

The Price of Borrowing and Microfinance: Evidence from an Interest Rate Cap Policy

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Soledad Giardili*

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In 2006, the Argentine government sanctioned a law imposing a ceiling of 6% annual interest rate on microcredit loans. This cap was well below the standard interest rate charged by local microfinance institutions. The enforcement of the law provides a source of quasi-experimental variation that allows me to identify the effect and magnitude of a decline in the cost of borrowing on loan repayment behaviour. Using a unique data set of borrowers' records, I find that the interest rate reduction improves the loan repayment discipline, both in the incidence of loan delinquency as well as in the probability of non-compliance.

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Microfinance has become increasingly important over the years. At the onset, only small loans were offered to groups of poor people who

*Queen Mary University of London - School of Economics and Finance, Mile End Road, London, E1 4NS, United Kingdom (e-mail: s.giardili@qmul.ac.uk). I am particularly grateful to the management and staff of Secretariado de Enlace de Comunidades Autogestionarias (SEDECA) for providing the data for this paper. My thanks are also directed to Diego Battistón, Guillermo Cruces and my thesis advisor Ricardo Bebczuk for providing helpful suggestions. I very gratefully acknowledge the help of Marcos Vera-Hernández throughout this research process. This research did not receive any specific founding. Any errors are the sole responsibility of the author.

needed funding to buy supplies, but lack traditional collateral. Nowadays, instead, a more diverse set of products (loans, saving accounts and insurance products) are offered under different types of contract (group-lending, individual-lending) and by a broad set of institutions, from non-for-profit organizations to for-profit lenders.

Parallel to this development, the high repayment rates claimed by microfinance institutions (MFIs) worldwide were considered sufficient evidence of the success of the microcredit programs. From the policy maker standpoint, this fact generates an increasing interest in microfinance as a tool to foster development and diminish poverty. From the academic side, it influences a progressive development of the microfinance literature, mainly focused on the capacity of the group-liability product (versus individual liability) on mitigating problems associated with asymmetric information.¹

Furthermore, the phenomenon of high repayment rates helped the MFIs to change direction toward new goals. In addition to trying to alleviate poverty, they began to pursue financial viability. The idea was that the key to the expansion of the microfinance sector depended on the success of it as a market phenomenon, free of subsidies (Robinson, 2001; Drake and Rhyne, 2002).

This new market orientation was partially based on the hypothesis of borrowers' insensitivity (Karlan and Zinman, 2008). The low loan delinquency rates claimed in the early period of microfinancing boosted the idea that the poorest were and are capable of paying high interest rates on loans and, at the same time, improve their socio-economic situation (see Armendáriz and Morduch, 2005). In other words, certain grade of impassivity would exist to the cost of borrowing; a hypothesis that has been scarcely explored in the microcredit literature.

¹The group lending methodology, which includes a joint liability clause in its contract, has two key features that appear to reduce the problems of asymmetric information: peer monitoring and peer pressure. This means that the team members play the role of controllers (Stiglitz, 1990; Wenner, 1995) and press for the enforcement of obligations (Besley and Coate, 1995). Another property of this methodology that operates in the same direction is peer selection. By shifting the costs of the group members selection process from the MFI to the borrowers, it establishes incentives for choosing reliable and suitable partners (Ghatak, 1999, 2000). The more information that individuals have about each other's businesses enables to foresee problems related to the ability or willingness to pay.

Although the second generation of papers highlights the importance of other determinants on repayment behavior² and began to question the benefits of the group lending methodology,³ relative scant evidence can be found about the role of the interest rate on loan delinquency rates.

Empirically, it is a challenge to evaluate the impact of the interest rate, given the lack of variability it has within each microcredit program (Dehejia et al. 2012). Additionally, the comparison of borrowers from two different institutions with different associated costs may, indeed, reflects differences in the borrowers' characteristics and other non-price discrepancies between programs instead of the effect on payment behaviour due to the interest rate charged. The fact that borrowers are self-selected into each microcredit program renders them non-comparable and makes the evaluation of the interest rate particularly challenging.

The goal of this paper is to fill the gap in the literature by providing causal estimates of the effect of interest rate on loan delinquency rates. To do so, I exploit the sanction of a the law No. 26.117 in Argentina ('Promoción del Microcrédito para el Desarrollo de la Economía Social') which introduced a ceiling on the interest rate of 6% per year in any disbursed loan using public funds. The enforcement of the law within the partner MFI, jointly with no change in the scheme and design of the microcredit program carried out, produced an unanticipated variation in the cost of borrowing that allows to identify the impact of a reduction in the interest rate on loan repayment discipline.

The rest of the paper is organized as follows. Section I examines the theoretical arguments and empirical results related to the role of the interest rate on loan delinquency rates. Section II presents a description of the microcredit program carried out by the partner institution and gives a detailed sketch of the transition process of the portfolio to the lower rate. Section III describes the data and the identification strategy, and the next section presents the main empirical results of the paper.

²For example, the need for frequent and public payment schemes (Armendáriz and Morduch, 2000, 2005) and dynamic incentives (Giné et al., 2009; Besley, 1995).

³Based on coordination failures and decreased social cohesion (Impávido, 1998; Armendáriz, 1999); incentives to choose riskier alternatives (Giné et al., 2009); and the likelihood of strategic default (Kono, 2006).

Finally, Section V concludes.

I. Interest Rate and Repayment Behaviour

Intuitively, the higher the cost of financing, the more challenging is for poor people to repay their loans on time or to avoid default. As the theoretical models in the context of group-liability programs point out, any increase in the interest rate should be accompanied by an adjustment of the loan amount (Stiglitz, 1990) or an increase in monitoring and penalties (Banerjee et al., 1994; Besley and Coate, 1995) to give borrowers the right incentives; either to choose between safe and risky projects or compare the gains of not repaying the loan with the cost of reimbursing it.

At the same time, high interest rates may reduce microcredit demand and slow down its expansion. The higher the price of borrowing, the more likely to narrow microcredit access and attract mostly risky borrowers. This idea motivates few contributions in the literature about borrowers' interest rate sensitivity.

