Measuring Trust in Peruvian Shantytowns *

Dean Karlan
Yale University

Markus M. Mobius
Harvard University and NBER

Adam Szeidl
UC Berkeley

Tanya S. Rosenblat
Wesleyan University

July 2009
FIRST DRAFT, COMMENTS WELCOME

Abstract

This paper uses a microfinance field experiment in two Lima shantytowns to measure the relative importance of social networks and prices for borrowing. Our design randomizes the interest rate on loans provided by a microfinance agency, as a function of the social distance between the borrower and the cosigner. This design effectively varies the relative price (interest rate differential) of having a direct friend versus an indirect friend as a cosigner. After loans are processed, a second randomization relieves some cosigners from their responsibility. These experiments yield three main results. (1) As emphasized by sociologists, connections are highly valuable: having a friend cosigner is equivalent to 18 per cent of the face value of a 6 month loan. (2) While networks are important, agents do respond to price incentives and switch to a non-friend cosigner when the interest differential is large. (3) Relieving responsibility of the cosigner reduces repayment for direct friends but has no effect otherwise, suggesting that different social mechanisms operate between friends and strangers: Non-friends cosign known high types, while friends also accept low types because of social collateral or altruism.

*Email addresses: dean.karlan@yale.edu, mobius@fas.harvard.edu, tanyar@iastate.edu and szeidl@econ.berkeley.edu. We are grateful to Ed Glaeser, Larry Katz, Sendhil Mullainathan and Robert Putnam and seminar participants at the Kennedy School of Government for comments. Margaret McConnell, Katherine Ambler and Sara Nadel were outstanding research assistants. We are grateful to the Russell Sage Foundation and the National Science Foundation for financial support.

1 Introduction

Neoclassical economics emphasizes the role of prices in determining the allocation of resources. The implicit assumption is that formal contracts can be costlessly enforced by the legal system. In contrasts, sociologists often argue that allocations are primarily determined by social context, with little room left for price incentives (Singerman 1995, Lomnitz 1977). In this paper, we use a unique microfinance field experiment in two shantytowns in Lima, Peru, to measure the relative importance of social networks and prices for borrowing.

We survey two communities with about 300 households each in Lima, Peru and invite about 25 individuals in each community to serve as *cosigner* for our program. Every household in the community receives a customized card which displays, for each cosigner, an interest rate that household members have to pay to a microfinance bank for loans that are cosigned by that specific sponsor. Our experimental design randomizes the interest rate on loans provided by a microfinance agency, as a function of the social distance between the borrower and the cosigner. This design effectively varies the relative price (interest rate differential) of having a direct friend versus an indirect friend as a cosigner. After loans are processed, a second randomization relieves some cosigners from 50% of their responsibility.

For our analysis, we take inspiration from discrete-choice models used in empirical industrial organization (e.g., Barry, Levinsohn and Pakes, 1995). We assume that each potential borrower has a choice set of all designated cosigners in the community. Each possible borrower/cosigner pair generates a certain joint surplus which includes the monetary payoff of the investment, the randomized interest rate, the psychological cost of asking someone for help, the altruistic benefit to the cosigner from helping out the borrower, the risk-premium from cosigning the borrower's loan and the monitoring and enforcement costs paid by the cosigner. We expect that all these non-monetary components of joint surplus naturally vary with social distance: borrowers presumably find it easier to ask friends and relatives for support rather than strangers. Cosigners in return are likely to feel more altruistic about their friends (Leider, Mobius, Rosenblat and Do 2009), they are likely to have more information about their friends' types and they might it easier to enforce repayment (Karlan, Mobius, Rosenblat and Szeidl 2009). We assume that borrowers will choose the cosigner in their choice set that generates

the highest joint surplus. Our interest randomization then allows us to measure the tradeoff between a lower interest rate and greater social distance. Our second randomization allows us to disaggregate the social proximity effect and measure the relative contribution of the monitoring and enforcement channel.

