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Signaling Creditworthiness in Peruvian Microfinance Markets: The Role of Information Sharing

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The Role of Information Sharing

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Abstract

Using borrower-level data from FINCA, one of Peru's leading microfinance institutions (MFIs), this paper evaluates the effect on borrowers' access to credit of FINCA's decision to share information on individual outstanding debt records (positive information) as well as group default records (negative information). Since all borrowers were simultaneously exposed to the same policy, the paper develops a creative identification strategy that relies on the exogenous variation of the opening and closing dates of loan cycles across lending groups. A credit expansion effect is identified for some borrowers in FINCA who looked more creditworthy after their positive records were exposed, suggesting that other lenders targeted FINCA clients with good credit records. This credit expansion effect seems to have hurt FINCA through higher default rates as its better clients were skimmed off.

Keywords: Access to Credit, Credit Bureaus, Microfinance, Information Sharing

JEL Classification: C33, O12, O16

1 Introduction

Formal lenders usually find it too expensive to serve poor borrowers in developing countries. The lack of traditional forms of collateral and the high costs of monitoring small-scale transactions translate into high interest rates that end up credit rationing the poor. Microfinance institutions (MFIs) originally emerged to tackle this problem by directly providing access to credit for poor borrowers. However, the provision of these services could also improve borrowers' access to credit *indirectly*; if the interaction of a borrower with an MFI facilitates the development of individual credit histories, other lenders can use these records as creditworthiness signals. Credit information systems that expose a personalized credit relationship with an MFI to a larger market may thus reduce screening costs for other lenders, improving borrowers' access to credit.

Despite the potential importance of credit information systems for the alleviation of credit constraints faced by the poor, very little is known about their specific effects in microfinance markets. Even less is known about one-sided increases in the credit information available. These policy changes are especially important in the Latin American context, where most of the time non-regulated MFIs have full discretion to choose whether or not to report their records and to determine the degree of information shared. This paper tries to address this gap in the literature by evaluating how an MFI's unilateral decision to increase the degree of information shared with other lenders affects access to credit for its own borrowers.

The specific objective of this study is to measure the effects of increased information sharing on the clients from an important MFI in Peru, FINCA (Foundation for International Community Assistance). In 2004, FINCA introduced important changes in its information sharing policy, providing a unique opportunity to measure the effects of increased information sharing on individual access to credit. The MFI transitioned from sharing group default records (*negative* information) to sharing both group default and individual outstanding debt records (*positive* information) of its clients. This decision increased the extent of information available to other lenders in the market without affecting the level of information to which FINCA had access. Interestingly, an increase in FINCA's default rates is observed right after the policy was implemented. This paper argues that this pattern could be explained by a credit expansion effect experienced by some borrowers who looked more creditworthy after the exposure of their positive records.

Even though all FINCA borrowers were simultaneously exposed to the same information sharing policy change, I am able to identify its effect on credit access outside the MFI by focusing on specific groups that were more likely to be affected by the additional information shared. First, notice that exclusive FINCA clients are expected to benefit the most. While they used to be lumped together with individuals with no credit histories, they can signal themselves as better risks after their credit relationship with FINCA is exposed. Second, borrowers with lower levels of outstanding debt with FINCA are expected to be more attractive for other lenders and/or more likely to

search for outside funding. Focusing on exclusive FINCA borrowers, I follow Rajan and Zingales (1998)'s difference in difference strategy and use borrowers with higher levels of outstanding debt as a control group for those with lower pending obligations with FINCA. If the latter are indeed the ones who benefit the most from FINCA's new information sharing policy, the effect on access to credit from external sources should be disproportionately large compared to that experienced by exclusive borrowers with higher levels of outstanding debt in FINCA.

This paper will thus focus on the credit expansion effect experienced by exclusive borrowers who vary in their levels of outstanding debt in FINCA in the baseline. The identification strategy strongly relies on the quasi-random procedure that FINCA uses to create village banks which, given that cycle duration is fixed at the banks' start-off date, allows us to consider the beginning and end dates of a loan cycle as exogenously given. This feature generates exogenous variation in the distance to the end of the ongoing cycle at the time the intervention took place. Since FINCA's methodology requires progressive repayment of the loans throughout the cycle, differences in the distance to the end of the cycle will be correlated with the amount of outstanding debt observed by other lenders when FINCA starts to share positive records but uncorrelated with access to credit outside the MFI.

I identify a credit expansion effect for exclusive FINCA borrowers who were more likely to have low levels of debt in the baseline. In particular, clients without default records who were exclusively served by FINCA, and who have lower levels of debt experienced the largest gains in credit access outside the institution. Although this is an improvement from the borrowers' perspective, this credit expansion seems to have hurt the institution through higher default rates as some of its better clients were skimmed off.

Previous developments in the theoretical and empirical literature have usually focused on the average effects of symmetric and universal increases in the information available to all lenders in developed credit markets (see Japelli and Pagano (2002), Galindo and Miller (2001), and Pagano and Japelli (1993)). In microfinance markets, the evidence to date suggests that the introduction of credit bureaus increases the volume of lending while reducing default rates (see McIntosh and Wydick (2009) and De Janvry, McIntosh, and Sadoulet (2010)).

No study to date analyzes the effects of unilateral decisions to augment the degree of information shared with other lenders, nor has anyone tried to identify the differential effects of additional information on heterogeneous borrowers. Thus, the contribution of this paper is threefold. First, it departs from previous efforts that concentrate on *universal* increases of credit information by analyzing FINCA's one-sided increase in the degree of information shared about its clients. Second, it measures the implications of this decision using micro-level data. Finally, the paper identifies differential effects for borrowers who vary in terms of their credit histories and existing outstanding debt when their credit records are extended.

Even though the focus is on borrower-level effects, my results also shed some light on the institutional effects of positive information sharing. All over the developing world, MFIs are increasingly trying to share more information about their clients' performance as a discipline device, but little is known about the consequences of such decisions. If information sharing facilitates client poaching and increases default rates as suggested by FINCA's experience, full information sharing in microfinance markets may only be feasible through regulations requiring symmetric and simultaneous extensions in the credit records shared by all lenders.

My results also highlight the importance of credit information systems in the process of *graduation* in microfinance markets. Understood either as the borrower's ability to escape poverty or as her ability to obtain credit access from formal banking institutions, graduation was postulated as the ultimate goal of MFIs when they first emerged.¹ Irrespective of the line of thought, most MFIs in developing countries have had trouble keeping graduation as their central goal.² The results presented here suggest that credit bureaus in microfinance markets can facilitate graduation, understood as access to formal credit markets, for some borrowers who can rely on their positive credit records as a signal of their creditworthiness.

The paper proceeds as follows. Section 2 briefly describes the existing theoretical and empirical literature on the effects of credit information systems in developed and microfinance credit markets. Section 3 describes credit markets in Peru and provides a basic profile of FINCA as well as a detailed description of the change in its information sharing policies during the period analyzed. The data are described in Section 4 while the empirical strategy is described in Section 5. Section 6 presents the results, and Section 7 concludes and describes the limitations of the study, as well as directions for future research.

2 Related Literature

Although there is a large body of theoretical work on the effects of asymmetric information in credit markets,³ less work has been done on the effects of information sharing between lenders. Early research by Pagano and Japelli (1993) and Padilla and Pagano (1997) points out that there are both costs and benefits implied by information sharing in formal credit markets. Although adverse selection and moral hazard problems are reduced through the use of credit information systems, participation in a credit bureau also generates the loss of monopoly power over client information.

¹ Given the relatively high interest rates charged by MFIs compared to banks or other institutional lenders, the second line of thought gained more advocates over time.

² Several factors explain the graduation failure. First, MFIs find it hard to let good borrowers go. Since clients who are ready to graduate are better risks and tend to get larger loans, losing them would considerably reduce profits, threatening the sustainability of the MFI. Second, even if micro loans help borrowers' businesses grow, access to formal credit markets may be limited due to lack of collateral, fear to leave the MFI and start a new credit relationship with a formal lender, excessive regulation, or limited ability of the borrower to rely on its past credit history with NGOs and cooperatives to obtain a loan in the formal banking sector.

³ Seminal contributions are due to Akerlof (1970), Stiglitz and Andrew (1981), and Jaffee and Russell (1976).

Incentives to share information are thus reduced when there is greater competition in the market and enhanced when sharing information is cheap and lenders face a large pool of borrowers on whom they have no information. Padilla and Pagano (1997) also point out that limited information sharing may lead borrowers to underperform since the gains of signaling creditworthiness are low. This result suggests that the expansion of credit information systems requires an institution able to centralize and standardize credit records from all lenders that can also punish banks that hold back or adulterate borrowers' records.

Contributions by Padilla and Pagano (2000) and Vercaemmen (1995) suggest that sharing more detailed information on borrowers' characteristics and/or credit performance can reduce the disciplinary effects of credit bureaus in developed credit markets. They argue that, in an adverse selection setting, the effectiveness of default as a bad signal is reduced as banks exchange better information on their clients. When richer information is disclosed, default is no longer a stigma; conditional on the additional information revealed, default becomes a weaker predictor of borrowers' type and future performance.

Using consumer credit data for the United States, Barron and Staten (2003) measure the marginal value of sharing records on outstanding loans (positive information) in addition to records on delinquency or default (negative information). At a given loan approval rate, they find that the default rate is 76.3 percent higher in an environment where only negative information is shared than in one in which both negative and positive records are revealed. Conversely, for a given default rate, credit scoring models that use positive and negative information approve far more loans than a system relying only on negative records.

Some other empirical studies on formal banking institutions have tried to measure the effect of information on credit constraints. Cross-country studies by Japelli and Pagano (2002), Love and Mylenko (2003), and Galindo and Miller (2001) show that better-developed credit information systems are associated with broader credit markets, a larger volume of lending, and lower credit constraints. Cowan and De Gregorio (2003) analyze the introduction of a private credit bureau in the Chilean banking sector and show that it was accompanied by an expansion of the total volume of consumption loans. Moreover, Hertzberg, Liberti, and Paravisini (2011) evaluate the expansion of the Argentinean credit registry in 1998 and find evidence of financial distress and reduced lending among borrowers whose multiple lending relationships were exposed. Their results suggest that credit bureaus can *reduce* access to credit for creditworthy borrowers.

