate? One possible answer is that, since the lender has the discretion to modify the borrower's information that is reported to the credit bureau, borrowers may believe that a renegotiation initiated by them will not result in an improvement of their reputation. This would lower the incentive to proactively renegotiate. Second, there is a price to pay, in the form of a higher total repayment to The Store. Potentially, some borrowers prefer to pay (or not pay) their current installments, in particular if their value of a good credit reputation is lower (e.g., if they do not foresee accessing formal credit markets in the short term).

4.2. *Externality effect on other lenders*

I study the effects of The Store’s renegotiation policy on the credit decisions of other agents that use the credit bureau. Note that to users of the credit bureau, borrowers who renegotiate before write off become indistinguishable from other individuals in good standing. Thus, in the presence of renegotiation before write off, banks may end up lending to a pool of borrowers that is less creditworthy. I study this claim by looking at the default rates of borrowers in the Below and Above groups. Column 7 of Table 7 reports the regression results when the outcome variable is a dummy that equals one if the borrower is in default, conditional on having bank debt. The interaction coefficient ($post \times above$) is the average increase in default rates for the Above group relative to before the campaign starts and relative to the Below group. The point estimate is 2.9%, statistically significant. Thus, individuals in the Above group are ex post relatively worse payers than those in the Below group. This relative increase in the default rate is large when compared to the baseline default rate of 33% (as per Table 6).

Column 8 of Table 7 shows that the increase in defaults is not necessarily driven by the higher level of debt reported in column 1. Indeed, bank debt in default as a fraction of outstanding balance, a measure of default that controls for the level of debt, is 2.3% higher for Above borrowers relative to Below borrowers after the renegotiation campaign. Therefore, more Above borrowers default, and the amount in default is a larger fraction of their balances.

This result suggests that the renegotiation campaign imposes a negative informational externality on banks by pooling less creditworthy borrowers together with borrowers in good standing. The result is not conclusive because lenders may be able to price in this higher risk through interest rates, which are unobservable to the econometrician. However, that equilibrium may entail credit rationing as in Stiglitz and Weiss (1981).

One possible interpretation for this result is that both The Store and borrower understand

this effect and collude to extract rents from banks. This externality effect has not been documented by the theoretical literature, which has assumed that renegotiations are an ex post efficient outcome of a mutually beneficial bilateral agreement. Rather, this effect is similar in spirit to Aghion and Bolton (1987), who show how optimal bilateral contracts may be socially inefficient. Further, this result illustrates the fundamental disconnect that exists between a borrower’s true willingness to repay a loan and the same borrower’s credit reputation, and also the potential problems that arise in the design of information-sharing mechanisms, like credit bureaus, if agents can manipulate the information they report.

5. Conclusion

This paper studies borrower reputation in consumer credit markets. Specifically, the paper makes two main contributions. First, using a natural experiment, I quantify borrowers’ willingness to pay for a good credit reputation. This is a quantitative assessment of a cost of default that may help sustain repayment in uncollateralized credit markets. I show that borrowers value a temporary good credit reputation because it gives the option to access formal credit markets. Other margins through which a good reputation may be valuable, like future access to jobs, cannot be tested in this study due to lack of data.

The paper’s second contribution is to show that debt contract renegotiations may have negative welfare effects by imposing an information externality on other lenders. A reasonable but speculative conjecture is that this entails credit rationing (e.g., Stiglitz and Weiss, 1981). However, a welfare analysis of the renegotiation mechanism is outside the scope of this paper.

The results are relevant in at least two dimensions. First, the design of debt contracts should consider that households value having a good repayment record. Failure to account for this may result in lower repayment or contract take-up. This fact may help explain the relatively unsuccessful history of the various loan modification programs implemented in the

US mortgage markets following the financial crisis.

Second, credit bureaus as information-sharing mechanisms should consider the potential for strategic manipulation. These sharing mechanisms are a prevalent feature of credit markets worldwide (Miller, 2003; Jappelli and Pagano, 2002, 2006; Djankov et al., 2007). A better understanding of the contracting implications of this manipulation could potentially help in the design of more robust credit information systems.

References

- Adelino, M., Gerardi, K., Willen, P. S., 2013. Why don't lenders renegotiate more home mortgages? Redefaults, self-cures and securitization. *Journal of Monetary Economics* 60, 835–853.
- Agarwal, S., Amromin, G., Ben-David, I., Chomsisengphet, S., Evanoff, D., 2011. The role of securitization in mortgage renegotiation. *Journal of Financial Economics* 102, 559–578.
- Aghion, P., Bolton, P., 1987. Contracts as a barrier to entry. *American Economic Review* 77, 388–401.
- Angrist, J. D., Pischke, J.-S., 2008. Mostly harmless econometrics: An empiricist's companion. Princeton University Press, Princeton, NJ.
- Barren, J., Staten, M., 2003. The value of comprehensive credit reports: lessons from the US experience. In: Miller, M. J. (Ed.), *Credit Reporting Systems and the International Economy*, vol. 8. MIT Press, Cambridge, MA, pp. 273–310.
- Brown, M., Zehnder, C., 2007. Credit reporting, relationship banking, and loan repayment. *Journal of Money, Credit and Banking* 39, 1883–1918.
- Bulow, J., Rogoff, K., 1989a. A constant recontracting model of sovereign debt. *Journal of Political Economy* 97, 155–178.
- Bulow, J., Rogoff, K., 1989b. Sovereign debt: Is to forgive to forget? *American Economic Review* 79, 43–50.
- Cadena, X., Schoar, A., 2011. Remembering to pay? Reminders vs. financial incentives for loan payments. NBER Working Paper No. 17020.