Data from our experiments yield three main results. (1) As emphasized by sociologists, connections are highly valuable: having a friend cosigner is equivalent to about 18 per cent of the face value of a 6 month loan. (2) While networks are important, agents do respond to price incentives and switch to a non-friend cosigner when the interest differential is large. These findings indicate that the value of networks can be understood in an explicit optimizing framework where agents trade-off monetary and social incentives (Becker and Murphy, 2004). (3) Relieving responsibility of the cosigner reduces repayment for direct friends but has no effect otherwise, suggesting that dfferent social mechanisms operate between friends and strangers: Non-friends cosign known high types, while friends also accept low types because of social collateral or altruism. This result suggests that cosigner-based microfinance programs are likely to reach a larger pool of potential borrowers by being able to exploit social mechanisms. While our estimates are likely to depend on specific features of the Lima communities and the experimental design, the broader lesson that social connections can be used for substantial economic gain is more likely to be externally valid.

The rest of the paper is organized as follows. Section 2 develops our analytical framework that underlies our experimental design which we discuss in section 3. In section 4 we summarize the main features of the data. Our empirical results are presented in section 5. Section 6 concludes.

2 Analytical Framework

We first outline the discrete-choice approach which provides us with a simple reduced-form empirical model. We then show that this reduced-form model encompasses the different channels through which social proximity affects borrowing costs

2.1 Discrete-Choice Approach

We assume that a borrower i wants to invest an amount L into some project. She needs a cosigner j from a group of sponsors Λ. If cosigner j sponsors the loan the project generates an expected surplus S_{ij} per unit of money invested to the borrower and an expected surplus $\hat{S}_{ij}$ to the cosigner.

The borrower's expected surplus S_{ij} consists of the monetary return from the project, S_i^*, plus a relationship-specific component S'_{ij}:

$$S_{ij} = S_i^* + S'_{ij} \tag{1}$$

The relationship-specific component is formally explore below and includes the psychological cost of asking a cosigner and other transaction costs paid by the borrower.

Similarly, the cosigner's surplus $\hat{S}_{ij}$ consists of of the opportunity cost $\hat{S}_j^*$ from not using the funds for alternative projects plus a relationship-specific component $\hat{S}'_{ij}$:

$$\hat{S}_{ij} = \hat{S}_i^* + \hat{S}'_{ij} \tag{2}$$

The cosigner's relationship-specific component includes the cost of monitoring the borrower, altruistic feelings towards the borrower, the cosigning risk and other related costs that are paid by the cosigner. In our field experiment, cosigners cannot use credit lines for sponsoring their own projects. Moreover, we try to select sufficiently many sponsors for each community with a sufficiently large aggregate credit line in order to minimize competition for sponsors. We therefore make the simplifying assumption that the opportunity cost $\hat{S}_j^*$ of not cosigning the borrower's request is zero.

The net expected surplus generated by a sponsored loan is therefore

$$L\left(S_{ij} + \hat{S}_{ij} - R_{ij}\right), \tag{3}$$

where R_{ij} is the interest rate paid by the borrower to the micro-finance organization. We assume that surplus can be costlessly transferred between borrower and cosigner. Therefore, the borrower will choose a cosigner to maximize the net surplus from the relationship. The borrower will therefore solve the following discrete

choice problem:

$$\text{optimal cosigner} = \arg\max_{j \in \Lambda} \left[S'_{ij} + \hat{S}'_{ij} - R_{ij} + \epsilon_{ij} \right] \tag{4}$$

The homoscedastic logistic error term ϵ_{ij} captures the borrower's private information about joint net surplus.

2.2 Channels

We now formally introduce the various channels through which social proximity affects the borrower's and cosigner's surplus. Since these channels are additive we introduce them one by one.

Psychological cost of asking. Many people are uncomfortable asking others for help, especially when they do not know the other person very well. Let $P(d)$ be the psychological cost of asking a person at distance d for one unit of money. Then the borrower's surplus changes by:

$$\Delta S'_{ij} = -P(d) \tag{5}$$

Directed altruism. People often lend money because they enjoy to help out their friends and close relatives. In an experimental study, Leider et al. (2009) show that altruistic feelings decline quickly with social distance. We assume that "warm glow" a cosigner receives from cosigning a borrower's loan at social distance d is a decreasing function $A(d)$ per unit of money. Hence, the cosigner's surplus changes by:

$$\Delta \hat{S}'_{ij} = A(d) \tag{6}$$

Information about borrower's type. Assume that borrowers are either good investors ($T_i = 1$) and do not destroy the principal, or are bad investors ($T_i = 0$) and lose the principal. Socially close cosigners are better informed about the borrower's type than socially distant cosigners, e.g. $Var\left(T_i|d\right)$ is increasing in social distance d. We denote the cosigner's coefficient of risk aversion with A. We

then get:

$$\begin{aligned}\Delta\hat{S}'_{ij} &= E\left(T_i|d\right) - A \cdot Var\left(T_i|d\right) \\ &= E\left(T_i\right) - A \cdot Var\left(T_i|d\right) + \left[E\left(T_i|d\right) - E\left(T_i\right)\right] \\ &= E\left(T_i\right) - A \cdot Var\left(T_i|d\right) + \eta_i \end{aligned} \tag{7}$$