In a seminal paper on competition in microfinance markets, McIntosh and Wydick (2005) show that when there are multiple lenders and an absence of information sharing among them, some borrowers may have an incentive to take on multiple loans. In their model, less patient borrowers reduce their overall cost of borrowing by getting two separate loans from two different

lenders, who only see a fraction of the borrowers' total debt. This behavior raises MFIs' institutional default rates due to higher levels of indebtedness and hidden debt in the market.

In a follow-up paper, McIntosh and Wydick (2009) develop a model that predicts that when all lenders exchange borrowers' records on default and outstanding debt, there is an overall reduction in default rates compared to the scenario where only negative records are shared. The authors argue that sharing positive information in addition to borrowers' negative records yields three effects: a screening effect, an incentive effect, and a credit expansion effect. The first two effects tend to reduce default rates through lenders' increased ability to screen multiple borrowers and reductions in the share of borrowers who engage in multiple loan contracts, respectively. In contrast, the credit expansion effect improves access to credit for clean and defaulting borrowers which in turn increases the probability of default, but without overwhelming the first two effects.

De Janvry, McIntosh, and Sadoulet (2010) and Luoto, McIntosh, and Wydick (2007) provide empirical evidence supporting McIntosh and Wydick (2009)'s findings. They evaluate the effects of introducing a credit bureau in the microfinance sector in Guatemala, set up by the three major microfinance lenders in the country. Focusing on branch-level data from one of the MFIs, the authors identify the *intention to treat* effect of access to credit records on credit performance. While institutional default rates experienced a 3.3 percent reduction, average loan sizes and overall lending increased after the risk bureau was implemented. De Janvry, McIntosh, and Sadoulet (2010) also report results from a randomized borrower training on the use of credit bureaus: making borrowers aware of the formalization of the dynamic incentives to repay raised the probability of taking a loan from an outside lender by 10 percentage points.

A related study by Giné, Goldberg, and Yang (Forthcoming) suggests how borrowers may respond to the introduction of a credit bureau in a context of imperfect identification systems and limited access to credit. The authors test the effect of improved personal identification by randomizing fingerprinting among loan applicants in Malawi. Despite the absence of a credit bureau, borrowers were told that their fingerprints and credit histories *could* be shared with other lenders. Fingerprinting substantially improved repayment rates for borrowers with the highest ex-ante default risk, suggesting that the intervention enhanced the credibility of the lender's dynamic incentives.⁴

Although most studies conclude that credit bureaus tend to reduce credit constraints and increase the volume of lending, the theoretical and empirical literature available for developed credit markets still provides mixed results. Most of the existing micro-level evidence on the effects of information sharing in credit markets has focused on microfinance markets, but much of this

⁴ Instead of manipulating the credibility of the dynamic incentive, Karlan and Zinman (2009) *inform* borrowers of its existence. They find strong evidence of moral hazard in the absence of formal dynamic incentives such as credit information systems.

work exploits a single policy experiment generated by the staggered rollout of a credit bureau in Guatemala. In addition, available studies to date pose crucial limitations. First, the existing evidence, both in developed and microfinance credit markets, corresponds to the effects of *symmetric* and *universal* increases in information for all lenders (De Janvry, McIntosh, and Sadoulet (2010)) or the simultaneous lengthening of credit histories exchanged between lenders (Barron and Staten (2003) and McIntosh and Wydick (2009)). Analyzing the unilateral decision of a non-regulated MFI to add records to a credit bureau is particularly relevant for Latin America, where these lenders tend to have full discretion to choose *if* and *how much* they want to share.⁵ Second, due to the lack of borrower-level data, most previous studies only measure average effects, ignoring differential effects on borrowers who are heterogenous in terms of their past and/or current credit histories. Relying on a novel identification strategy that takes advantage of FINCA's credit methodology, this paper is able to address both of these gaps in the literature.

3 Context and Intervention

The main suppliers of credit in Peru are institutional or formal lenders, regulated by the Banking and Insurance Superintendent (SBS due to its Spanish acronym). Almost all the formal credit in the country is provided by commercial and government banks, but there are also regulated MFIs that emerged in the form of for-profit private savings and loan unions (CMACs and CRACs) or financial institutions especially designed to target small and medium sized firms (EDPYMEs).⁶

Other financial institutions such as NGOs with altruistic objectives and credit and savings cooperatives are also present in the Peruvian credit market. These institutions are registered with but not regulated by the SBS. Since institutional lenders tend to ask for traditional forms of collateral that low-income segments of the population lack, poor borrowers in Peru are usually served by these non-regulated microlenders or by informal moneylenders.

Since 1968, the SBS has been operating a public credit bureau. All regulated lenders are compelled to share their clients' information on default and current, contingent, and total debt with the public bureau on a monthly basis. Private risk bureaus appeared in the country in 1995. In addition to the records from the public credit bureau, they also distribute records from other institutions with whom they are able to sign data agreements.

The rapid growth of the microfinance sector beginning in the 1990s generated worries about multiple borrowing and overindebtedness. COPEME—a consortium of private organizations and MFIs working for the development of micro and small firms—served as a discussion forum for all its members, who were particularly worried about these trends. They reached the conclusion that higher levels of transparency in the market were necessary to avoid client overlaps in the credit

⁵ See Espinosa, Shapleigh, Fernandez, Mutchler, and Daly (2003) and Kormos (2003) for examples.

⁶ For more details, see Marchini (2004).

portfolios of non-regulated institutions. With the technical assistance and the funds of USAID, a joint program with COPEME was established in 1998 to channel the existing worries among the MFIs into a concrete strategy. Under an agreement signed between COPEME and EQUIFAX, all the consortium's partner MFIs agreed to progressively incorporate their credit records into the bureau's database in exchange of preferential rates at the credit bureau.⁷

The timing of the decision to share was basically shaped by technological restrictions that delayed the transmission of institutional records to EQUIFAX, so that we can rule out strategic reasons on FINCA's side to choose a specific date for the introduction of the information sharing policy change. By 2005, the credit bureau had access to the credit records of 85 percent of the borrowers in non-regulated MFIs, and more than four-fifths of them had negative and positive records in the credit bureau's database.

3.1 FINCA and the Evolution of its Information Sharing Policy

FINCA is a non-profit but financially sustainable MFI that has been operating in Peru since 1993. It sponsors lending and savings groups of poor female microentrepreneurs in three regions of the country: Lima, Ayacucho, and Huancavelica. In addition to providing credit, FINCA promotes saving habits among its clients by requiring savings deposits and encouraging additional voluntary savings. As of July 2008, FINCA sponsored 584 lending groups with a total of 11,696 clients, 92 percent of whom were women. Total savings reached US\$3.2 million and outstanding debt amounted to US\$2.3 million. By 2005 FINCA served 5.5 percent of the microfinance clients in Peru and accounted for almost 4 percent of the outstanding debt in all MFIs (Navajas and Tejerina (2006)).

FINCA's methodology is based on many of the principles of the Grameen Bank model. Loan applicants are grouped in village banks consisting of 25-30 women. Unlike most group lending organizations around the developing world, a FINCA sponsored village bank is not self-selected but instead quasi-randomly created. Loan applicants who come to FINCA are put on a list and once this list contains about 30 names, a new group is formed.⁸ The village bank usually begins operations one or two days after the group is complete.

The group applies for a single loan, initially small, to be paid in weekly, biweekly, or monthly installments over a loan cycle. Almost all village banks in Ayacucho have cycles that last for four months while the cycles of most village banks in Lima have durations between four and

⁷ See Valdivia and Bauchet (2003) and Appendix 2 in Brom (2012) for more details. Notice that this environment is very similar to that in Guatemala during the implementation of CREDIREF (see Luoto, McIntosh, and Wydick (2007)).

⁸ According to Karlan (2007), FINCA prefers this methodology over self-selection because it is the fastest way to create new banks and it facilitates the creation of new social connections. Since FINCA's mission includes helping the poor accumulate social capital, they prefer that initial village bank members do not know each other.

six months. Each installment includes a fixed portion of the principal and interest owed to FINCA, as well as mandatory savings dependent on the loan size.

Savings accumulated by the village bank are a non-traditional form of collateral. In fact, other lenders in the market highly value FINCA clients because of their savings. Once FINCA grants a loan, each person gets a share of the funds as an individual loan, but all group members are jointly liable for loan repayment. If someone is not able to completely repay her individual loan by the end of the cycle, her savings are used to cover the unpaid portion. When that is not enough, equal discounts from the savings accounts of all group members are applied. At the end of the cycle, the defaulter may be excluded from the group.

FINCA started to share *group* default records with EQUIFAX in 1999. Legal restrictions related to the group lending methodology do not allow the MFI to report individual default. In the context of the COPEME-EQUIFAX agreement, FINCA added borrowers' records on *individual* outstanding debt in August 2004, increasing the amount of information shared with other lenders but leaving unaffected the degree of information it had access to.⁹ FINCA's main motivation to add its positive records was to contribute to the transparency of the market as a way to avoid client poaching.

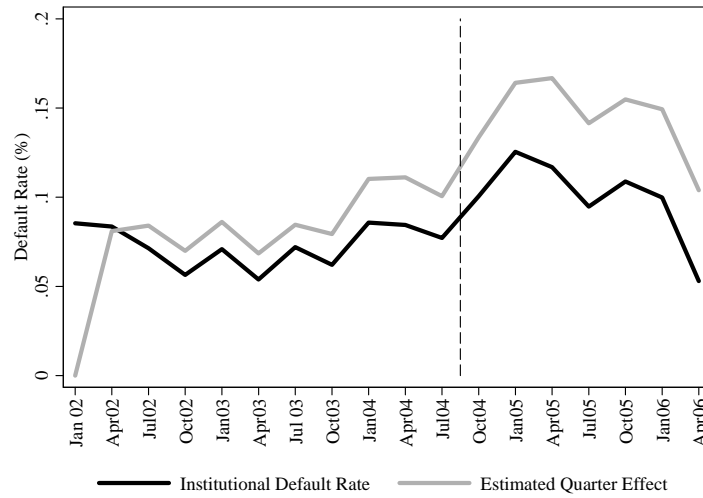
This unilateral increase in the information shared by FINCA seems to have had short-run negative effects on institutional default rates. Figure 1 depicts both the evolution of default rates over time as well as the estimated quarter effect at the bank level. The quarter effect is added to the figure as a way to show the evolution of default rates net of compositional effects that may arise from changes in the pool of clients over time. It is clear that average default rates in FINCA increased over time, especially after the information sharing policy change took place. Relative to the first quarter of 2002, quarter effects are increasing and significant. In particular, there is a jump between the third quarter of 2004 and the first quarter of 2005, which coincides with the timing of FINCA's exposure of positive records.¹⁰ A mean comparison *t*-test confirms that there is a significant difference between the pre- and post-policy periods: average default rates go from 7 percent to 10 percent after FINCA's addition of positive records.