- Cowan, K., De Gregorio, J., 2003. Credit information and market performance: The case of Chile. In: Miller, M. J. (Ed.), *Credit Reporting Systems and the International Economy*, vol. 4. MIT Press, Cambridge, MA, pp. 163–201.
- De Janvry, A., McIntosh, C., Sadoulet, E., 2010. The supply- and demand-side impacts of credit market information. *Journal of Development Economics* 93, 173–188.
- Diamond, D. W., 1989. Reputation acquisition in debt markets. *Journal of Political Economy* 97, 828–862.
- Djankov, S., McLiesh, C., Shleifer, A., 2007. Private credit in 129 countries. *Journal of Financial Economics* 84, 299–329.
- Eaton, J., Gersovitz, M., 1981. Debt with potential repudiation: Theoretical and empirical analysis. *Review of Economic Studies* 40, 289–309.
- Fuster, A., Willen, P., 2012. Payment size, negative equity, and mortgage default. Federal Reserve Bank of New York Staff Report No. 582.
- Gorton, G., 1996. Reputation formation in early bank note markets. *Journal of Political Economy* 104, 346–397.
- Hahn, J., Todd, P., Van der Klaauw, W., 2001. Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica* 69, 201–209.
- Haughwout, A., Okah, E., Tracy, J., 2009. Second chances: subprime mortgage modification and re-default. Federal Reserve Bank of New York Staff Report No. 417.
- Hunt, R. M., 2006. Development and regulation of consumer credit reporting in the United States. In: Bertola, G., Disney, R., Grant, C. (Eds.), *The Economics of Consumer Credit*. MIT Press, Cambridge, MA, pp. 301–345.

- Imbens, G. W., Lemieux, T., 2008. Regression discontinuity designs: A guide to practice. *Journal of Econometrics* 142, 615–635.
- Jappelli, T., Pagano, M., 2002. Information sharing, lending and defaults: Cross-country evidence. *Journal of Banking & Finance* 26, 2017–2045.
- Jappelli, T., Pagano, M., 2006. The role and effects of credit information sharing. In: Bertola, G., Disney, R., Grant, C. (Eds.), *The Economics of Consumer Credit*. MIT Press, Cambridge, MA, pp. 347–371.
- Karlan, D., McConnell, M., Mullainathan, S., Zinman, J., 2010. Getting to the top of mind: How reminders increase saving. NBER Working Paper No. 16205.
- Kast, F., Meier, S., Pomeranz, D., 2012. Under-savers anonymous: Evidence on self-help groups and peer pressure as a savings commitment device. NBER Working Paper No. 18417.
- Keys, B. J., Mukherjee, T., Seru, A., Vig, V., 2010. Did securitization lead to lax screening? Evidence from subprime loans. *Quarterly Journal of Economics* 125, 307–362.
- Lee, D. S., Lemieux, T., 2010. Regression discontinuity designs in economics. *Journal of Economic Literature* 40, 281–355.
- Livingston, J. A., 2005. How valuable is a good reputation? a sample selection model of internet auctions. *Review of Economics and Statistics* 87, 453–465.
- Mayer, C., Morrison, E., Piskorski, T., Gupta, A., 2014. Mortgage modification and strategic behavior: Evidence from a legal settlement with Countrywide. *American Economic Review* 104, 2830–2857.
- McCrary, J., 2008. Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142, 698–714.

- Mian, A., Sufi, A., 2009. The consequences of mortgage credit expansion: Evidence from the US mortgage default crisis. *Quarterly Journal of Economics* 124, 1449–1496.
- Miller, M. J., 2003. Credit reporting systems around the globe: the state of the art in public and private credit registries. In: Miller, M. J. (Ed.), *Credit Reporting Systems and the International Economy*, vol. 1. MIT Press, Cambridge, MA.
- Musto, D. K., 2004. What happens when information leaves a market? Evidence from postbankruptcy consumers. *Journal of Business* 77, 725–748.
- Navarro-Martinez, D., Salisbury, L. C., Lemon, K. N., Stewart, N., Matthews, W. J., Harris, A. J., 2011. Minimum required payment and supplemental information disclosure effects on consumer debt repayment decisions. *Journal of Marketing Research* 48, S60–S77.
- Padilla, A., Pagano, M., 2000. Sharing default information as a borrower discipline device. *European Economic Review* 44, 1951–1980.
- Pagano, M., Jappelli, T., 1993. Information sharing in credit markets. *Journal of Finance* 48, 1693–1718.
- Piskorski, T., Seru, A., Vig, V., 2010. Securitization and distressed loan renegotiation: Evidence from the subprime mortgage crisis. *Journal of Financial Economics* 97, 369–397.
- Roberts, M. R., Whited, T. M., 2013. Endogeneity in empirical corporate finance. In: Constantinides, G. M., Harris, M., Stulz, R. M. (Eds.), *Handbook of the Economics of Finance*, vol. 2A. Elsevier, North Holland, pp. 493–572.
- Stewart, N., 2009. The cost of anchoring on credit-card minimum repayments. *Psychological Science* 20, 39–41.
- Stiglitz, J. E., Weiss, A., 1981. Credit rationing in markets with imperfect information. *American Economic Review* 71, 393–410.