Dehejia et al. (2012) exploit an unanticipated 1% monthly interest rate increase in two of the three branches of SafeSave, a microcredit institution located in Dhaka. ⁴Using a difference-in-difference strategy, they found a price elasticity of microcredit close to -0.73 under different specifications and an observation window of one year before and after the policy change. The effect becomes even more negative (-1.04) after controlling for the debt capacity of the borrowers, measured by their saving levels and instrumented by the time spent in the program. Additionally, they found that a higher interest rate increases the loan renewal probability by five percentage points but, at the same time, the size of the amount disbursed was reduced by 17% compared to the average size. Hence, increasing the cost of borrowing accelerates the speed of repayment at the cost of reducing the loan sizes. In 2003, Karlan and Zinman (2008) conducted a randomized control trial offering consumption loans, at different interest rates and

⁴from an interest rate of around 18% per year to around 30% per year

maturity terms, to former borrowers of a bank in South Africa. As for the interest rate, the results are heterogeneous depending on the direction of change from the standard rate charged by their partner institution (between 7.75% and 11.75% per month). When the rate offered is above the lender's standard interest rate, they find a large negative effect on the loan demand and the repayment rate, but the effect is less pronounced when the rate offered is below the standard loan pricing. This implies a kinked demand curve. When the rate get reduced from a maximum of 11.75% per month to 3.25%, the slope of the demand is slightly negative, increasing the quantity demanded in just 2.6 percentage points. On the contrary, the slope of the demand is steeper for above-standard interest rates. Regarding the size of the loan, the elasticity is negative and significant but unlike Dehejia et al. (2012), the level is relatively small. They find that the requested loan amount is much more sensitive to variations in the length of the credit cycle than the loan price.

One common aspect of both studies is that loans' destination is not tied to productive investments. But how loans are used may affect borrowers' capacity to repay. Survey data reveals that one of the key reason of a worsening situation after borrowing a microcredit is the use of the loan for a day-to-day consumption or one-off 'luxury' expenditure (Jahiruddin et al., 2011).

Interestingly, the recent work of Bengtsson and Pettersson (2012) in Tanzania, based on a randomized controlled trial of a transitory interest rate reduction on loans to farmers, found no significant difference in repayment rates between treated and reference group, although, the demand immediately responds to the subsidy announcement. They justified this diverging result as a consequence of different possibilities of screening ex-ante risk. On the other hand, the results could be partly due to the fact that only 52% of the members in the treatment group took the subsidized loan and that it has a fixed maturity term of 6 month,⁵ which may be mismatched with the farming business cycles. Additionally, a default is defined as having failed to meet the deadline,

⁵Previously to the intervention regular loans had different maturities, from three to twelve months.

although, in the context of microfinance the incidence of the loan delinquency (which proportion of the loan is overdue) may be a more accurate measure.

As detailed in the next section, my partner MFI only lends microcredits for poor people involved in small businesses located in urban areas. The primary role of the staff is to supervise that the destination of the loan does not deviate from the productive investment expressed in the loan's application. In general, these businesses yield low to moderate financial returns and, in this context, high interest rates may be particularly harmful (Stewards et al., 2010). Although it is beyond the scope of this study to estimate microcredit price elasticity, I do find evidence that borrowers react to interest rate through better repayment discipline.

II. The Microcredit Program and the Implementation of the Law No. 26117

This paper uses information on loans disbursed by Secretariado de Enlace de Comunidades Autogestionarias (SEDECA). In the two following subsections, I describe the microcredit program intended for investment in established businesses and the process that the MFI used to implement the ceiling on the interest rate imposed by the Law 'Promoción del Microcrédito para el Desarrollo de la Economía Social'.

A. SEDECA Microcredit Program

SEDECA is a pioneer institution in Argentina formed in 1980 and primarily focused on providing technical assistance to small organizations on issues related to the access to housing and land. The development of lending programs came later, beginning in 1994, in different districts of the north of Gran Buenos Aires. The microcredits were aimed at low-income families with two different purposes: (1) loans for home improvements, and (2) loans for very small commercial or production business. In this paper, I used these latter borrowers'

records since only this part of the microcredit program was affected by the law.

Within the microcredit program for small entrepreneurs, SEDECA works with the three standard microcredit methodologies: individual loans, solidarity groups, and village banks. The conditions to access a microcredit are the followings: (a) it is necessary to be a small entrepreneur with at least six months in the business, and (b) the loan must be allocated exclusively to business development, acquiring either fixed or variable capital. Once the credit is delivered, the borrowers should repay the loan with a weekly or biweekly frequency, depending on their choice. The maximum number of instalments that a borrower can choose is twenty-five and the interest rate charged was 25% per year. Lastly, a complete cancellation of the loan is required to access to a new one. This fact excludes the possibility of a borrower with more than one active loan.

As mentioned above, the area of action of the institution was historically concentrated in the districts located in the north of Gran Buenos Aires.⁶ However, motivated by the enactment of the law, the MFI began to expand the program for productive investment gradually to new locations, either to the south (Vicente López and Villa 21-24) or the north (José C. Paz and Moreno) of the historical areas.

B. The Implementation of the Law

The 26117 Law set up the National Microcredit Commission (CONAMI, for its acronym in Spanish) as a source of support, regulation and promotion of the microcredit sector. In relation to the interest rate, one of the explicit objectives specified for the commission is to “to develop mechanisms to regulate and reduce operating costs and interest rates imposed on the beneficiaries of the Microcredits” (Art. 3 , June 2006). Similarly, it is mentioned that this commission should use the public funds not only to enhance MFI's portfolios but to “to partially or fully subsidize the interest rates, operating expenses and technical assistance

⁶Especially in the Tigre district (Baires, Bancalari, Don Torcuato, Aviación and Los Troncos) and the downtown area of Pilar district.

of microfinance institutions corresponding to their business operations” (Art. 13, June 2006).