This paper argues that the evolution of default rates can be explained by a strong credit expansion effect experienced by some borrowers from FINCA who benefited from the increase in the information available on them. Before the intervention, clean borrowers exclusively served by FINCA used to be observably equivalent to individuals with no credit records in the baseline,

⁹ It is worth noting here that since FINCA was already sharing its negative records with EQUIFAX it did not benefit from additional reductions of the credit bureaus' rates. Thus, between 1999 and 2004, the MFI's access to credit information remained the same.

¹⁰ Between 1993 and 1997, Peru experienced accelerated economic growth but then stagnated between 1998 and 2001 due to the combined effects of *El Niño* and international credit market crises. Analyzing the evolution of default rates after 2001 minimizes the influence of macroeconomic shocks on the estimates of the quarter effects.

Figure 1. Estimated Year Effect on Village Bank Default Rates



Source: FINCA-Peru’s historical database.

Note: Identification of the quarter effect is based on the estimation of $y = \alpha_A D^A + \alpha_T D^T$, where y is the average default rate in a village bank, and D^A and D^T are the vectors of dummies that identify the age of each group and the quarter in which y is measured, respectively. Since age, cohort, and year effects are linearly dependent, and given that FINCA has not changed its targeting policy over time, cohort effects are excluded to identify α_A and α_T . See Attanasio (1998) for an alternative identification strategy.

while exclusive and past defaulting borrowers were observably similar to past defaulters with no access to credit. The lack of positive credit records made it impossible for lenders to accurately infer the potential risk of FINCA exclusive borrowers which made them more likely to be rejected when looked up in EQUIFAX’s dataset. After the intervention, exclusive borrowers could use their positive records as a credible signal of their creditworthiness and lenders could see their screening costs for these borrowers reduced. Since FINCA did not experience any change in the amount of information it had access to (or the cost of getting it), McIntosh and Wydick (2009)’s screening effect is absent in this context. Thus, the change in other lenders’ perceptions of the creditworthiness of FINCA’s clients may dominate the incentive effect, increasing institutional default rates.

4 Data

This paper draws on three different data sources. First, data on all the loans granted by FINCA between May 1999 and June 2006 are gathered from the MFI’s institutional records. The unit of observation is the client, and the time dimension is given by the number of cycles in which the borrower was in a village bank. Institutional records contain information on the loan size, interest

rates charged, individual repayment balances by the end of the cycle, voluntary and mandatory savings by the end of the cycle, and basic demographics collected when the client first entered a village bank sponsored by the institution.

The second source of data is EQUIFAX's records for individuals who were FINCA clients by December 2004. This database contains information on outstanding debt with all lenders sharing information with EQUIFAX, past group default records with FINCA, and past individual/group default records with other lenders.¹¹ This information is collected for FINCA's December 2004 client base at two points in time, December 2004 and December 2005, irrespective of the relationship of these clients with FINCA after the baseline.¹²

Ideally, one would want to measure the change in access to credit outside FINCA before and after August 2004. A limitation of EQUIFAX's data is that there is a gap of four months between the time at which positive information sharing started (August 2004) and the measurement of the baseline (December 2004). However, even in the worst case scenario improvements in access to credit are underestimated because other lenders could have used the additional information on FINCA borrowers to grant additional loans during these four months. In what follows, December 2004 is considered to be the implementation date of the policy.¹³

This paper focuses on exclusive FINCA clients served in the regions of Lima and Ayacucho. The third office in Huancavelica had very few clients by December 2004 and is therefore excluded from the analysis. The final sample corresponds to a two-period balanced panel of 3320 individuals who were exclusive FINCA clients in EQUIFAX's baseline data, covering 70 percent of FINCA's client base in Lima and Ayacucho in December 2004.

Table 1 presents some basic characteristics of exclusive FINCA borrowers, distinguishing between those with clean credit records and those with past default records with FINCA or with any other lender. As expected, past defaulters are also more likely to have been late at least once in their payments to their village bank. Defaulters also tend to have higher dropout rates than clean borrowers. In particular, more than half of the dropouts with past default records leave FINCA, having had problems in repaying their individual loans on time at least once.

¹¹ Since EQUIFAX's database only provides records for loans with lenders that share their information with the risk bureau, loans with some non-regulated institutions could be missed. However, these are not big concerns due to EQUIFAX's strong presence in the non-regulated microfinance sector.

¹² EQUIFAX data were obtained by Innovations for Poverty Action (IPA) and *Grupo de Análisis para el Desarrollo* (GRADE), in the context of a collaborative effort between them, the Consortium for the Promotion of Women and the Community (*Consortio de Promoción de la Mujer y la Comunidad*, PROMUC), and EQUIFAX. The data were originally collected to analyze the evolution of multiple borrowing in microfinance markets and, for that matter, only two periods of data were required.

¹³ It is unlikely that borrower behavior was affected during these months. Although FINCA provided a brief training session to inform their clients about the policy change, the staff pointed out that, even after the training, most borrowers had a limited notion of the implications of positive information sharing. Clients became more aware of the policy implications as time went by and credit officers reinforced the information given in the training during the regular bank meetings.

Table 1. Ex-ante Characteristics of FINCA Exclusive Borrowers, by Past Default History

	Clean	Defaulters	Total
Number of individuals	2890	430	3320
<i>Characteristics in FINCA</i>			
Ever late in payments to Village Bank (%)	17.6	27.4	18.9
Cumulative Savings (US\$)	300	228	291
External Account Loan Size (US\$)	225	238	227
Time in a Village Bank (months)	27.5	28.0	27.6
Dropout Rate (%)	26.7	34.2	27.6
Dropout With Default Records (%)	43.4	54.0	45.1
<i>Demographic Characteristics</i>			
Number of children	1.8	1.6	1.8
Married (%)	73.2	71.4	72.9
Educational Attainment (%)			
No education	9.1	1.9	8.2
Primary	28.7	13.5	26.7
Secondary	44.3	50.2	45.1
Higher	17.9	34.4	20.0
Age	38.4	37.4	38.3
Lima (%)	25.9	44.4	28.3
Economic Activity (%)			
Sales	27.6	42.3	29.5
Grocery	21.7	18.6	21.3
Prepared Food	9.9	8.6	9.8
Services	11.3	14.0	11.7
Production	26.3	11.4	24.4
Other	3.1	5.1	3.3

Source: FINCA-Peru's historical database.

Note: The dropout rate is defined as the percentage of FINCA borrowers present in Dec04 who left between Dec04 and Dec05. The dropout with default records rate is defined as the percentage of dropouts who left with at least one default episode.

In terms of demographics, Table 1 reveals that defaulters tend to be more educated than clean borrowers. Moreover, defaulters seem to work more in sales activities and tend to be more concentrated in Lima than clean borrowers. The fact that defaulters are on average relatively more educated suggests that they may have more chances to obtain credit from other lenders than borrowers with clean records. Additionally, entrepreneurs in the sales sector might face more fluctuations in their income flow, which could be positively correlated with default.

Table 2 shows how credit sources changed for exclusive borrowers from FINCA between 2004 and 2005. After the policy was implemented, both defaulters and clean exclusive FINCA

Table 2. Average Outstanding Debt (US\$) and Share of Total Debt: Exclusive FINCA Borrowers

	Number of individuals	Outstanding Debt by Dec04	Outstanding Debt by Dec05			
		Non-Regulated	Non-Regulated		Regulated	
		FINCA	FINCA	Other MFIs	Banks	MFIs
All Exclusive Clients	3320					
US\$		146	133	58	33	30
Share of Total Debt		1.00	0.72	0.12	0.04	0.05
Clean	2890					
US\$		145	132	53	30	31
Share of Total Debt		1.00	0.73	0.11	0.04	0.05
Defaulters	430					
US\$		148	142	92	54	24
Share of Total Debt		1.00	0.62	0.19	0.07	0.05

Source: EQUIFAX's records for December 2004 and December 2005.

borrowers increased the share of their total debt in other lending institutions, but defaulters were able to increase their debt with other lenders more than clean borrowers were. By December 2005, clean borrowers still kept 73 percent of their outstanding debt in FINCA, while defaulters only owed 62 percent of the value of their pending loans to the MFI. Not only did past defaulters experience a greater expansion in their credit access in other non-regulated lenders, but they also surpassed clean borrowers in terms of their share of debt in regulated institutions.

Since both clean and defaulting borrowers exclusively served by FINCA had similar levels of debt in 2004, the greater increase in debt outside FINCA observed for defaulters may be a response to the incentives that these borrowers have to obtain additional loans to repay old ones in arrears. This pattern suggests that the evolution of credit access outside FINCA is quite different across the groups of clean and defaulting borrowers. Thus, the effects of the policy are measured separately for each group.