Table 1

Summary statistics

This table reports means and standard deviations (SD) as of January 2010: “Balance” is the debt balance at The Store in thousands of pesos (approximately 500 pesos per dollar), “Age” is the age in years, “Tenure” is the number of months since the client first took on credit at The Store, “Female” is the fraction of female borrowers, “Monthly income” is the borrower’s reported monthly income in thousands of pesos at the time of application for The Store’s credit card, “Credit score” is The Store’s internal credit score, “Late > 90 days” represents the fraction of borrowers who are late by more than 90 days, “Fraction late” represents the fraction of the borrower’s balance that is late. “Full sample” corresponds to borrowers at The Store with a positive balance as of January 2010. “Renegotiation offer sample” borrowers are the subset of “Full sample” borrowers that: (1) are late by more than 30 days and less than 180 days, (2) had first used The Store credit card at least six months earlier, and (3) had renegotiated before write off at most once during the last year and twice in the last three years.

	Full sample		Renegotiation offer sample	
	Mean	St. dev.	Mean	St. dev.
Balance ('000 pesos)	397.07	720.94	587.87	995.53
Age (years)	44.72	13.43	41.78	13.38
Tenure (months)	96.35	73.65	78.97	65.23
Female	0.571	0.495	0.532	0.499
Monthly income ('000 pesos)	341.68	475.76	285.15	462.67
Credit score	578.14	132.80	474.95	56.21
Late > 90 days	0.062	0.240	0.450	0.497
Fraction late	0.104	0.261	0.474	0.350

Table 2

Effect of phone campaign on probability of renegotiation before write off

This table shows the effect of the phone campaign on the fraction of renegotiations. The table reports the constant $\omega(n)$ and the coefficient $\pi(n)$ of the regression:

$$\text{renegotiation}(n) = \omega(n) + \pi(n) \text{ above} + f(\text{amount} - 50,000) + \epsilon,$$

where the outcome $\text{renegotiation}(n)$ is a dummy variable that equals one if borrower renegotiates between one and n months after January 2010, for months $n \in \{1, 3, 6, 12, 20\}$, on *above*, a variable that equals one if the borrower owes more than 50,000 pesos as of January 2010 and zero if she owes less, and $f(\text{amount} - 50,000)$, a 4th degree polynomial of the outstanding balance at The Store as of January 2010. Regressions are run on the sample of borrowers in the renegotiation offer sample who as of January 2010 owe between 10,000 and 200,000 pesos ($N = 51,622$). Standard errors are clustered at the “comuna” level (332 comunas), a Chilean geographical division similar to a US county. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Outcome	<i>renegotiation</i> (n)				
n	1	3	6	12	20
<i>above</i>	0.0740*** (0.005)	0.1129*** (0.007)	0.1204*** (0.008)	0.1182*** (0.008)	0.1144*** (0.009)
<i>Constant</i>	0.0069*** (0.001)	0.0181*** (0.002)	0.0248*** (0.003)	0.0380*** (0.003)	0.0501*** (0.003)
R^2	0.032	0.062	0.076	0.076	0.070

Table 3

Summary statistics for renegotiations before write off

This table shows means, medians, and standard deviations for variables related to the renegotiations that occur within six months after the campaign starts, for borrowers in the renegotiation offer sample whose outstanding balance as of January 2010 is between 50,000 and 100,000 pesos. “Installment increase” is the increase in installment amount as a fraction of the installment before the renegotiation; “Number of installments before offer” is the estimated average number of installments remaining before the renegotiation offer; “Number of installments after offer” corresponds to the average number of installments after renegotiation; “Amount increase” is the increase of the debt balance due to the renegotiation as a fraction of balance before the renegotiation; “Upfront payment as a % of amount” corresponds to the upfront payment as a fraction of the renegotiated outstanding balance; “Frac. borrowers with no upfront” corresponds to the fraction of borrowers who renegotiate their loan and do not make an upfront payment; “Implied yearly interest rate” corresponds to the implied yearly interest rate that makes the discounted value of installments equal to the loan balance as of January 2010, shown as $12\times$ monthly rate.