In practice, this was translated into an imposition of a ceiling to the interest rate at 6% annually that the MFIs could charge whenever they deliver loans financed by the CONAMI’s funds (CONAMI, 2009). This upper limit to the cost of borrowing was, by then, well below the rates charged by the Argentine microfinance institutions.⁷

The first funding from CONAMI received by SEDECA, and other organizations known as pioneers,⁸ dates from March 2007. The enforcement of the law required SEDECA to open a new bank account in a national bank to have separated accounting, and allow the control of the application of the funding by the commission. In the first phase, the decision was to designate the public-financed loans to the new locations where the program was expanding (see above). This meant that, from March 2007, all loans to borrowers located in the new areas were provided at a 6% interest rate, while former borrowers from the historical areas continued to receive the high-rate loans (25%). In a second phase, SEDECA decided to begin a process of transferring its entire portfolio to the new interest rate regardless of the area of residence of the borrowers. This process was gradual, starting in November 2007, and following a very simple administrative procedure: conditional on the availability of funds from the Commission, any new loan application or any loan renewal should be granted at a rate of 6% per annum. This means that as a new microloan application turned up or whenever a former borrower pays his loan in full and requests a new one, they receive a loan disbursed at the new lower rate of 6%.⁹ If the public funds on that date were not available, the loan was disbursed at the standard interest rate. Finally, in September 2008, SEDECA received an additional funding from the CONAMI, which allow to relax the

⁷For 2007, Campion, Ekka and Wenner estimate that effective interest rates for a set of Latin American countries ranged between 20% and 70% annually, placing Argentine’s MFIs at an average of about 50%.

⁸These organizations accompanied the process of formulating the first draft of the Law 26117 and comprise the Permanent Consultative Commission of the CONAMI (CONAMI, 2009).

⁹Once the borrower received the low-interest loan, subsequent disbursements were always received at this lower rate of 6%.

restriction and deliver all loans at the low rate. As shown in Figure 1, the average interest rate applied to loans decreased over time, according to this staggered process of granting loans at lower interest rate. Figure 2, shows the transition in the number of loans delivered at these two different prices.

Consequently, considering only the former borrowers of the institution, the date of switching from high-rate to low-rate loans was determined solely by two facts: the date on which the borrower applies for a new loan after completing the repayment of the higher rate loan, and the availability of state funds on the institution on that particular day (until September 2008). As explained in following sections, these two factors can be safely assumed exogenous to individual's (unobserved) characteristics.¹⁰

Figure 3 shows the transition from high-rate to low-rate loans for the sub-sample of borrowers considered in the analysis from the first quarter of 2007, before the implementation of the new policy of granting loans at 6% annually, until the third quarter of 2009. As shown in the graph, the largest number of transfers to the new portfolio is concentrated in the last quarter of 2008, when SEDECA received the second disbursement from the Commission. The transfers of borrowers posterior to this point in time is a consequence of loan maturity dates or renewal delayed by the borrowers. For illustration purposes, Figure 4 shows the staggering process in the transition for 20 borrowers.

III. Data and Empirical Strategy

Associating the impact of the effect of the interest rates by simply comparing two microcredit programs with different interest rates may be biased when interest rates attract different individuals with dissimilar financial habits or when institutions have different levels of

¹⁰It is noteworthy that the borrower did not know in advance the rate at which the loan would be granted by SEDECA. Decisions on the actual rate charged were determined at the time of delivery of the credit in the institution, so the decision to renew the loan is assumed before the implementation of the policy. This point is not minor as it reduces the possibility of anticipatory behaviours, an issue that will be fully covered in the next section.

sophistication associated with providing loans at different interest rate levels. I addressed the identification problem by using the unanticipated change in the interest rate due to the implementation of the law within the partner institution to assess the sensitivity of the borrowers to changes in the interest rate. Specifically, I focus on different loan delinquency measures.

Regarding this point, it is important to note that the policy shift towards cheaper loan was not simultaneously accompanied by any change in the granting and management of the loans within the institution. Neither different requirement was asked to apply for a loan, nor modification of the mechanism to collect the payments.¹¹ Similarly, there was no change in the instalment frequency neither an alteration in the credit cycle length that borrowers can choose. This allows us to isolate the effect of changes in the interest rate of any other factors relevant to the credit contract and execution that may be affecting the outcome variables.

The initial sample was stratified as follows: from a total of 1100 borrower's credit records, it is possible to differentiate: (a) individuals who always took high rate loans, (b) those who entered under the new policy and always took low-rate loans and finally, (c) those who switch from high-rate to low-rate loans due to the application of the law. The latter group forms the sample of analysis in this work. Restricting the sample to this subset is necessary because, as previously mentioned, different costs of capital may attract very different borrowers, with different risk aversions and entrepreneurial skills. On the contrary, observing the same individuals before and after the treatment ensures the validity of the empirical strategy. Additionally, this allows controlling for temporal effects or macroeconomic shocks given that different borrowers have switched at different points of time, depending on the date the previous loan was fully cancelled and renewal was submitted.

¹¹Unlike many other institutions, SEDECA collects payments electronically through Pago Fácil system, and thus the loan officers duties are set aside mainly to support the daily activities of the entrepreneurs and screening the loan applications.

A. Data

The sample consisted of 91 individuals who, during the observation window January 2007-September 2009, received a total of 486 loans.¹² Of these, 264 were delivered at the higher rate and 222 at the rate of 6%. Delinquency averaged 13.5% among all the loan records. Additional descriptive statistics are presented in Table 1. For example, most of the borrowers are women with a mean age of 46 years. The businesses are mainly concentrated in the commercial sector and the average years of business experience is above 5. Regarding the variables related to the term of the contract, the majority of the loans (77%) are paid back through weekly payments, the average loan cycle length is over the four months, and the average microloan size is around 2000 Argentine pesos¹³ (approximately \$630 U.S. dollars).