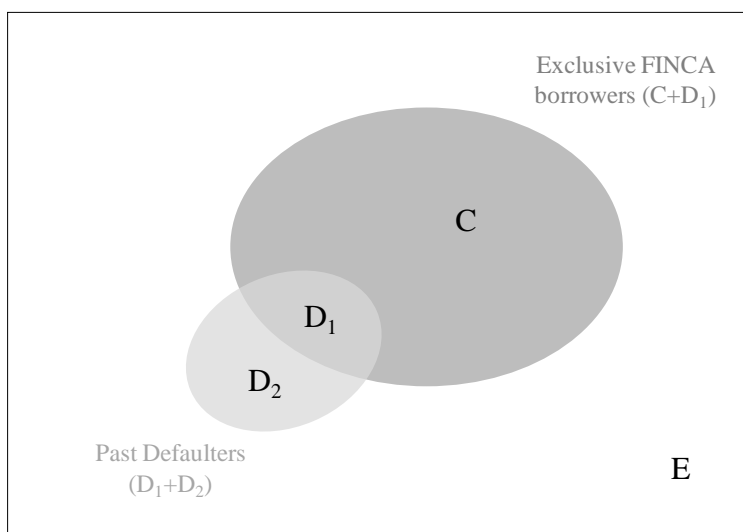
5 Empirical Strategy

5.1 The Environment

Figure 2 portrays a simplified version of the setting of the experiment, comparing exclusive FINCA borrowers in December 2004 to individuals who were observationally equivalent to them before positive records were added. As mentioned at the end of Section 3, clean borrowers exclusively served by FINCA used to be observably equivalent to individuals with no credit records in the

baseline, while exclusive and past defaulting borrowers were observably similar to past defaulters with no access to credit. In the figure, borrowers with *current* credit access through FINCA are labeled as C and D_1 , while individuals excluded from credit markets are represented by areas E and D_2 . The group of *past* defaulters, $D = D_1 + D_2$, is composed of borrowers with at least one default experience with FINCA and/or with some other lender in the past. Within this group, area D_1 represents past defaulters who obtained a new loan after they defaulted, while area D_2 represents past defaulters with no current credit access.

Figure 2. Distribution of Borrowers



Before the intervention, other lenders in the market could only distinguish between past defaulters in group D and borrowers not in D ($\sim D=C+E$). After FINCA started to share its borrowers' positive records, other lenders could differentiate between groups D_1 , D_2 , C , and E . Past defaulters in D_1 experienced an improvement in their reputation; even though other lenders still observed their negative records, the intervention allowed them to show that they were able to obtain a new loan after their default episode. Since these borrowers were good enough to obtain a new loan, access to credit through FINCA signals that a past default was probably a random shock uncorrelated with their type. Borrowers in C experience a similar effect; after the intervention, they look different from individuals who are screened out of the credit market (E).

Assume that the market has a large number of borrowers with no wealth or collateral who request loans to finance their business projects. Borrowers are heterogenous in three dimensions: type, past default records, and current outstanding debt. In the first dimension, it is assumed that borrowers can be born either as a good (g) or a bad (b) type. Define $\Theta = \{g, b\}$ as the set of possible borrower types. When a borrower has $\theta = g$, she has a higher success probability for her

project than a borrower with $\theta = b$, which means that lenders find the former type more attractive when lending.¹⁴ Lenders do not observe individual types but they know the distribution of types in the population.

Borrowers can also differ in terms of their past credit history and their current credit balances. In terms of past credit history, heterogeneity arises from the fact that some borrowers could have past default records (D) while others have clean credit records (C+E). Moreover, borrowers have different levels of current outstanding debt at a given point in time.

Define α_i as the proportion of type- g borrowers in group i and N_i as the total number of borrowers in i , where $i = \{C, D_1, D_2, E\}$. Given the differences in the probability of success across types, it is reasonable to expect that type- g borrowers are more abundant in C relative to D_1 . Since a higher probability of success translates into a lower default probability, all other things equal, it can be assumed that $\alpha_C > \alpha_{D_1}$. Moreover, individuals who defaulted but were given a second chance in FINCA are more likely to be type- g borrowers than individuals with past default records excluded from credit markets. Thus, $\alpha_{D_1} > \alpha_{D_2}$ can also be assumed. Additionally, it is assumed that E is the group with the lowest proportion of type- g borrowers. Since these individuals have no credit histories, it is sensible to expect that most of them were perceived as bad credit risks by all lenders. In sum, it is assumed that $\alpha_C > \alpha_{D_1} > \alpha_{D_2} > \alpha_E$.

When only FINCA's group default records are available, the probabilities of being a type- g borrower for each observed group are given by:

$$\begin{aligned}\alpha_D &= Pr(\theta = g|D) \\ &= \frac{\alpha_{D_1}N_{D_1} + \alpha_{D_2}N_{D_2}}{N_{D_1} + N_{D_2}} \in [\alpha_{D_1}, \alpha_{D_2}] \\ \alpha_{\sim D} &= Pr(\theta = g|\sim D) \\ &= \frac{\alpha_C N_C + \alpha_E N_E}{N_C + N_E} \in [\alpha_C, \alpha_E]\end{aligned}$$

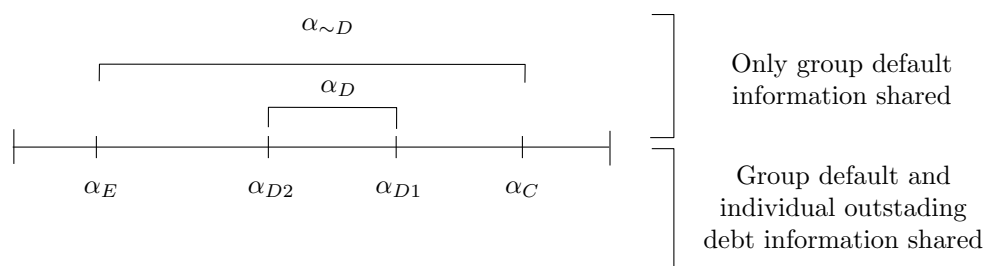
Once outstanding debt records are exposed, other lenders are able to distinguish between C, D_1 , D_2 , and E. This implies that lenders can update the borrowers' probabilities of being type- g to α_i within each group i . Figure 3 shows how sharing outstanding debt records benefits borrowers in C and D_1 : their probabilities of being type- g increase from $\alpha_{\sim D}$ to α_C and from α_D to α_{D_1} , respectively. It is clear that these borrowers become more attractive for other lenders, which implies that they are more likely to experience a credit expansion effect.¹⁵ However, the credit expansion effect they experience will vary depending on their level of outstanding debt by the time positive records are shared. With decreasing returns to scale for the project and default probability increas-

¹⁴ Strategic default is assumed away.

¹⁵ Although $\alpha_C > \alpha_{D_1}$, the size of $(\alpha_C - \alpha_{\sim D})$ relative to $(\alpha_{D_1} - \alpha_D)$ will determine if the positive signal was stronger for clean or defaulting exclusive borrowers.

ing in total debt, higher levels of outstanding debt make the borrower a worse risk, reducing the loan size a new lender is willing to offer. Consequently, access to credit will be mostly improved for exclusive borrowers who experience an increase in the probability of being type- g and have low levels of outstanding debt from FINCA.

Figure 3. Probability of Being a Type- g Borrower, before and after Outstanding Debt Is Revealed



5.2 Identification Strategy

The main objective of this study is to empirically identify the differential effects of FINCA's one-sided increase in the supply of information to EQUIFAX on equilibrium outcomes for its exclusive clients. From the above, one would expect the effect of the intervention to be different depending on the borrower's past credit history and her level of pending debt by the time FINCA reveals individual positive records. Within the groups of exclusive and clean borrowers (group C in Figure 3) and exclusive and defaulting borrowers (group D_1 in Figure 3), changes in the *logarithm of outstanding debt outside FINCA* and the *logarithm of outstanding debt in regulated institutions* between December 2004 and December 2005 are measured.^{16,17}

Since all exclusive borrowers have zero outstanding debt outside FINCA in December 2004, it is not surprising that a before and after comparison among them yields a positive effect in total debt outside the MFI. Starting at zero, the only way they can change their outstanding debt with other lenders between 2004 and 2005 is by increasing it.

Within the group of clean and defaulting exclusive borrowers, I identify differential effects for borrowers who vary in their levels of outstanding debt in FINCA in the baseline. However, comparing borrowers based on their observed level of debt might yield biased estimates of the

¹⁶ Although one year may seem to be a relatively short window of time, the advantage is that other features of the credit environment are more likely to remain unchanged.

¹⁷ Since exclusive borrowers have no access to loans outside FINCA before December 2004, measuring the change in outstanding debt instead of the change in the loan size from other institutions is a good approximation to the change in their access to credit outside FINCA. Some borrowers could have obtained a loan in other institutions after December 2004 and completely repaid it by December 2005. Although these cases are missed, this possibility only underestimates the effect of the policy on access to credit.

policy effect because observed debt is an endogenous equilibrium outcome. Both observed outstanding debt in FINCA and access to credit from other lenders are functions of the borrower's past performance, loan size, and individual demographic characteristics.

An unbiased effect of the intervention for borrowers with lower levels of outstanding debt can be identified if there is a variable uncorrelated with borrowers' characteristics and financial performance, but correlated with their level of outstanding debt in FINCA in December 2004. This variable can be used to sort individuals between artificially constructed low and high debt groups to obtain a clean effect of the intervention for borrowers with lower debt.

Fortunately, FINCA's group formation procedures and cycle duration schemes described in Subsection 3.1 allow us to use the variation in the distance between December 2004 and the end of the ongoing cycle across groups as such exogenous variable. In particular, two key aspects back up this claim.

First, the differences in the startup date of the current cycle at a fixed point in time are random across village banks and are not influenced by clients' characteristics (see Appendix A). Since village banks are quasi-randomly created, so is the creation date of a bank. Moreover, since cycle duration is fixed once a bank opens and a new loan cycle starts two or three days after the previous cycle's end, the beginning and end dates of a loan cycle are exogenously given. Borrowers have little power to affect these dates and they are instead driven by the creation date of the village bank and the cycle duration set at that time.¹⁸

Second, the new information sharing policy was an exogenous shock, experienced simultaneously by all village banks. The particular implementation date was not an endogenous choice but instead followed from technical issues related to data transmission and the timing of the formalization of the institutional agreements between FINCA and EQUIFAX.