The error term $\eta_i = E\left(T_i|d\right) - E\left(T_i\right)$ has zero mean but is heteroscedastic since it has higher variance when d is lower. To map this into our homoscedastic discrete choice approach, assume that there is an additional noise term ν so that total noise is $\varepsilon = \eta + \nu$, and that ν has much bigger variance than η. Moreover, assume that the coefficient of risk aversion A is big. Then small changes in the conditional variance have big effects on the surplus, but they have negligible effects on the total variance which is mainly driven by ν. Therefore homoscedastic logit is a good approximation.

Monitoring cost. Let $e(d)$ be the cosigner's cost of monitoring the borrower's repayment. This affects the cosigner's surplus as follows:

$$\Delta\hat{S}'_{ij} = -e(d) \tag{8}$$

Enforcement. Social proximity helps to enforce repayment by threatening to break off an ongoing relationship if a loan is not repaid. Assume that there is social collateral $SC(d)$ between cosigner and borrower (Karlan et al. 2009). If L is the loan size then $[L - SC(d)]^+$ has to be secured using physical collateral (such as a borrower's TV or bicycle), which has a per dollar transaction cost τ. Therefore, the borrower's surplus changes by:

$$\Delta S'_{ij} = -\tau \frac{[L - SC(d)]^+}{L} \tag{9}$$

If social collateral declines with social distance the borrower's surplus decreases because she has to work harder to assure the cosigner to guarantee the loan.

3 Experimental Design

Our micro-finance program was implemented in communities that are as self-contained as possible. Since we implemented the program in Lima which is a city of almost 8 million people we chose identifiable neighborhoods with about 250 to 300 households and a community leadership that helps to organize the community and represent it in front of municipal authorities. For example, in both communities the leadership had lobbied for the construction of running water lines.

Survey work. The survey work was implemented in two rounds. The first round (Baseline I) was a household level census of the community. The most important aspect of the survey was the collection of a list of all household members, but it also included basic socioeconomic indicators, information on leaders in the community, detailed income and occupation information, information on household assets, and information on household businesses. The community roster, or list of people living in the community, was derived from this survey.

The second round of survey work (Baseline II) was implemented in two modules. Module A was a household level survey that collected information about contacts the family had had in the community before moving there, and savings and loans held by family members. Module B was an individual level social network survey which was conducted with both the head of household and his or her spouse. It asked respondents to name the people in the community outside of their home that they spent the most time with and who they trusted the most. Respondents were also asked to name family members who lived in the community but not in their household, and list people with whom they were members of Roscas and village banks. For each link we inquired whether respondents had borrowed money or objects from that contact or lent money or objects to that contact. We also asked a number of hypothetical questions, such as "Would you leave this person in charge of your home?", "Would you ask this person to assist in the construction of your home?", "Would you start a business with this person?" Baseline II surveys were done with sponsor households, any household they had named as well as any household those households had named.[1] Clients of our loan program who had not received a baseline II survey were surveyed after the start of the loan program.

Randomization. We choose an interest rate randomization which is geared to

[1] At this time an annex containing the questions from Baseline I was done if the household had not participated in the initial census.

estimate the tradeoff between choosing a socially close sponsor and a more distant sponsor with lower interest rate. Every client is randomly assigned one of 4 'slopes': slope 1 decreases the interest rate by 0.125 percent per month for 1-step increase in social distance. Slopes 2 to 4 imply 0.25, 0.5 and 0.75 decrements. Therefore, close friends generally provide the highest interest rate and distant acquaintances the lowest but the decrease depends on SLOPE. The interest rate offset for close friends is either 4.5 percent with 75 percent probability (DEMAND=0) or 5 percent (DEMAND=1) with 25 percent probability and DEMAND is a i.i.d. draw across clients.