B. Empirical Strategy

The approach followed in this paper uses the unanticipated variation of the interest rate given the ceiling imposed by the Law No. 26117 to evaluate the causal impact of a decrease in the interest rate from 25% to 6% on loan repayment discipline. The gradual implementation of the switch within the institution constitutes what is called *phase-in-design* (Duflo *et al.*, 2007; Miguel and Kremer, 2004), and allows me to consistently evaluate the short run impact of the reduction in the interest rate whenever this change is exogenous for each individual. Following Carpena *et al.* (2010),¹⁴ the staggering process generates in each period a natural control group constituted by those borrowers with an active 25%-rate loan but who eventually, at a later date, will receive a loan at the lower 6% rate.

As was previously specified, the use of unanticipated changes in policy for causal analysis depends crucially on the absence of

¹²From the initial sample of 97 individuals, 6 were dismissed because incomplete observations along their credit records.

¹³All monetary variables are expressed in 2008 pesos.

¹⁴Carpena *et al.* (2010) studied the impact of the transition from individual to group liability evaluating a *phase-in designed* program in India where borrowers were assigned to treatment at different points in time.

correlation between the event under analysis and any other incident that may simultaneously affect the outcomes (Duflo *et al.*, 2007). For example, if this is the case, it becomes difficult to single out if the changes in the outcome variables are driven by the shift in the interest rate or a change in the contract structure or management of the loans of any kind. Then, it becomes crucial to highlight that the application of the law was not accompanied by any change in the granting and management of the credits within the institution. Neither there was a change in the requirements to apply and access to the loans, nor in the payment system to collect the instalments or the applicable maturity periods. On the other hand, the date of the reduction in the interest rate respond to exogenous factor, particularly to the maturity date of each individual loan and to the availability of public fund within the institution whenever the borrower decides to renew the loan. Indeed, given the dependency of the treatment in the availability of public funds, the procedure follow by the institution was to reduce the interest rate (if possible) once the borrower had applied for a renewal, that is, after he had already agreed on the amount, the number of instalments and other factors “as if” the interest rate was 25%. Under such setting it is possible to believe that the application of the law could not be anticipated.¹⁵ Consequently, at least with respect to internal institutional factors or borrowers’ behaviour, it is in principle possible to isolate the effect of the reduction in the interest rate from any other factor simultaneously affecting loan repayment discipline.

Nevertheless, there is a factor of external nature that should be taken into account. It is mainly related to the growth in the microcredit supply since the sanction of the law and the creation of the Commission. I will discuss this later in more detail.

¹⁵Although there was no public announcement of the application of the law from the institutions to their borrowers, an exception to the above statement could be found if they, just by chance, learned about this and decided to cancel in advance their loans or change their repayment strategy seeking to obtain as soon as possible the low-rate microloan. However, even in the case of not an strictly random assignment of the treatment, the availability of a rather wide set of additional control variables will allow to control for observable differences between the groups and, as will be discuss in the remainder of the section, the inclusion of individual fixed effect eliminates any bias due to individual unobserved characteristics that are time invariant.

The empirical model assumes the following specification:

$$y_{ic} = \beta X_{ic} + \varphi T_{ic} + \alpha_i + \delta_t + \epsilon_{ic} \quad (1)$$

where y_{ic} is a delinquency variable (I will specify different dimensions of payment behaviour) of the microloan c from borrower i . The variable T_{ic} takes the value one if the borrower's loan c was disbursed at 6% interest rate and zero otherwise. Consequently, the estimation of φ captures the impact of the reduction in the interest rate over payment behaviour. The variable X_{ic} includes a set of controls related to the characteristics of the loan. Including these variables allows me to control by differences in the temporal evolution of the determinants of the payment behaviour of individuals with already lowered interest rate and those with loans at the higher rate. The variable α_i captures all the time-invariant unobserved heterogeneities at the individual level (this include risk aversion, reputation loss, entrepreneur ability, and more). I also included δ_t an indicator of the period when the loan was disbursed to the individual for the purpose of controlling for any aggregated tendency in the economy that could have affected, in a different way, borrowers who were earlier benefited with the reduction in the interest rate. Finally, ϵ_{ic} is assumed to be an idiosyncratic shock uncorrelated with any other explanatory variable.

In the following paragraphs, I discuss some potential factors that can affect the identification and the empirical strategy followed in each case to reduce the potential bias.

First, the Law 26.117 not only increased the funding for SEDECA and other existing lending organizations, but also boosted the creation of new MFIs since 2006. As documented for some experiences in Latin America and Asia, the increasing access to external financial opportunities can reduce the incentives to pay on time since the opportunity cost of delinquency is lower. The oversupply of microcredits can affect the quality of the programs when it induces borrowers to repay debt with more debt or when generates distortions on the attractiveness of projects associated with different levels of risk (see section 1). To avoid the potential bias associated with the fact that

new MFIs creation was not geographically homogeneous, and some individuals were exposed to different levels of external financing opportunities,¹⁶ I collected data on the number of MFIs in each area at every point of time and included this variable as a control in the estimation.¹⁷ Particularly, the effect that I want to control is related to the fact that the phase-in implementation of the policy was not linear, as shown in figure 3. Borrowers who were initially switched to the lower interest rate may have been affected differently by the increase in external loan supply than borrowers who passed most of the period with a higher-rate loan and were affected by the policy at the final stage with the second disbursement in September 2008. This implies, from a theoretical point of view, that individuals with reduced interest rates in the first instance may be found less attractive the external supply of loan. Thus, the validity of the analysis may be affected for the periods closer to the final stages, because this group of borrowers would include individuals more exposed to external supply than the group of borrowers that were treated early.

The second factor to be controlled for is a possible anticipatory behaviour of the borrowers. This would be the case if individuals tried to pay their microloans before the maturity date or change their payment behaviour to apply for a renewal at a lower rate. Despite the evidence of the exogeneity in the implementation of the process, the estimation of φ could underestimate the actual effect of the reduction in the interest rate if there exists even a small degree of anticipatory behaviour. To identify this potential bias, I included an indicator variable that takes one in the loan previous to the reduction of the interest rate and zero otherwise.