Given that the variation of the opening and closing dates of loan cycles across lending groups is exogenous and that FINCA's methodology requires progressive repayment of the loans throughout the cycle, borrowers in groups closer to the end of their cycle are more likely to have lower levels of outstanding debt, irrespective of their bank or individual characteristics. In particu-

¹⁸ Two possible caveats about the exogeneity of the end date of a cycle are worth mentioning here. Clients in Lima might self-select into different cycle durations and meeting frequency combinations, potentially affecting the start and end dates of loan cycles. Nevertheless, two-group *t*-tests on the equality of means show that there are no significant differences across treatment and control groups in terms of the duration or the frequency of the meetings in Lima. Neither are there significant differences in terms of ex-ante average repayment performance and average external debt across village banks with different durations and meeting schedules. This is consistent with Field and Pande (2008), who show that repayment frequency has no effect on repayment performance. It should also be pointed out that cycle length and meeting frequency is a choice only available to the initial group of borrowers who establish the village bank; members who join later take the cycle duration as given. Worries about the endogeneity of cycle duration are thus only justified for new banks in Lima and by December 2004, only 15 percent of the banks in the region had operated for four or fewer cycles. A second caveat emerges if restructuring or renegotiation of the group with FINCA is allowed and affects the duration and the end date of the cycle. Fortunately, these events are very unlikely in FINCA and should not be a source of major concern.

lar, the distance between December 2004 and the end of the ongoing cycle at that date is exogenous and allows us to construct two ex-ante similar groups: an “early in the cycle” group, which includes borrowers with more than half of their cycle left, and a “late in the cycle” group, which consists of borrowers with less than half of their cycle left. The former group is associated with higher levels of debt while the latter is likely to include borrowers with lower levels of outstanding debt in December 2004.¹⁹

Both groups, early in the cycle and late in the cycle, are compared in Appendix B to ensure that they are effectively similar ex-ante. Tables B.1 and B.2 present t -tests on the equality of means in terms of observed characteristics in the samples of exclusive and clean and exclusive and defaulting borrowers. In general, the identification strategy produces observably similar groups for both clean and defaulting borrowers. Only some minor differences in observables are identified but they can be controlled for in the estimation.²⁰ As an additional check, Table B.3 provides a comparison of ex-ante characteristics for the full sample of exclusive borrowers, irrespective of their past default records. Again, very few significant differences between early and late in the cycle groups are identified.

5.3 Estimation Strategy

Define Y_{ijt} as the level of outstanding debt with lenders other than FINCA for individual i in district j at time t , where j goes from 1 to 6 to index the six districts served by FINCA during the period analyzed.²¹ Thus, $\Delta Y_{ij} = Y_{ij5} - Y_{ij4}$ measures the change in access to credit outside FINCA between December 2004 and December 2005 for borrower i in district j . Since all exclusive borrowers have zero outstanding debt outside FINCA ex-ante, ΔY_{ij} is actually equivalent to Y_{ij5} , which could continue to be zero or become positive.²² Thus, a first difference estimator can capture the effect of the intervention:

$$\log(Y_{ij5}) = \alpha + \beta_1 L_{ij} + \beta_2 X_{ij} + \beta_3 Z_{ij} + \nu_j + \epsilon_{ij} \quad (1)$$

where L_{ij} is a dummy variable that is equal to one when the borrower belongs to the late in the cycle group and zero otherwise, X_{ij} are additional individual controls such as demographic and borrower characteristics, and Z_{ij} are village bank-level characteristics. The term ν_j is the

¹⁹ Since the distance between August 2004 and December 2004 is close to the typical cycle duration of four months, a village bank which is in the “late” group in August will also be in the “late” group in December.

²⁰ In the case of the clean group, significant differences at the 0.01 level are found for the percentage of clients in Lima and the percentage of clients with businesses in the services sector (see Table B.1). But even in these cases, the magnitude of the differences between groups is small. Among the defaulting borrowers, the late in the cycle group has spent significantly less time in a village bank sponsored by FINCA (see Table B.2).

²¹ These are Huamanga and Huanta in Ayacucho and San Juan de Lurigancho, San Juan de Miraflores, Villa El Salvador, and Villa Maria del Triunfo in Lima.

²² Whenever $Y_{ij5} = 0$, its value was replaced by 1 so that its logarithm was equal to zero.

unobserved time-invariant district effect and ϵ_{ij} is an error term. The estimated impact of the intervention for borrowers in the late group will be given by β_1 in equation (1), which is separately estimated for clean and defaulting borrowers to allow for differences in coefficients across subsamples.

By definition, multiple borrowers already had positive outstanding debt balances in December 2004, which implies that the differential effect of being in the late group for them has to be estimated using a double difference estimator:

$$\log(Y_{ijt}) = \lambda + \alpha P_t + \beta_0 L_{ij} + \beta_1 P_t \cdot L_{ij} + \beta_2 X_{ij} + \beta_3 Z_{ij} + \nu_j + \epsilon_{ijt} \quad (2)$$

where Y_{ijt} is outstanding debt with other lenders different from FINCA at time t and P_t is a dummy variable that is equal to one when $t = 5$ and zero otherwise. Again, fixed effects at the district level are included and ϵ_{ijt} is an error term.

If credit access improved for everyone in the market for some other reason different from the new information sharing policy of the MFI, then we should identify a positive coefficient for α . Moreover, if something else in the market was driving a differential positive effect for borrowers in the late group in FINCA then we should expect β_1 to be positive both for exclusive and multiple borrowers. However, if β_1 is positive and significant only among exclusive borrowers, which is the group of borrowers most likely to be affected by the additional information shared, we have evidence in favor of a credit expansion effect due to FINCA's new information sharing policy. Since multiple borrowers were already observed in EQUIFAX's database even before FINCA revealed outstanding debt records, the change in the information available on them is marginal. If at all, multiple borrowers in the late group are expected to experience a much less important credit expansion effect than their exclusive borrowers counterparts, so the results for the former should work as a placebo test.

It is worth noting here that, since exclusive borrowers had no access to credit outside FINCA ex-ante, there is no such thing as an intensive margin effect among them. What β_1 is capturing is the net effect on the extensive margin, both through an increase in the number of loans from other lenders as well as through an increase in the amount borrowed from *each* additional lender.

6 Results

Table 3 presents estimates of the extensive margin effect, β_1 in (1), for two outcome variables: the change in the logarithm of outstanding debt outside FINCA and the change in the logarithm of outstanding debt in regulated institutions. The first column shows the number of individuals included in each regression while the next three columns present $\hat{\beta}_1$ when there are no controls, adding individual controls (X_{ij}), and with individual and village bank controls (X_{ij} and Z_{ij}). Vari-

ables in X_{ij} include: number of children, civil status, educational attainment, age of the borrower, economic activity of the business, and time spent in a village bank. Additionally, Z_{ij} contains village bank characteristics such as the age of the group, the average turnover rate (the ratio of new clients and dropouts to the number of original clients in a given cycle), and the average savings per capita across cycles. In all cases, district fixed effects are included.

Table 3. Impact of Positive Information Sharing on Access to Credit Among Exclusive Borrowers in the Late in the Cycle Group

Dependent Variable	N⁰ Individuals	No Controls	Individual Controls	Individual & VB Controls
<i>Log(Outstanding Debt Outside FINCA)</i>				
All Exclusive Clients	3320	0.179** (0.080)	0.170** (0.080)	0.193** (0.080)
Clean	2890	0.155* (0.083)	0.150* (0.083)	0.168** (0.083)
Past defaulters	430	0.356 (0.254)	0.318 (0.258)	0.292 (0.256)
<i>Log(Outstanding Debt in Regulated Institutions)</i>				
All Exclusive Clients	3320	0.087 (0.061)	0.101* (0.061)	0.087 (0.061)
Clean	2890	0.089 (0.064)	0.111* (0.064)	0.096 (0.064)
Past defaulters	430	0.075 (0.190)	0.085 (0.195)	0.100 (0.195)

Source: FINCA-Peru's historical database and EQUIFAX's database.

Note: Fixed effects at the district level. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In general, after FINCA exposed its borrowers' positive records, exclusive borrowers closer to the end of their cycles by December 2004 experienced a greater credit expansion effect than those early in their cycle (see the results for all exclusive clients). This is true for both outcome variables, although the credit expansion effect is clearly weaker in regulated institutions. Although these aggregate results suggest global marginal gains for exclusive borrowers who were more likely to have lower debt when the policy was implemented, further analysis is conducted separately in the sub-samples of clean borrowers and past defaulters.

For both outcomes, the positive effect on access to credit seems to have been driven by the average gains from clean borrowers in the late group. Since the dependent variable is in log form, the coefficient $\exp(\beta_1)$ is the ratio of the expected geometric mean for the late in the cycle group over the expected geometric mean for the early in the cycle group, when other covariates are held fixed. Estimates of β_1 from the last column in Table 3 imply that clean borrowers in the

late group significantly increased their outstanding debt outside FINCA 18 percent more than their early in the cycle counterparts. In turn, defaulters in the late group had 37 percent more debt than defaulters in the early group, but $\hat{\beta}_1$ is not significantly different from zero for them.

Access to regulated institutions is particularly important because these lenders provide larger loans and lower interest rates compared to non-regulated MFIs.²³ Compared to their early in the cycle counterparts, clean and defaulting borrowers in the late group had 9 percent and 12 percent more outstanding debt in regulated institutions, respectively. Although $\hat{\beta}_1$ is not significant in any case, it is closer to significant among clean borrowers. Although the evidence is weaker for access to credit from regulated institutions, it seems that clean borrowers who were more likely to have low levels of debt in the baseline experienced an important credit expansion effect, not only in terms of finding new funding sources outside FINCA, but also in terms of the quality of the loan contracts they were able to obtain.²⁴

The effect on the extensive margin for late in the cycle borrowers relative to early in the cycle borrowers can be decomposed into two parts: the differential change in the number of external lenders and the differential change in the debt per external lender. Let K_{ijt} denote the number of external creditors serving borrower i who lives in district j at time t . Since $Y_{ij4} = K_{ij4} = 0$, the log of the change in access to credit outside FINCA for individual i can be expressed as:

$$\log(Y_{ij5}) = \log(K_{ij5}) + \log\left(\frac{Y_{ij5}}{K_{ij5}}\right) \quad (3)$$

Table 4 decomposes the treatment effect experienced by late in the cycle borrowers into the two channels in (3). The last column is just showing estimates of β_1 from Table 3 when individual and village bank controls are considered. The first and second columns in Table 4 decompose $\hat{\beta}_1$ into the contribution of the change in outstanding debt per lender— $\log(\Delta Y/K)$ —and the contribution of the change in the number of lenders— $\log(\Delta K)$ —, respectively.