Variable	Mean	Median	St. dev.
Installment increase	-0.335	-0.417	0.486
Number of installments before offer	6.27	5.00	20.24
Number of installments after offer	11.66	12.00	3.38
Amount increase	0.315	0.343	0.184
Upfront payment as % of amount	0.059	0.000	0.120
Frac. borrowers with no upfront	0.641	1.000	0.480
Implied yearly interest rate	0.480	0.372	0.396
N		2,735	

Table 4

The willingness to pay for a good credit reputation

This table reports the effects of renegotiation before write off on ex post repayment and on default rates. The first two columns are based on the regression

$$npv = \alpha + \beta \text{renegotiation} + \epsilon,$$

of the outcome npv , the discounted sum of payments for 20 months after January 2010 over the initial balance using a 48% yearly discount rate on $renegotiation$, a dummy that equals one if a borrower in the renegotiation offer sample renegotiates her debt within six months after January 2010. Column 1 corresponds to the OLS regression on a sample of borrowers in the renegotiation offer sample whose outstanding balance is between 50,000 and 200,000 pesos as of January 2010 ($N = 33,636$). Column 2 shows the fuzzy RD estimates, which are implemented using a 2SLS procedure as described in the text on borrowers in the renegotiation offer sample whose outstanding balance as of January 2010 is between 10,000 and 200,000 pesos ($N=51,622$). Columns 3 through 6 repeat the fuzzy RD regression with the outcomes $default(1)$, $default(4)$, $default(5)$, and $default(12)$ which correspond to whether a borrower is 30 days late as of *one* month, *three* months, *five* months, and 12 months after January 2010, respectively. Standard errors are clustered at the “comuna” level (332 clusters), a Chilean geographical division similar to a US county. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	npv	npv	$default(1)$	$default(4)$	$default(5)$	$default(12)$
$renegotiation$	0.3052*** (0.007)	0.3182** (0.152)	-0.6046*** (0.0903)	-0.2928*** (0.0956)	-0.0676 (0.0991)	0.0051 (0.0918)
$constant$	0.3644*** (0.007)	0.4084*** (0.017)	0.7753*** (0.0109)	0.5648*** (0.0114)	0.5563*** (0.0110)	0.5839*** (0.0105)
R^2	0.043	0.016	0.000	0.109	0.04	0.017
Estimate	OLS	Fuzzy RD	Fuzzy RD	Fuzzy RD	Fuzzy RD	Fuzzy RD

Table 5

Robustness: different discount rates

This table shows how the estimated willingness to pay for a good credit reputation varies with the rate used to discount ex post repayment. The table shows the fuzzy RD coefficients using $npv(r)$ as the outcome for different values of r , where r is the yearly discount rate. Details of the estimation are as in Table 4 above. Standard errors are clustered at the “comuna” level (332 comunas), a Chilean geographical division similar to a US county. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Outcome			npv		
discount rate r	36%	60%	72%	84%	96%
<i>renegotiation</i>	0.3705** (0.164)	0.2740* (0.144)	0.2353* (0.137)	0.2020 (0.132)	0.1641 (0.128)
<i>constant</i>	0.4334*** (0.018)	0.3873*** (0.016)	0.3681*** (0.015)	0.3522*** (0.015)	0.3378*** (0.014)
R^2	0.017	0.016	0.015	0.013	0.012

Table 6

Descriptive statistics

This table shows summary statistics of the cross-section of borrowers in the renegotiation offer sample that owe between 40,000 and 60,000 pesos at The Store as of January 2010 (All), and by subsamples: Above (who owe between 50,000 and 60,000 pesos) and Below (owe between 40,000 and 50,000 pesos). “Balance,” “Tenure,” “Credit score,” and “Late>90” days refer to Store credit and are self explanatory. “Debt” is the aggregate debt with banks in thousand pesos; “Consumer,” “Commercial,” and “Mortgage” correspond to the average aggregate (across banks) debt broken down by type of debt; “Fraction bank debt” is the fraction of borrowers who have a positive balance with banks; “Default” is the fraction of borrowers with outstanding bank debt that are in default with respect to their bank debt; “Frac default” is the borrower’s total bank debt in default divided by the borrower’s outstanding bank debt balance. All Store variables are as of January 2010, while all bank debt variables are as of December 2009. The t -stat column shows the t -stat of the difference between the average variable for the Below group and the average variable for the Above group; ** represents significance at the 95% level.

Sample	All ($N = 6,837$)		Above ($N = 3,427$)		Below ($N = 3,410$)		t -Stat
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.	
<i>As of 01/2010</i>							
Balance ('000 pesos)	49.92	5.74	54.86	2.88	44.96	2.92	-140.00**
Tenure (months)	70.72	63.42	70.77	64.13	70.69	62.71	-0.06
Credit score	483.0	59.6	480.8	63.4	485.3	55.5	3.16**
Late>90 days	0.429	0.495	0.434	0.496	0.424	0.494	-0.83
<i>As of 12/2009</i>							
Debt ('000 pesos)	3,655.68	14,478.04	3,568.20	16,197.74	3,743.59	12,515.73	0.50
Consumer	1,329.19	3,404.88	1,372.52	3,412.92	1,285.65	3,396.73	-1.05
Commercial	511.50	9,736.04	569.53	12,215.91	453.19	6,332.63	-0.49
Mortgage	1,814.97	7,905.63	1,626.15	7,195.44	2,004.74	8,557.07	1.98**
Fraction bank debt	0.518	0.500	0.521	0.500	0.515	0.500	-0.56
Default	0.326	0.469	0.344	0.475	0.309	0.462	-2.21**
Frac default	0.088	0.238	0.091	0.238	0.086	0.238	-0.59