Finally, I conducted two falsification exercises to provide evidence of

¹⁶Note that the inclusion of temporal variables in the specification above does not capture this effect

¹⁷This variable was constructed using three different sources of information: The first two from the Ministerio de Desarrollo Social, Mapa interactivo de Centros y Organizaciones which is available in electronic format and the document Primer Congreso Latinoamericano de Microcrédito “Nuestra Palabra tiene Crédito”. The third document is “Mapeo de Instituciones de Microcréditos de Argentina” (2009) from Fundación Andares and the Red Argentina de Instituciones de Microcrédito (RADIM). In some few cases, I used the MFIs web pages to corroborate the date of foundation.

the validity of the identification strategy, and as additional robustness checks. The first exercise consisted of estimating the effect of a fake treatment variable, called “Fake T”, which takes the value one for loans with the higher interest rate two periods before the actual date of the switch and takes the value zero otherwise. In this case, the sample is reduced to those individuals that have at least a credit history of three high-rate loans before being affected by the treatment. The second falsification exercise consisted in replicating the staggered temporary reduction of the interest rate, but with random assignment of the dates of the treatment to different borrowers. In other words, the fake temporal distribution of treatment design matches the actual one (i.e. in which loan cycle number the switch took place) but individuals are assigned different dates of treatment in a random way. This final exercise allows me to discard that the results are driven by the timing of the treatment instead of the reduction of the interest rate itself.

IV. Results

Tables 4 to 6 show the effect of the reduction in the interest rate for different dimensions of payment behaviour. In Table 4, the dependent variable is the delinquency rate defined as the proportion of credit overdue at the due-date. In Table 5, the outcome is determined according to the number of unpaid instalments at the due-date. Both measures capture the incidence of delinquency. Finally, Table 6 reports the results for the binary variable *on time 30*, which takes the value one if the loan was paid at most 30 days after the credit cycle maturity date and zero otherwise.¹⁸ Under all these specifications I found similar results. The reduction in the interest rate improves the repayment of the

¹⁸I considered a 30 days delay in accordance with the standard measures used to assess the quality of the portfolio. Furthermore, this definition is more suited to the practical application of dynamic incentives by MFIs and SEDECA in particular, i.e., beyond this period, the probability of non-renewal or removal of access to future loans is higher. On the other hand, small thresholds to define delinquent credits may be subject to measurement errors. As reported by the staff, it was not unusual to record a lack of service in the electronic payment system used by the institution, a fact that could delay the receipt of instalments payments due to reasons beyond the scope of the borrowers

loans.

Results on delinquency rate from an OLS regression are shown in Table 4. In the first column, only T_{ict} and the number of MFIs in each area/period were included as regressors and the point estimate of -0.012 is significant at a 10% level. Columns 2 and 3 include controls discussed in the previous sections, and the final column 4 adds the individuals fixed effects and time effects. The estimated coefficient is very similar throughout all these specifications, going from -0.018 to -0.02 when time and borrower fixed effects are included. This means a reduction of 2 pp in the delinquency rate when borrowers get a low-rate credit.

Although the value of these coefficients appears to be relatively small, one must consider that it is affecting relatively low delinquency rates. Moreover, the results are consistent with the evidence found in Karlan and Zinman (2008), where the effect of variations in the cost of capital is less pronounced when the rate falls below the average.¹⁹ Consequently, a plausible interpretation of the results is that even the well behaved borrowers, those with low delinquency history, show a better payment discipline when the cost of capital is reduced. Moreover, as previously mentioned, the coefficient φ may underestimate the effect of access to low-rate credit if borrowers had an anticipatory behaviour. This control seems to matter given its significance and the increase in the coefficient associated variable Interest Rate Low when it is included (see column 3).

Table 5 shows similar results for the variable *number of unpaid instalments*. Depending on the specification, the effect is between -0.19 and -0.31, at a significance level of 5%. In relation to the variable *on time*

¹⁹The authors propose several explanations underlying this asymmetric phenomenon. The first justification is that the discount rate or return of the borrowers, before the policy change (change in interest rate), could be close in value to the rate charged by the institution. That is, if there is a value of the interest rate that relax the borrowers' liquidity constraint, if the interest rate charged by the MFI is less than this threshold, then the outcome variable become more insensitive compared to a situation where interest rate charged lies above this threshold. The second explanation is that when the interest rate increases enough, the external credit options become better substitutes, but below a certain threshold, the credit offered by the MFI has no close substitutes. In our case, and as mentioned before, the assessment of the relationship with the institution by the borrower and the reputation may be affected when there is greater availability of external credit supply and as a result, if the law were not accompanied by an expansion of low-rate credit supply, we would expect a higher improvement on the delinquency rate.

30, Table 6 shows that when the rate drops, the probability of repaying the loan in less than 30 days after maturity is 5% higher compared to high-rate credits. This result holds when fixed effects are included.

Finally, Tables 7 and 8 (panels A to C) show the results of the falsification exercises following the same structure presented in the previous tables. In both cases, no significant effect of the false treatment was found on any of the different delinquency measures considered in the primary analysis.

When the fake treatment is imposed on two loan records before the actual record the treatment took place, the coefficients are markedly different to the ones found in the main analysis (Tables 4 to 6), and they are all non significant. When the individual and temporal controls are omitted, the coefficients are in absolute terms lower than those in the primary analysis, especially for those that measure the incidence of delinquency. When these controls are included, the coefficients even change the sign. Given these results, it is possible to rely on that the finding in the main analysis, Tables 4 to 6, are not driven by a correlation between the change in the interest rate and any other unobservable variables indicative of lower delinquencies.

Unlike the first exercise that took a sub-sample of individuals, the second falsification exercise is based on the same set of borrowers and loans than the main analysis. The staggering structure in the reduction of the interest rate across individuals and their loans records is replicated, but the assignment of treatment is done randomly. Again, the results are that the fake treatment variable is not significant, and the estimated coefficient has a sign contrary to the one predicted by the theory and the one we found previously. These last results suggest that the temporal structure of staggering reduction of interest rates does not explain the reductions in delinquency and that the identification strategy properly controls the temporal trend. Both exercises provide evidence of the exogeneity in the implementation of the policy imposing a ceiling on the interest rates and, therefore, on the validity of the econometric specification used.