It is clear that most of the expansion in access to credit outside FINCA experienced by late in the cycle exclusive borrowers is explained by an increase in the average loan size per lender. Only 6.2 percent of the change in total outstanding debt identified for all exclusive borrowers in the late group is explained by $\log(\Delta K)$. Similarly, less than 4 percent of the change in regulated loans is due to an increase in the number of lenders. This pattern also holds for clean borrowers and past defaulters. In particular, 92.4 percent of the positive and significant effect on total external

²³ With the exception of Ecuador and Paraguay, the gap between annual interest rates charged by MFIs and banks in Latin American countries ranges from 6 to 21 percentage points. In Peru, the microfinance premium reaches 16 percentage points (see FOMIN (2008)).

²⁴ Robustness checks with continuous treatment variables do find a significant credit expansion effect among exclusive clean borrowers (see Tables C.2 and C.3).

Table 4. Decomposition of the Credit Expansion Effect Among Exclusive Borrowers in the Late in the Cycle Group

	$\log(\Delta Y/K)$	$\log(\Delta K)$	$\log(\Delta Y)$
External Loans			
All Exclusive Clients	0.182	0.012	0.193
	93.9%	6.2%	100.0%
Clean	0.156	0.012	0.168
	92.8%	7.4%	100.0%
Past Defaulters	0.285	0.008	0.292
	97.4%	2.6%	100.0%
Regulated loans			
All Exclusive Clients	0.084	0.003	0.088
	96.5%	3.7%	100.0%
Clean	0.092	0.004	0.096
	96.4%	3.9%	100.0%
Past Defaulters	0.098	0.002	0.100
	98.0%	2.0%	100.0%

Source: FINCA-Peru's historical database and EQUIFAX's database.

Note: Row percentages in the second line.

borrowing identified among clean borrowers who are late in their cycle is due to an increase in the average outstanding debt per lender.

Notice that this does *not* mean that multiple borrowing does not explain the expansion of credit access outside FINCA. The relatively small role of $\log(\Delta K)$ is just ruling out that the increase in total outstanding debt from other lenders is occurring through several small loans with other institutions. Each new credit relationship established outside FINCA creates important credit expansion gains, as the change in the average loan per lender reveals.

The results presented here may seem to contradict the predictions from McIntosh and Wydick (2009) and the empirical evidence in Luoto, McIntosh, and Wydick (2007) and De Janvry, McIntosh, and Sadoulet (2010). Instead, in the context of Padilla and Pagano (1997)'s model, my results suggest that the loss of informational rents dominates the potential amelioration of moral hazard problems that FINCA faces (remember that the unilateral decision to share more information generates no gains in terms of adverse selection for the MFI). Nevertheless, my results do not invalidate the overall reduction in default rates identified under full information sharing by McIntosh and Wydick (2009). In fact, after FINCA revealed more information on its borrowers, market-wide average default rates among FINCA clients went down from 18 percent to 16.5 percent. Despite the rise in FINCA's default rates, the addition of positive records seems to have

benefited other lenders in the market that were then able to better screen borrowers and target good risks in the market.

6.1 Placebo Test and Robustness Checks

As mentioned above, multiple borrowers were already observed in EQUIFAX’s database before FINCA revealed additional records on them, which implies that the policy change should not affect them as much as it affected exclusive borrowers. Therefore, we can use this sub-sample to conduct a placebo test and look at the marginal credit expansion effect identified among those in the late group.

Table 5 presents the estimates of β_1 for the sample of multiple loan takers. As expected, no significant effect is identified for late in the cycle multiple borrowers, which reinforces the robustness of the effects identified for exclusive borrowers. The lack of a credit expansion effect among these borrowers suggests that other factors unrelated to the intervention are not driving the results I identify for exclusive borrowers in the late group.

Table 5. Impact of Positive Information Sharing on Access to Credit Among Multiple Borrowers in the Late in the Cycle Group

Dependent Variable	N⁰ Individuals	No Controls	Individual Controls	Individual & VB Controls
<i>Log(Outstanding Debt Outside FINCA)</i>				
All Multiple Borrowers	1415	0.160 (0.121)	0.123 (0.120)	0.127 (0.120)
Clean	997	0.098 (0.141)	0.063 (0.140)	0.074 (0.140)
Past defaulters	418	0.281 (0.232)	0.242 (0.230)	0.233 (0.231)
<i>Log(Outstanding Debt in Regulated Institutions)</i>				
All Multiple Borrowers	1415	0.067 (0.176)	0.084 (0.172)	0.065 (0.172)
Clean	997	0.021 (0.207)	0.075 (0.201)	0.051 (0.202)
Past defaulters	418	0.152 (0.330)	0.079 (0.328)	0.064 (0.328)

Source: FINCA-Peru’s historical database and EQUIFAX’s database.

Note: Fixed effects at the district Level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix C presents additional robustness checks. Table C.1 presents the results that use the inverse hyperbolic sine transformation to deal with the zeros in the dependent variable, access to credit outside FINCA. Compared to the strategy of recoding zeros with ones before taking the logs, the results are qualitatively and quantitatively similar. Additionally, Tables C.2 and C.3

present $\hat{\beta}_1$ for the sub-sample of exclusive borrowers when the number of days left until the end of the cycle and the percentage of the cycle left are used as alternative ways of defining the treatment. In general, the results are robust to all of these different specifications.²⁵ Even with continuous indicators, exclusive borrowers closer to the end of their cycle experience the largest credit expansion effect.

6.2 Credit Expansion Effect and Institutional Default Rates

The results presented above reveal that the policy decision to share individual outstanding debt records, in addition to group default records, benefited clients exclusively served by FINCA who were closer to the end of their cycles at the baseline. From the other lenders' perspective, FINCA borrowers imply a lower risk than other borrowers in the market due to the potential role of their accumulated savings in the MFI as a non-traditional form of collateral. The exposure of positive records provides a credible signal of creditworthiness for exclusive borrowers and makes it easier for other lenders to identify and pursue FINCA borrowers. Given the increasing competition over unbanked clients in the Peruvian microfinance market, the reduction in screening costs that FINCA indirectly provided to other lenders may have ended up hurting the institution.

This section tries to link the credit expansion effect identified to the increase in FINCA's default rate recorded in the year following the intervention (see Figure 1). To do so, the change in the default rate between November 2004 and December 2005 is decomposed into the contribution of survivors, dropouts, and entrants. Within the group of survivors, special attention is paid to the contribution of exclusive clients who stayed in FINCA but became multiple borrowers since the credit expansion effect experienced by them is expected to be an important force driving the rise in default rates.

Define D_{it} as a dichotomic variable which is equal to one if individual i defaults in year $200t$ and N_t as the number of borrowers in FINCA in year $200t$. The default rate in year $200t$ is

$$\sum_{i=1}^{N_t} D_{it}$$

then given by $D_t = \frac{\sum_{i=1}^{N_t} D_{it}}{N_t}$. Let k identify different groups of borrowers such that $k = \{s, \chi, \epsilon\}$, where s denotes the group of survivors, χ denotes the group of exiting borrowers, and ϵ labels the group of entrants. The previous equation can also be expressed as the share-weighted sum of average default rates across k , $D_t = \sum_k \theta_k^t R_k^t$, where R_k^t is group k 's average default rate and θ_k^t is the relative size of group k in the total pool of borrowers at t , N_t . Following Aw, Chen, and Roberts (2001), the change in default rates between 2004 and 2005, ΔD , can be decomposed as follows:

²⁵ Notice that $\hat{\beta}_1$ is expected to be negative when these indicators are used.

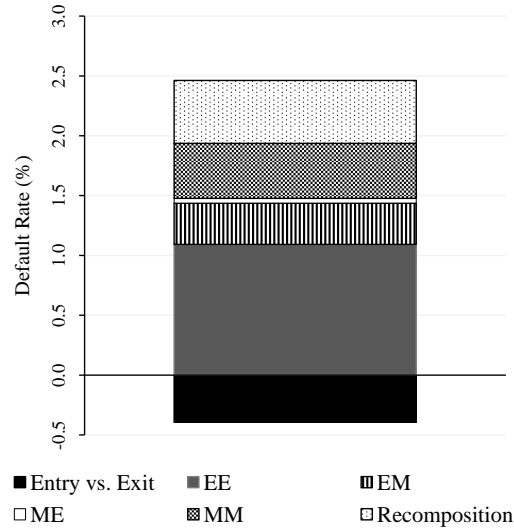
$$\begin{aligned}
\Delta D &= \left[\sum_{k=s} \theta_k^5 R_k^5 - \sum_{k=s} \theta_k^4 R_k^4 \right] + [\theta_\epsilon^5 R_\epsilon^5 - \theta_\chi^4 R_\chi^4] \\
&= \sum_{k=s} \left(\frac{\theta_k^5 + \theta_k^4}{2} \right) (R_k^5 - R_k^4) + \left(\frac{\theta_\epsilon^5 + \theta_\chi^4}{2} \right) (R_\epsilon^5 - R_\chi^4) \\
&\quad + \sum_{k=s} \left(\frac{R_k^5 + R_k^4}{2} \right) (\theta_k^5 - \theta_k^4) + \left(\frac{R_\epsilon^5 + R_\chi^4}{2} \right) (\theta_\epsilon^5 - \theta_\chi^4) \tag{4}
\end{aligned}$$

Equation (4) consists of four terms: the first term represents the contribution of changes in default rates among continuing borrowers in FINCA. This term can be considered as capturing the change in default rates in the intensive margin of FINCA's business. The second term is the contribution that results if the default rate of the entering cohort in 2005 differs from the default rate of the exiting cohort in 2004, which would be equivalent to the change in the default rates in the extensive margin of FINCA's operations. The last two terms combined capture the recomposition effect due to changes in the shares of each group between 2004 and 2005.