Table 7

The effect of a good reputation on access to credit and default rates

This table shows that a good reputation is valuable because it allows borrowers to have more debt with banks, and that ex post, renegotiated borrowers have a higher propensity to default on their bank debt. The table shows the coefficients on *post* and *post* \times *above* for the regression

$$outcome_{it} = \alpha_i + \xi_t + \omega post_t + \beta post_t \times above_i + \epsilon_{it},$$

where the outcomes are: bank debt in good standing (1), consumer (2), commercial (3), and mortgage debt (4) with banks. α_i and ξ_t are individual and time fixed effects, respectively. Columns 5 and 6 run the same regression as column 4 but restricted to the sample of borrowers who initially had no mortgage (“No mortg.”) and who had a mortgage (“W/mortg.”) as of December 2009, before the renegotiation campaign. Columns 7 and 8 use a dummy that equals one if the borrower is in default with respect to her bank debt (7) (default), and the fraction of outstanding bank debt that is in default (8) as outcomes. The sample corresponds to borrowers in the renegotiation offer sample that owe between 40,000 and 60,000 pesos at The Store as of January 2010. All regressions include month and individual fixed effects. Standard errors are clustered by individual. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. variable	Debt	Consumer	Commercial	Mortgage	Mortgage	Mortgage	Default	Frac default
<i>post</i>	-81.11 (72.95)	-22.63 (26.55)	34.17 (28.80)	23.47 (46.51)	125.82*** (32.56)	-809.86** (329.60)	0.0379*** (0.0112)	0.0798*** (0.0066)
<i>post</i> \times <i>above</i>	209.87* (114.39)	42.02 (46.88)	-26.87 (39.63)	206.37** (84.65)	179.66*** (69.59)	325.00 (561.82)	0.0285* (0.0161)	0.0230** (0.0096)
Sample	All	All	All	All	No mortg.	W/mortg.	All	All
R^2	0.002	0.001	0.000	0.002	0.005	0.006	0.008	0.085
Obs.	27,348	27,348	27,348	27,348	24,544	2,804	13,681	13,681
Clusters	6,837	6,837	6,837	6,837	6,136	701	3,893	3,893

Fig. 1. Fraction of borrowers who renegotiate before write off. The figure shows the average fraction of borrowers in the renegotiation offer sample (as defined above) who renegotiate their loans before write off between one and six months after January 2010, in bins of 10,000 Chilean pesos (USD20), and the fitted values and 90% confidence intervals from the regression model,

$$renegotiation = \alpha_0 + \pi_{above} + f(amount - 50,000) + \epsilon,$$

where the outcome variable *renegotiation* is an indicator that equals one if the borrower renegotiates the loan within six months after selection into the renegotiation offer sample, on *above*, a variable that equals one if the borrower owes more than 50,000 pesos as of Jan 2010 and zero if she owes less, and $f(amount - 50,000)$, a 4th degree polynomial of the outstanding balance at The Store as of January 2010. The sample corresponds to borrowers in the renegotiation offer sample who as of January 2010 owe between 10,000 and 200,000 pesos ($N = 51,622$). The dashed vertical line represents the 50,000 pesos campaign cutoff. Standard errors are clustered at the “comuna” level (332 comunas), a Chilean geographical division similar to a US county.