V. Conclusions

The microfinance sector in Argentina, still in early development, have grown steadily in recent years, although at a much lower rate than experienced in the rest of Latin America and the Caribbean. However, the peculiarity of the process is that, unlike many other countries in the region, the microfinance sector is included in the public agenda and took the biggest boost from a national law. This generated a particular scenario (an exogenous change) that allows evaluating the impact of a reduction in the interest rate, a critical factor widely discussed in a theoretical and policy level, but scarcely tested empirically.

The main contribution of this paper is the use of a novel panel data of borrower credit records and the sanction of the law that imposed a ceiling on the interest rate that could be charged by the IMF to assess the effect of the cost of capital on the payment behaviour of the beneficiaries of microcredit programs. In general, the main difficulty of evaluating this effect is that the interest rate has little or no variation within the same program and that the comparison of two different programs is inconsistent if there are unobservable differences between borrowers (selection bias). Furthermore, there is little evidence of microcredit programs that have made changes in the interest rate in a non-optional and non-selective way.

Especially in this paper, the identification strategy uses an unanticipated change in interest rates starting from the implementation of the “Promoción del Microcrédito para el Desarrollo de la Economía Social” Law (No. 26117) in Argentina. Under all proposed specifications, the evidence is detrimental to the insensibility hypothesis of the microcredit borrowers against the cost of money. Faced with a lower interest rate, borrowers improve their discipline in the cancellation of the loan promptly. Consequently, this evidence suggests that the long debate on the financial viability of the MFIs should not ignore the importance of the interest rate in the contract design and highlight the need for a greater and higher level of analysis of their effect on the repayment behaviour and any other portfolio quality measures.

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Figure 1: Average interest rate by quarter

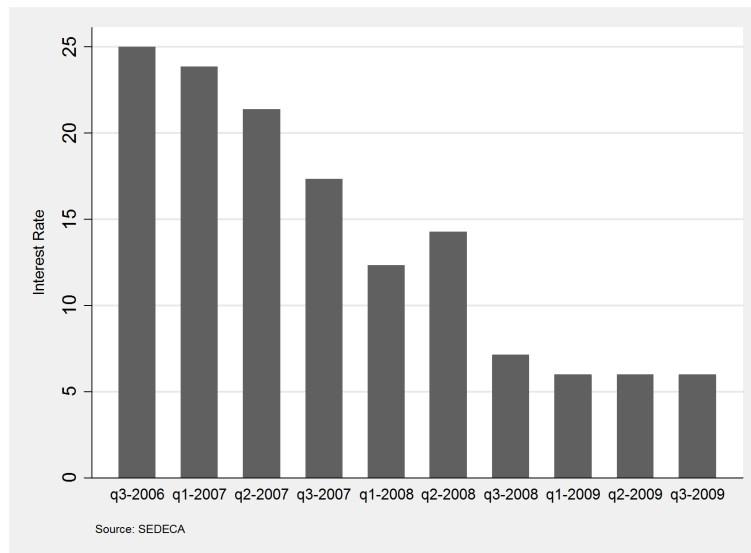


Figure 2: Loans Granted Evolution by month

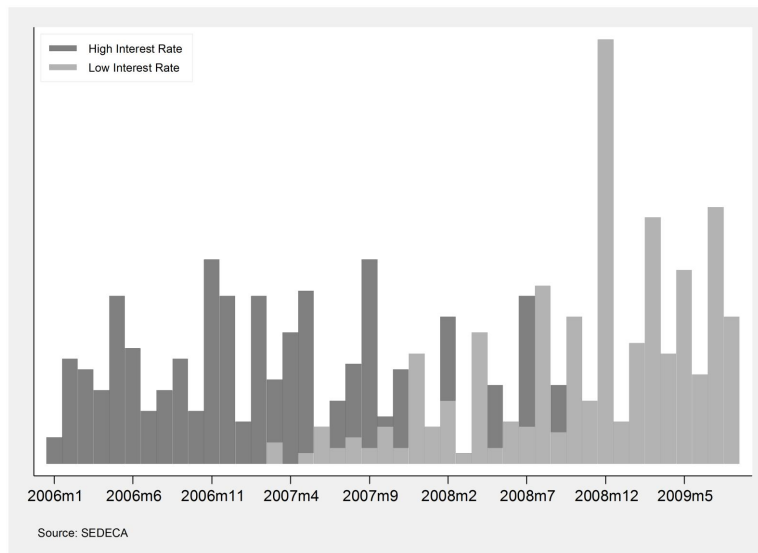


Figure 3: Transition of Former Borrowers to the Low Interest Rate by Quarter

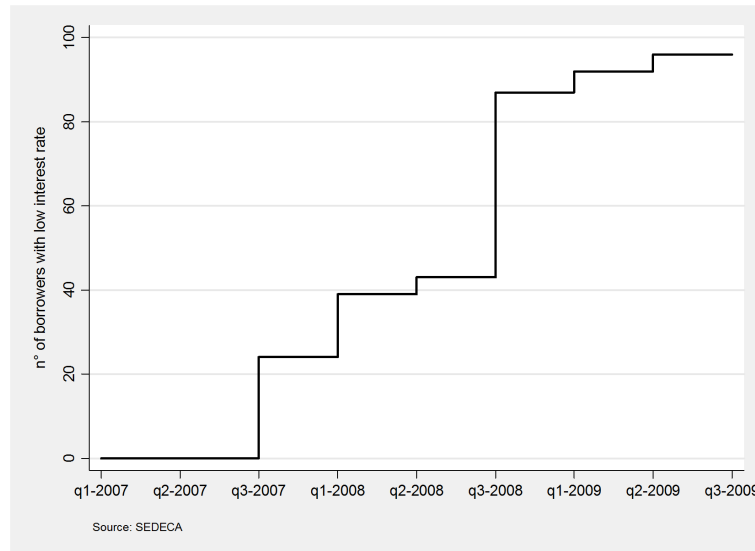


Figure 4: Temporary Stepping Reduction in Interest Rate. Example for 20 individuals