According to the change in their lending relationships between December 2004 and December 2005, continuing clients in FINCA can be classified as i) exclusive clients who remained exclusive (EE), ii) exclusive clients who became multiple borrowers (EM), iii) multiple borrowers who became exclusive (ME), and iv) multiple borrowers who kept borrowing from FINCA and other lenders (MM). Thus, the first term in (4) can be further decomposed into the contribution of each of these groups. Figure 4 depicts the decomposition of the total change in FINCA's default rates considering the separate contribution of these four groups of survivors as well as the contribution of dropouts and entrants and the recomposition effect. The net height of the bar represents ΔD and the contribution of each group is depicted with a different pattern.

First, notice that differences in default rates between entering and exiting borrowers reduced FINCA's default rate by 0.4 percentage points between 2004 and 2005, which means that changes in individual default rates in FINCA's intensive margin drove the increase in institutional default rates. In particular, exclusive borrowers who remained exclusive (EE) explained 1.1 out of the 2.1 percentage points increase in FINCA's default rates. However, their contribution is mostly driven by the important share that they represented in the pool of FINCA borrowers both in November 2004 and December 2005 (0.30 and 0.28, respectively). On the other hand, exclusive borrowers who obtained additional loans outside FINCA (EM) explained 0.3 percentage points of the total increase in default rates. Despite their small share (0.06 in 2004 and 0.05 in 2005), the EM group has an important contribution due to the sharp increase in their default rate from 1.7 percent to 7.9 percent, which by far represented the greatest rise in default rates across all groups.

Figure 4. Decomposition of the Change in Institutional Default Rates: Nov04-Dec05



Source: FINCA-Peru’s historical database and EQUIFAX’s database.

Note: EE are exclusive FINCA borrowers who remain exclusive. EM are exclusive FINCA borrowers who stay in FINCA but obtain additional loans outside the MFI. ME are multiple borrowers who become exclusive FINCA borrowers. MM are multiple borrowers who remain multiple borrowers. The baseline default rate is measured in November 2004 to reduce possible biases due to the gap between the actual intervention and December 2004. Too many observations are missed if default rates are measured before August 2004: FINCA borrowers present in December 2004 were not necessarily FINCA clients before that date.

Multiple borrowers who kept borrowing from FINCA and other lenders were responsible for 0.5 additional percentage points in ΔD . Although they faced a similar increase in average default rates as the one experienced by EE borrowers, their contribution is smaller due to their smaller share in the pool of clients in both periods (around 0.12). The smallest contribution comes from the multiple borrowers who became exclusive, as they only contribute 0.04 points to the total change in FINCA’s default rate. Finally, the recomposition effect contributes 0.5 percentage points, and it is mostly driven by the second term in the last line of (4), reflecting that θ_c^5 was greater than θ_x^4 .

7 Conclusion

Despite the potential importance of credit information systems for the alleviation of credit constraints, not much is known about their effects in microfinance markets. Using data from FINCA, a Peruvian MFI, this study measures the effects of a unilateral decision to increase the degree of

information shared on borrowers' access to credit. The results reveal that the decision of the institution to share individual outstanding debt records on its clients, in addition to group default records, benefits exclusive FINCA clients who were more likely to have low levels of debt when the policy was implemented. In particular, clean borrowers closer to the end of their cycles experienced the greatest gains in access to credit, both in terms of the extent of new funding sources as well as in the quality of their loan contracts.

The results presented here also draw attention to the potential role that credit bureaus may play in the process of graduation of microfinance clients into formal credit markets. Even if a borrower is able to maintain a good credit relationship with an MFI, access to regulated institutions will also depend on her ability to expose her credit performance to a larger market. Graduation can thus be facilitated by credit information systems that allow good borrowers with limited access to credit to use their positive credit records as a creditworthiness signal.

From an institutional point of view, it is not clear that FINCA's unilateral decision to share more information about its clients benefited the MFI. The inclusion of outstanding debt records in EQUIFAX's database facilitated client poaching, a phenomenon that explains an important share of the observed increase in FINCA's default rates. Almost 25 percent of the increase in institutional default rates in FINCA can be attributed to exclusive clients who became multiple loan takers after the policy was implemented. Moreover, this group experiences the greatest increase in average default rate in FINCA. The additional information shared seems to have increased the value of the outside option of FINCA's exclusive borrowers so that solidarity methodologies were no longer enough to enforce repayment.

Although this paper only focuses on the short-run effects of the increase in information, the results suggest that full information sharing in microfinance markets may not develop as an equilibrium outcome. Instead, the intervention of credit market regulators might be necessary to coordinate multilateral and symmetric increases in information.

Although FINCA has continued to share its positive records, the MFI has tried to deal with client poaching in other ways. First, it now uses more and better information to screen new as well as continuing clients. Since 2004, three other private credit bureaus have emerged to compete with EQUIFAX and now hold important market shares. The competition has brought down the price of information, expanded the diversity of the sources used by credit bureaus (to include not just lenders' records but also records on government credit programs, for example), and increased the number of loan assessment products offered by risk bureaus. This has allowed FINCA to conduct periodic checks of its client base as well as to better screen new borrowers. Second, FINCA has been increasingly trying to target underserved markets to avoid client overlaps with other lenders. The MFI has been progressively shifting its focus from more penetrated urban markets in Lima and Ayacucho towards excluded rural areas where about 95 percent of its clients are exclusive. Finally,

the institution has added a mandatory training component on financial education that educates clients on topics such as the risks of multiple loan taking and overindebtedness.

To conclude, this paper should be considered a departure point for a richer agenda focusing on the evaluation of aggregate welfare effects of information sharing in microfinance markets. This is an exploratory empirical study that is important in order to start thinking about a model capable of measuring welfare gains from increased information sharing both for borrowers and lenders in microfinance markets.

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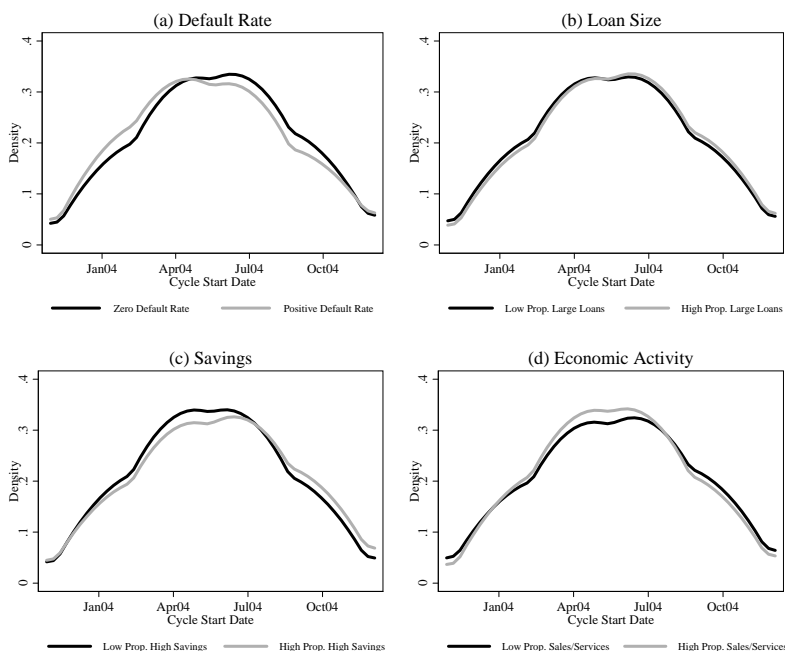
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A Exogeneity of Cycle Start Dates and Cycle Length

Using the sample of exclusive borrowers in the period prior to the intervention (between December 2003 and December 2004), Figure A.1 plots the distribution of cycle start dates at the village bank level by several group characteristics that could potentially influence the beginning of a new cycle. These selected characteristics are the average default rate, the proportion of large FINCA loans in the group, the proportion of borrowers with high levels of savings, and the proportion of borrowers with businesses in the sales and services sector.²⁶ In general, cycle start dates do not vary by group characteristics, which confirms that borrowers cannot affect the beginning date of a new cycle.

Figure A.1. Distribution of Cycle Start Dates by Borrower Characteristics at the Village Bank Level



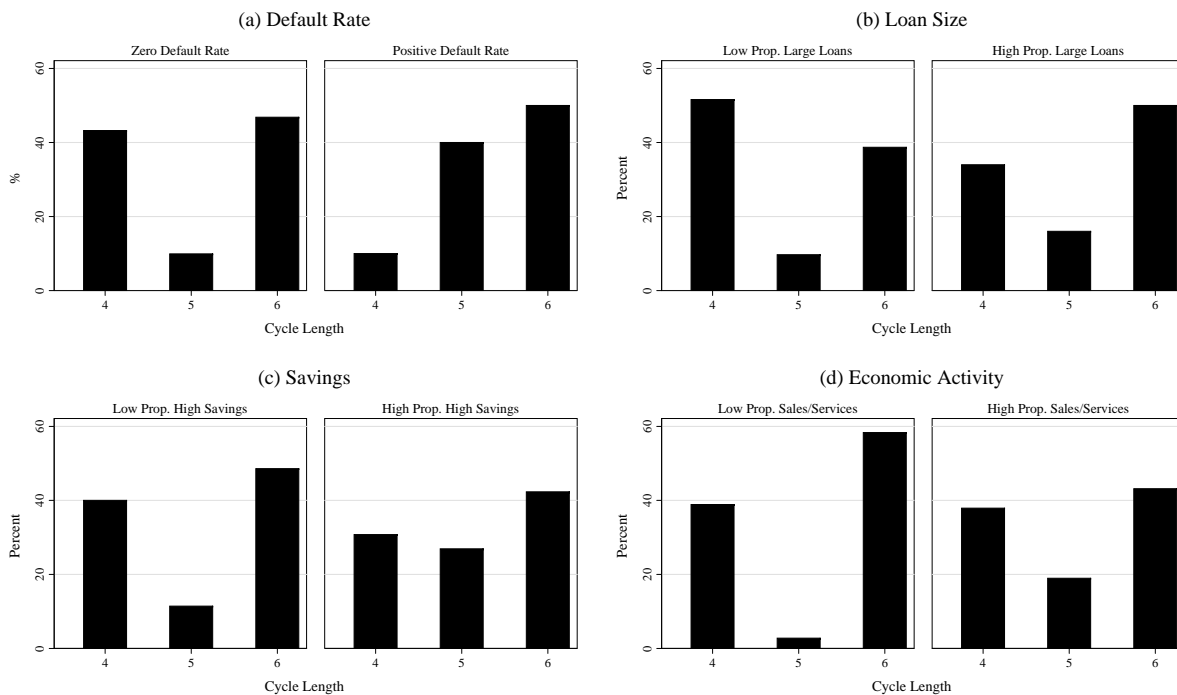
Source: FINCA-Peru's historical database.