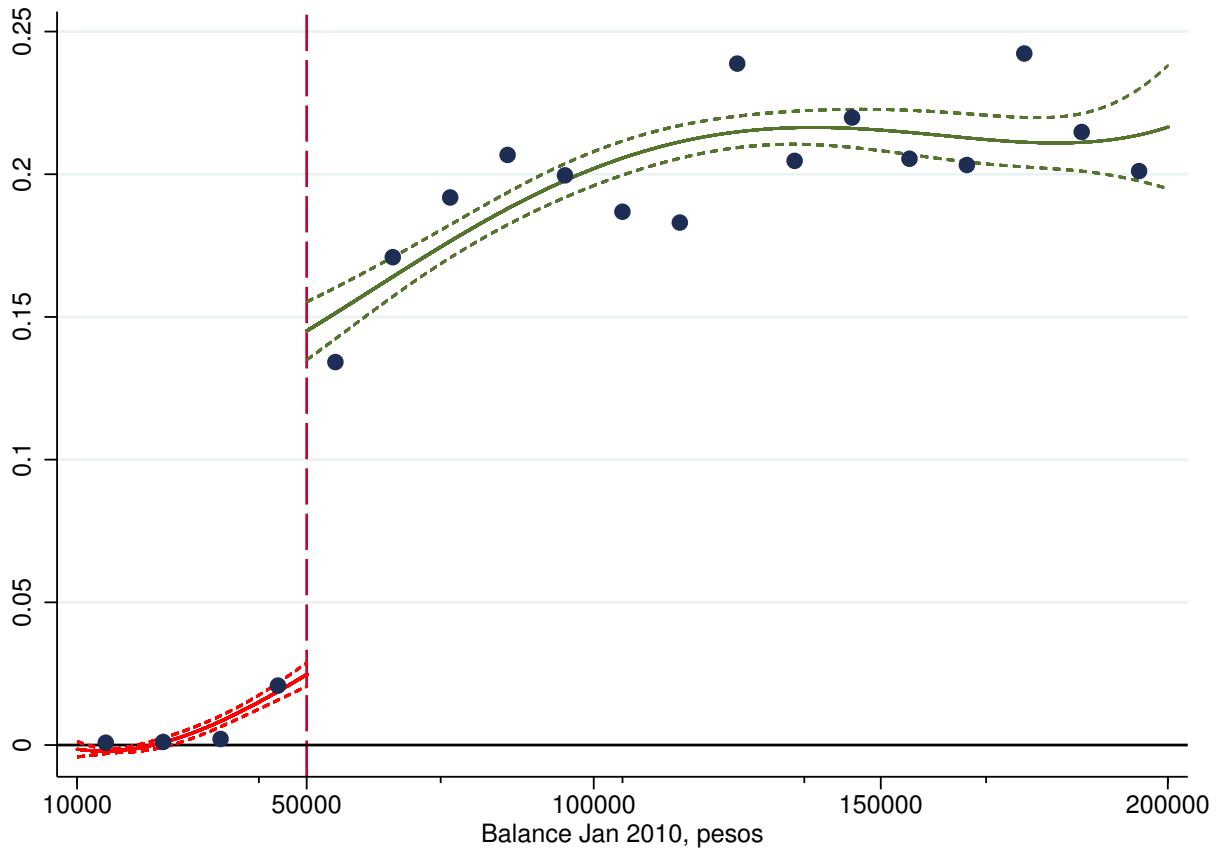


Fig. 2. Histogram of January 2010 store debt balance. This figure shows that borrowers do not manipulate the amount they owe to be on either side of the cutoff before the renegotiation campaign. The figure is a histogram of borrowers in the renegotiation offer sample by the balance as of January 2010, generated using code by Justin McCrary, for balances from zero to 250,000 pesos (USD0 to USD500). The sample corresponds to borrowers in the renegotiation offer sample who as of January 2010 owe between 10,000 and 200,000 pesos ($N = 51,622$). The dashed vertical line represents the 50,000 pesos threshold. Algorithm and methodology found in McCrary (2008).