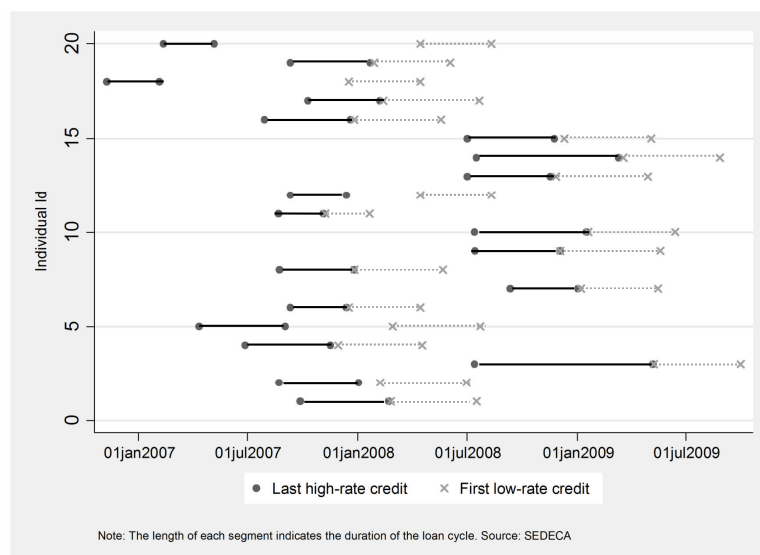


Table 1. Descriptive Statistics

Variable	Mean	SD	Min	Max	Obs.
<i>Socioeconomics Characteristics</i>					
Gender (=1 female)	0.78	0.42	0	1	91
Age	45.82	15.20	23	78	91
Foreign	0.16	0.37	0	1	91
<i>Business Type</i>					
Commercial	0.83	0.37	0	1	91
Production	0.11	0.32	0	1	91
Services	0.06	0.23	0	1	91
Business experience (months)	69.57	61.66	6	365	91
<i>Microloan contract characteristics</i>					
Days late over due date	8.88	15.21	1	108	121
Renewals	5.34	2.57	1	11	91
Loan amount (Argentine pesos)	1930.5	1310.2	200	7649.8	486
Number of instalments	14.63	4.00	4	25	486
instalment temporality					
Weekly	0.77	0.42	0	1	486
Biweekly	0.23	0.42	0	1	486
Loan cycle (length in days)	130.18	40.41	73	372	486

Source: SEDECA

Table 2. Delinquency Rate

	[1]	[2]	[3]	[4]
T (=1 if interest rate is low)	-0.012*	-0.013*	-0.018**	-0.020*
	[0.006]	[0.007]	[0.009]	[0.010]
No. of MFIs	0.008***	0.008***	0.009***	0.016***
	[0.002]	[0.003]	[0.003]	[0.006]
Credit Amount		-0.008***	-0.009***	0.005
		[0.003]	[0.003]	[0.004]
Instalment Frequency (=1 weekly)		-0.004	-0.006	0.011
		[0.013]	[0.014]	[0.014]
Credit Cycle		0.001	0.001	-0.003***
		[0.001]	[0.001]	[0.001]
Number of loans received		0.002**	0.002**	0.006**
		[0.001]	[0.001]	[0.003]
Switch (Tic+1 - Tic)			-0.014*	-0.019**
			[0.008]	[0.007]
Temporal Effect	NO	NO	NO	YES
Individual Fixed Effect	NO	NO	NO	YES
Average Dep. Var. High Interest Rate (T=0)	0.0170	0.0170	0.0170	0.0170
Average Dep. Var. Low Interest Rate (T=1)	0.0142	0.0142	0.0142	0.0142
Observations	486	486	486	486
Number of Individuals		91	91	91

Notes: This table reports results from OLS regression with panel data from January 2007 to September 2009. Dependent variable is the proportion of credit overdue at the due-date. Credit amount is expressed in thousands (argentine pesos) and real term using Price Consumer Index GBA (2008=100). Robust standard errors are shown in brackets below each estimate. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* SEDECA

Table 3. No. of instalments due

	[1]	[2]	[3]	[4]
T (=1 if interest rate is low)	-0.190*	-0.180*	-0.254*	-0.316**
	[0.099]	[0.103]	[0.129]	[0.154]
No. of MFIs	0.123***	0.097**	0.107**	0.234***
	[0.037]	[0.042]	[0.046]	[0.085]
Credit Amount		-0.109***	-0.115***	0.062
		[0.036]	[0.037]	[0.056]
Instalment Frequency (=1 weekly)		0.152	0.125	0.332
		[0.170]	[0.173]	[0.204]
Credit Cycle		0.031*	0.031*	-0.030***
		[0.018]	[0.018]	[0.011]
Number of loans received		0.025**	0.027**	0.110**
		[0.011]	[0.011]	[0.047]
Switch (Tic+1 - Tic)			-0.198*	-0.264**
			[0.110]	[0.109]
Temporal Effect	NO	NO	NO	SI
Individual Fixed Effect	NO	NO	NO	SI
Average Dep. Var. High Interest Rate (T=0)	0.265	0.265	0.265	0.265
Average Dep. Var. Low Interest Rate (T=1)	0.207	0.207	0.207	0.207
Observations	486	486	486	486
Number of Individuals		91	91	91

Notes: This table reports results from OLS regression with panel data from January 2007 to September 2009. Dependent variable is the number of instalments due. Credit amount is expressed in thousands (argentine pesos) and real term using Price Consumer Index GBA (2008=100). Robust standard errors are shown in brackets below each estimate. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* SEDECA

Table 4. Ongoing Payment (30 days)