Similarly, Figure A.2 compares the distribution of cycle length for village banks in Lima, where duration can vary. Once more, cycle duration does not seem to vary that much by group characteristics. The distribution of cycle durations looks pretty similar when we look across different groups of banks, which confirms the exogeneity of this variable. Irrespective of the proportion of large loans, clients with high levels of savings, or clients with businesses in the services sector, the distribution of cycle durations looks more or less the same: higher concentrations of banks

²⁶ According to survey data from FINCA collected in Karlan and Valdivia (2011), these businesses usually have higher returns.

have 4 and 6-month durations while a small proportion of them have cycles that last for 5 months. The only noticeable difference is identified when we look at banks by their average default rate. Although the proportion of village banks with cycles of 6 months is comparable across groups with zero and positive average default rates, banks with default episodes tend to have relatively more banks with 5-month cycles than with 4-month cycles. Nevertheless, the sample size of the banks in Lima with positive default records is very small (only 20 banks) and the conclusions we can draw from here are limited.

Figure A.2. Distribution of Cycle Length by Borrower Characteristics at the Village Bank Level, Lima



Source: FINCA-Peru's historical database.

Table A.1 further confirms the exogeneity of cycle start date and cycle duration. In all but one case, Kolmogorov-Smirnov tests of the equality of the distributions of cycle start dates and cycle length reject that borrowers' characteristics generate important distributional differences.

Table A.1. Kolmogorov-Smirnov Test for Equality of Distributions of Cycle Start Date and Cycle Duration

	Combined D	Approximate p-value	
<hr/>			
Cycle Start Date			
Default	0.081	0.840	
Loan Size	0.024	1.000	
Savings	0.051	0.877	
Sales/Services Activities	0.034	0.998	
Age	0.037	0.993	
Education Level	0.044	0.955	
Cycle Duration			
Default	0.329	0.029	**
Loan Size	0.179	0.344	
Savings	0.104	0.958	
Sales/Services Activities	0.146	0.551	
Age	0.219	0.060	
Education Level	0.337	0.020	

Source: FINCA-Peru's historical database.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B Ex-ante Differences Between Early and Late in the Cycle Groups

Table B.1. Exclusive and Clean Borrowers in December 2004

	Early	Late	Difference	
Number of individuals	1688	1202		
<i>Characteristics in FINCA</i>				
Ever late in FINCA (%)	17.5	17.8	-0.3	
Cumulative Savings in FINCA (US\$)	287	318	-31	**
Loan Size (US\$)	220	232	-11	*
Age in FINCA (months)	27.1	28.1	-1.1	
Dropout Rate (%)	26.1	27.4	-1.2	
Dropout With Default Records (%)	37.0	33.7	3.2	
<i>Demographic Characteristics</i>				
Number of children	1.8	1.9	0.0	
Married (%)	72.6	73.9	-1.2	
Educational Attainment (%)				
No education	8.6	9.8	-1.2	
Primary	29.1	28.1	1.0	
Secondary	44.9	43.6	1.3	
Higher	17.4	18.5	-1.1	
Age	38.4	38.4	0.1	
Lima (%)	27.7	23.4	4.3	***
Economic Activity (%)				
Sales	28.7	26.1	2.5	*
Grocery	22.1	21.1	1.0	
Prepared Food	10.2	9.5	0.8	
Services	10.1	13.1	-2.9	***
Production	25.4	27.7	-2.3	*
Other	3.5	2.5	1.0	*

Source: FINCA-Peru's historical database.

Note: The dropout rate is defined as the percentage of FINCA borrowers present in Dec04 who left between Dec04 and Dec05. The dropout with default records rate is defined as the percentage of dropouts who left with at least one default episode.

Table B.2. Exclusive and Defaulting Borrowers in December 2004

	Early	Late	Difference	
Number of individuals	254	176		
<i>Characteristics in FINCA</i>				
Ever late in FINCA (%)	27.6	27.3	0.3	
Cumulative Savings in FINCA (US\$)	237	215	21	
Loan Size (US\$)	235	242	-7	
Age in FINCA (months)	30.7	24.1	6.6	***
Dropout Rate (%)	33.9	34.7	-0.8	
Dropout With Default Records (%)	41.9	41.0	0.9	
<i>Demographic Characteristics</i>				
Number of children	1.7	1.4	0.3	**
Married (%)	69.7	73.9	-4.2	
Educational Attainment (%)				
No education	2.4	1.1	1.2	
Primary	14.6	11.9	2.6	
Secondary	49.6	51.1	-1.5	
Higher	33.5	35.8	-2.3	
Age	38.1	36.4	1.7	*
Lima (%)	47.6	39.8	7.9	*
Economic Activity (%)				
Sales	40.9	44.3	-3.4	
Grocery	20.1	16.5	3.6	
Prepared Food	9.1	8.0	1.1	
Services	13.4	14.8	-1.4	
Production	12.2	10.2	2.0	
Other	4.3	6.3	-1.9	

Source: FINCA-Peru's historical database.

Note: The dropout rate is defined as the percentage of FINCA borrowers present in Dec04 who left between Dec04 and Dec05. The dropout with default records rate is defined as the percentage of dropouts who left with at least one default episode.

Table B.3. Exclusive Borrowers in December 2004

	Early	Late	Difference	
Number of individuals	1942	1378		
<i>Characteristics in FINCA</i>				
Ever late in FINCA (%)	18.8	19.0	-0.2	
Cumulative Savings in FINCA (US\$)	280	305	-25	**
Loan Size (US\$)	222	233	-11	*
Age in FINCA (months)	27.5	27.6	-0.1	
Dropout Rate (%)	27.1	28.3	-1.2	
Dropout With Default Records (%)	37.8	34.9	2.9	
<i>Demographic Characteristics</i>				
Number of children	1.8	1.8	0.0	
Married (%)	72.2	73.9	-1.6	
Educational Attainment (%)				
No education	7.8	8.7	-0.9	
Primary	27.2	26.1	1.1	
Secondary	45.5	44.6	1.0	
Higher	19.5	20.7	-1.2	
Age	38.4	38.1	0.3	
Lima (%)	30.3	25.5	4.9	***
Economic Activity (%)				
Sales	30.3	28.4	1.8	
Grocery	21.8	20.5	1.3	
Prepared Food	10.1	9.3	0.8	
Services	10.6	13.3	-2.7	***
Production	23.6	25.5	-1.8	
Other	3.6	3.0	0.6	

Source: FINCA-Peru's historical database.

Note: The dropout rate is defined as the percentage of FINCA borrowers present in Dec04 who left between Dec04 and Dec05. The dropout with default records rate is defined as the percentage of dropouts who left with at least one default episode.

C Additional Robustness Checks

Table C.1. Impact of Positive Information Sharing on Access to Credit Among Exclusive Borrowers in the Late in the Cycle Group: Inverse Hyperbolic Sine Transformation

Dependent Variable	N⁰ Individuals	No Controls	Individual Controls	Individual & VB Controls
<i>Log(Outstanding Debt Outside FINCA)</i>				
All Exclusive Clients	3320	0.182** (0.082)	0.176** (0.082)	0.171** (0.082)
Clean	2890	0.150* (0.086)	0.141* (0.086)	0.131 (0.086)
Past defaulters	430	0.294 (0.260)	0.331 (0.265)	0.338 (0.267)
<i>Log(Outstanding Debt in Formal Institutions)</i>				
All Exclusive Clients	3320	0.068 (0.063)	0.072 (0.063)	0.062 (0.063)
Clean	2890	0.062 (0.066)	0.068 (0.066)	0.055 (0.066)
Past defaulters	430	0.109 (0.198)	0.145 (0.202)	0.148 (0.203)

Source: FINCA-Peru's historical database and EQUIFAX's database.

Note: Fixed effects at the district Level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table C.2. Impact of Positive Information Sharing on Access to Credit Among Exclusive Borrowers in the Late in the Cycle Group: Days Left Until the End of the Cycle

Dependent Variable	N⁰ Individuals	No Controls	Individual Controls	Individual & VB Controls
<i>Log(Outstanding Debt Outside FINCA)</i>				
All Exclusive Clients	3320	-0.003** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Clean	2890	-0.003** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Past defaulters	430	-0.004 (0.003)	-0.001 (0.003)	-0.001 (0.003)
<i>Log(Outstanding Debt in Formal Institutions)</i>				
All Exclusive Clients	3320	-0.001 (0.001)	-0.002** (0.001)	-0.002** (0.001)
Clean	2890	-0.001 (0.001)	-0.002** (0.001)	-0.002** (0.001)
Past defaulters	430	-0.002 (0.002)	-0.002 (0.003)	-0.002 (0.003)

Source: FINCA-Peru's historical database and EQUIFAX's database.

Note: Fixed effects at the district Level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table C.3. Impact of Positive Information Sharing on Access to Credit Among Exclusive Borrowers in the Late in the Cycle Group: Percentage of the Cycle Left

Dependent Variable	N⁰ Individuals	No Controls	Individual Controls	Individual & VB Controls
<i>Log(Outstanding Debt Outside FINCA)</i>				
All Exclusive Clients	3320	-0.255* (0.145)	-0.231 (0.145)	-0.251* (0.144)
Clean	2890	-0.240 (0.150)	-0.217 (0.150)	-0.236 (0.150)
Past defaulters	430	-0.246 (0.485)	-0.233 (0.489)	-0.180 (0.486)
<i>Log(Outstanding Debt in Formal Institutions)</i>				
All Exclusive Clients	3320	-0.203* (0.110)	-0.185* (0.110)	-0.173 (0.110)
Clean	2890	-0.199* (0.115)	-0.188 (0.115)	-0.174 (0.115)
Past defaulters	430	-0.191 (0.362)	-0.233 (0.369)	-0.265 (0.368)

Source: FINCA-Peru's historical database and EQUIFAX's database.

Note: Fixed effects at the district Level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.