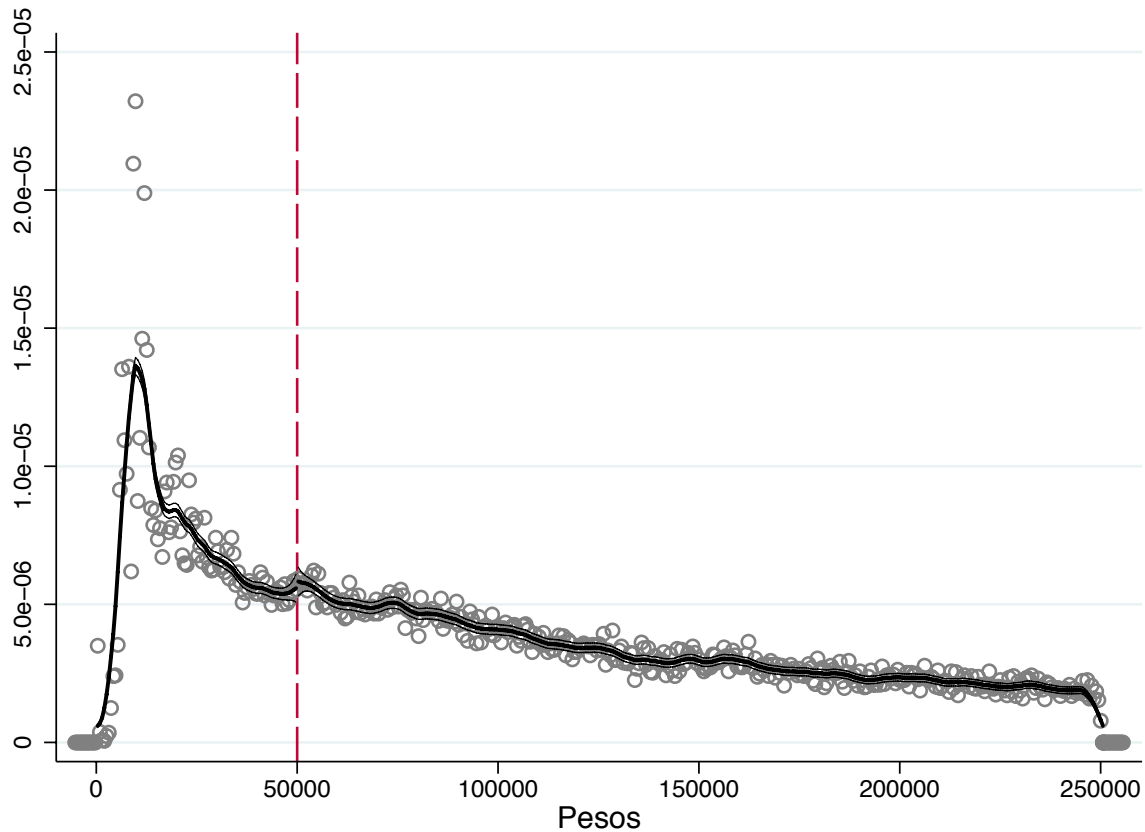


Fig. 3. Cross-sectional covariates. This figure shows that predetermined variables are continuous at the cutoff for borrowers in the renegotiation offer sample. Four plots are shown for the age, tenure at Store, monthly reported income and a dummy for 90 days or more in default. All variables as of January 2010. Plots show averages grouped in bins of 10,000 pesos (USD20) of the balance at The Store as of January 2010. The plots also show the fitted values and 90% confidence interval of a modified version of the regression in Eq. (1),

$$outcome = \alpha_0 + \beta above + f(amount - 50000) + \epsilon,$$

with each of these variables as outcomes, on *above*, a variable that equals one if the borrower owes more than 50,000 pesos as of Jan 2010 and zero if she owes less, and $f(amount - 50,000)$, a polynomial of the balance as of January 2010. The sample corresponds to borrowers in the renegotiation offer sample who as of January 2010 owe between 10,000 and 200,000 pesos ($N = 51,622$). The dashed vertical line represents the 50,000 pesos campaign cutoff. Standard errors are clustered at the “comuna” level (327 comunas), a Chilean geographical division similar to a US county.

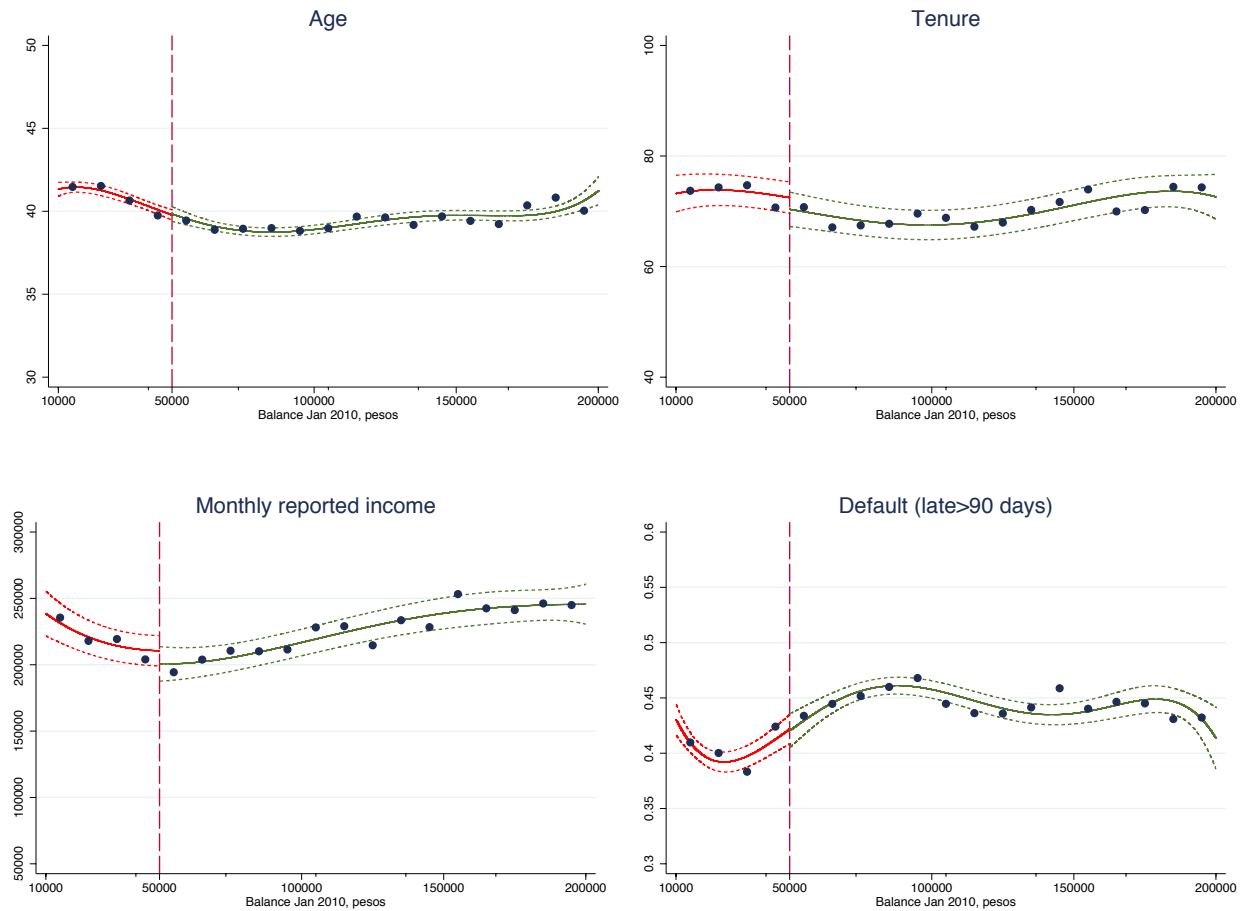


Fig. 4. Effect of renegotiation before write off on ex post repayment. This figure examines the effect of the renegotiation campaign on ex post repayment for all borrowers who were eligible for the renegotiation before write off irrespective of whether they renegotiated or not (i.e., the reduced-form estimates). The plot shows the average value of npv , the discounted sum of payments for 20 months after January 2010 as a fraction of initial balance discounted at a 48% yearly rate, for borrowers in the renegotiation offer sample in bins of 10,000 Chilean pesos (USD20), and the fitted values and 90% confidence intervals from the regression model,