	[1]	[2]	[3]	[4]
T (=1 if interest rate is low)	0.031*	0.035*	0.046*	0.048*
	[0.018]	[0.019]	[0.024]	[0.029]
No. of MFIs	-0.012**	-0.015**	-0.017**	-0.003
	[0.005]	[0.006]	[0.007]	[0.016]
Credit Amount		0.017**	0.018**	-0.013
		[0.008]	[0.008]	[0.011]
Instalment Frequency (=1 weekly)		0.035	0.039	0.101***
		[0.033]	[0.033]	[0.039]
Credit Cycle		-0.003	-0.003	0.007***
		[0.004]	[0.004]	[0.002]
Number of loans received		-0.006**	-0.006**	-0.004
		[0.003]	[0.003]	[0.009]
Switch (Tic+1 - Tic)			0.029	0.046**
			[0.021]	[0.021]
Temporal Effect	NO	NO	NO	SI
Individual Fixed Effect	NO	NO	NO	SI
Average Dep. Var. High Interest Rate (T=0)	0.961	0.961	0.961	0.961
Average Dep. Var. Low Interest Rate (T=1)	0.972	0.972	0.972	0.972
Observations	453	453	453	453
Number of Individuals		91	91	91

Notes: This table reports results from OLS regression with panel data from January 2007 to September 2009. Dependent variable is a dummy variable that takes value 1 if the loan was paid at 30 days or less after the credit cycle due date and zero otherwise. Credit amount is expressed in thousands (argentine pesos) and real term using Price Consumer Index GBA (2008=100). Robust standard errors are shown in brackets below each estimate. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* SEDECA

Table 5. First Falsification Test

<i>Panel A</i>			
	Delinquency Rate		
FAKE T (=1 if interest rate is low)	-0.004 [0.006]	-0.009 [0.007]	0.018 [0.013]
No. of MFIs	0.012*** [0.003]	0.010** [0.004]	0.034*** [0.011]
Credit Amount		-0.009** [0.004]	0.021* [0.012]
Instalment Frequency (=1 weekly)		0.009 [0.012]	0.008 [0.022]
Credit Cycle		0.002 [0.001]	-0.000 [0.001]
Number of loans received		0.003* [0.001]	0.022** [0.010]
<i>Panel B</i>			
	No. of instalment due		
FAKE T (=1 if interest rate is low)	-0.073 [0.101]	-0.126 [0.116]	0.261 [0.221]
No. of MFIs	0.208*** [0.058]	0.148** [0.058]	0.598*** [0.182]
Credit Amount		-0.113* [0.060]	0.398* [0.204]
Instalment Frequency (=1 weekly)		0.314 [0.191]	0.154 [0.377]
Credit Cycle		0.035* [0.018]	-0.013 [0.022]
Number of loans received		0.032 [0.021]	0.362** [0.160]
<i>Panel C</i>			
	Ontime Payment (30 days)		
FAKE T (=1 if interest rate is low)	-0.022 [0.015]	-0.000 [0.014]	-0.049 [0.034]
No. of MFIs	-0.019** [0.009]	-0.020** [0.009]	0.019 [0.028]
Credit Amount		0.021* [0.011]	-0.031 [0.032]
Instalment Frequency (=1 weekly)		0.025 [0.030]	0.094 [0.059]
Credit Cycle		-0.004 [0.003]	-0.001 [0.003]
Number of loans received		-0.009** [0.004]	0.011 [0.025]
Temporal Effect	NO	NO	SI
Individual Fixed Effect	NO	NO	SI
Observations	309	309	309
Number of Individuals			69

Notes: This table reports OLS results with panel data for the first falsification test. Dependent variables are specified at the beginning of each column. The fake treatment is a dummy variable that takes the value one from the two loans previous to the first low rate loan received and zero otherwise. This implies simulating the implementation of the policy change two loans before to the real treatment. The sample was restricted to individuals who received at least three high-rate loans after treatment. Robust standard errors are shown in brackets below each estimate. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* SEDECA

Table 6. Second Falsification Test

<i>Panel A</i>			
	Delinquency Rate		
FAKE T (=1 if interest rate is low)	-0.012 [0.015]	-0.011 [0.014]	-0.001 [0.011]
No. of MFIs	0.007*** [0.002]	0.006** [0.002]	0.017*** [0.005]
Credit Amount		-0.007*** [0.003]	0.004 [0.003]
Instalment Frequency (=1 weekly)		-0.001 [0.013]	0.013 [0.014]
Credit Cycle		0.002 [0.001]	-0.002*** [0.001]
Number of loans received		0.002** [0.001]	0.005* [0.003]
<i>Panel B</i>			
	No. of Instalment due		
FAKE T (=1 if interest rate is low)	-0.077 [0.148]	-0.046 [0.137]	0.087 [0.162]
No. of MFIs	0.099*** [0.025]	0.068** [0.030]	0.244*** [0.079]
Credit Amount		-0.104*** [0.036]	0.057 [0.050]
instalment Frequency (=1 weekly)		0.185 [0.160]	0.361* [0.202]
Credit Cycle		0.035* [0.019]	-0.027** [0.011]
Number of loans received		0.020** [0.009]	0.089** [0.044]
<i>Panel C</i>			
	Ontime Payment (30 days)		
FAKE T (=1 if interest rate is low)	0.017 [0.035]	0.017 [0.033]	0.004 [0.031]
No. of MFIs	-0.008** [0.004]	-0.009* [0.005]	-0.007 [0.015]
Credit Amount		0.014* [0.007]	-0.012 [0.009]
Instalment Frequency (=1 weekly)		0.026 [0.032]	0.096** [0.038]
Credit Cycle		-0.004 [0.004]	0.007*** [0.002]
Number of loans received		-0.005** [0.002]	-0.002 [0.008]
Temporal Effect	NO	NO	SI
Individual Fixed Effect	NO	NO	SI
Observations	486	486	486
Number of Individuals			91

Notes: This table reports OLS results with panel data for the first falsification test. Dependent variables are specified at the beginning of each column. The fake treatment is constructed by replicating the staggering structure in the reduction of the interest rate but allocating the credit number in which the treatment occurs for each individual randomly. Robust standard errors are shown in brackets below each estimate. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source:* SEDECA