$$npv = \alpha + \gamma_{above} + f(\text{amount} - 50,000) + \epsilon,$$

of npv on $above$, a variable that equals one if the borrower owes more than 50,000 pesos as of Jan 2010 and zero if she owes less. $f(\text{amount} - 50,000)$ is a 4th degree polynomial. The sample corresponds to borrowers in the renegotiation offer sample who as of January 2010 owe between 10,000 and 200,000 pesos ($N = 51,622$). The dashed vertical line represents the 50,000 pesos campaign cutoff. Standard errors are clustered at the “comuna” level (332 comunas), a Chilean geographical division similar to a US county.

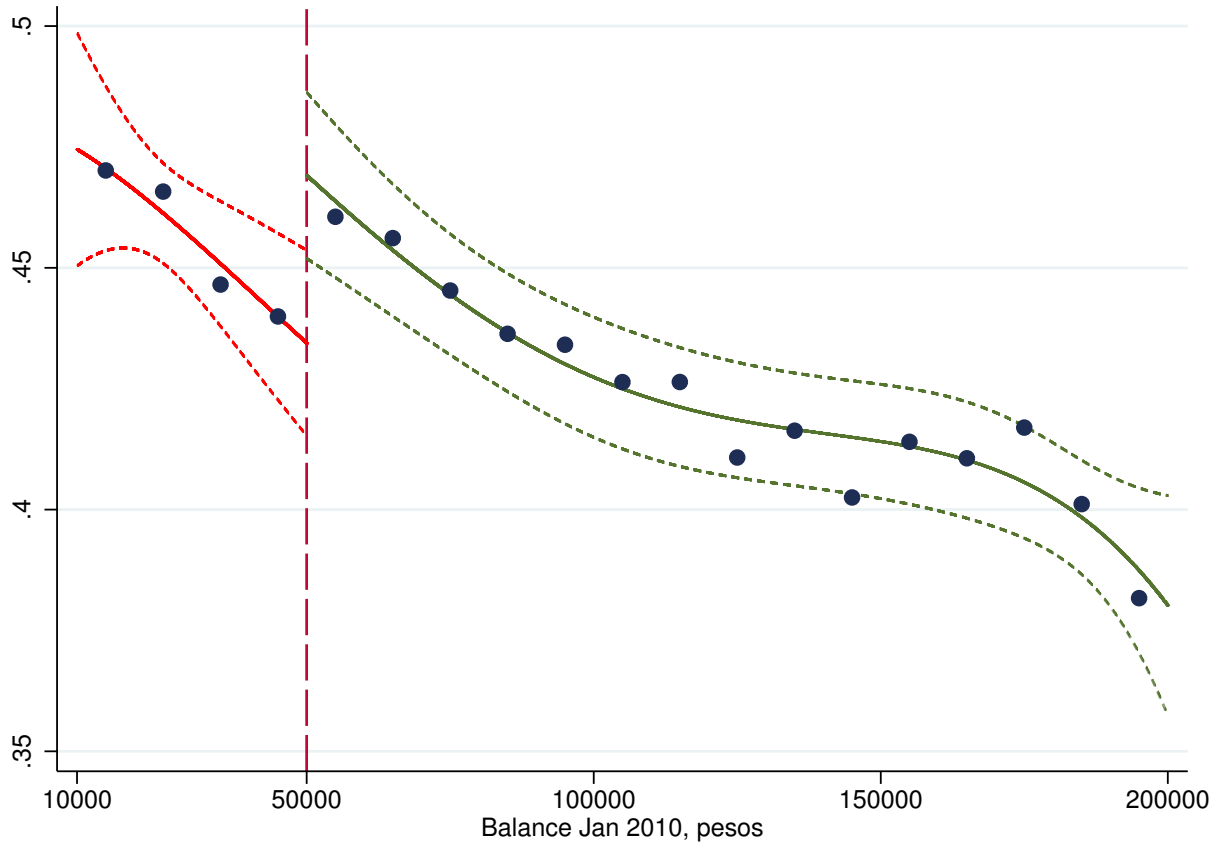


Fig. 5. Time series plots for Above and Below groups. The figures show plots of outstanding balance at The Store, days late at The Store, credit score at The Store, and fraction of borrowers late by more than 90 days at The Store for the Above and Below groups. Above borrowers are borrowers in the renegotiation offer sample who as of January 2010 owed between 50,000 and 60,000 pesos; Below borrowers owed between 40,000 and 50,000 pesos.