SLOPE identifies the interest rate/social distance tradeoff. DEMAND allows us to test whether interest rates also influence the demand for loans in addition to affecting the choice of sponsors.

Loan program. About 25 sponsors were recruited based on their responses to Baseline I. An attempt was made to identify sponsors that had been named as community leaders and who were in the top half of the socioeconomic spectrum, but some interested people who did not fit these characteristics were accepted. Sponsors were evaluated by a credit officer and were assigned a credit line based on their capacity to pay. They were allowed to use 30 percent of this credit line for personal loans or loans to other members of their household at a preferential interest rate. They participated in a training session held by the credit officer, explaining the program, how to sponsor clients, and what to look for in responsible clients. Each sponsor was told that they would participate in three lotteries over the course of the first six months of the program as an incentive for sponsoring loans. The number of points that they received was based both on the number of loans that they had sponsored and the percentage of their credit line that they had used sponsoring.

The loan program was advertised to community members through a door to door promotion. Each household received a customized laminated card explaining the program and listing all the sponsors and the interest rate at which the client could take out a loan if that sponsor agreed to co-sign the client's loan (see appendix A for an anonymized sample card). The back of the card contained a map of the community indicating the homes of all the sponsors to make it easy for clients to find the sponsors. An effort was made to explain the program personally to someone in each household but if no one was found at home after two or three

visits, the card was left under the door. The same cards were distributed again in both communities three months after the initial promotion to remind community members of the program.

The credit officer made weekly visits to each community at a pre-specified time and location. Those who wanted a loan would go to the meeting with their sponsor to verify his or her willingness to co-sign the loan contract. Loan information was then collected through a Pocket PC which assigned the correct interest rate based on the selected client/sponsor pair. Both the client and the sponsor returned to the meeting the next week and the credit officer handed out the check and both signed the contract. Both the client and the sponsor were given a copy of the payment schedule. If the loan had been assigned 50 percent sponsor responsibility, the sponsor and client would both later receive letters informing them that the sponsor was legally responsible for only half of the loan she had sponsored.

All loans were taken out for periods of six months with both capital and interest paid every month. The payments were made at a local bank, a 10 to 15 minute distance from the communities. Sponsors had initial responsibility for controlling default and ensuring that payments were made on time. If clients were more than a month late in their payments they would receive letters at their homes and the credit officer would visit the sponsors and eventually the clients themselves. Recuperation procedures were somewhat complicated by cumbersome record-keeping procedures of the NGO.

4 Data Description

We chose two communities located in the Northern Cone of Lima. The baseline I and II surveys were conducted in 2005. The heads of households and spouses (if available) of 299 households were interviewed. Summary statistics of of household income and basic demographic characteristics are reported in Table 1. Average monthly household income in the two communities was 957 and 840 Peruvian New Soles (S/.), respectively, which equals approximately 294 and 258 USD, using the exchange rate in 2005.

Respondents listed, on average, 8.6 social links, and the average geographic distance between connected agents is 42 and 39 meters in the two communities; this is considerably lower than the geographic distance between two randomly

selected addresses, which is 132 and 107 meters, respectively.[2] About 59 percent of relationships were classified by respondents as "vecino" (neighbor) and 39 percent as "amigo" or "compadre" (friend). The share of "relativos" was just 2 percent.[3] Vecinos live slightly closer than amigos/compadres (35 versus 51 meters). Over 90 percent of directly connected people met in the neighborhood for the first time.

Lending within the social network is common as we already report in Karlan et al. (2009): there are 254 informal loans in the dataset; 167 borrowers in 138 households reported to have borrowed on average 76 S/. (about 23 USD) from 173 lenders during the past 12 months. In the two communities, 46 percent of all households have at least one household member who borrowed money in this manner. The mean age of both the borrower and the lender is 39 years and they live, on average, 36 meters apart.

All together, we observed 128 cosigned loans. 53 percent of these loans were cosigned by direct friends and 26 percent by friends of friends.The mean loan size was 1,228 S/. and the median loan was 1000 S/. (about 330 USD). The repayment rate was 88 percent of the average loan size.

5 Results

Slopes. We first check whether our interest randomization was significant enough to affect the social distance between borrower and cosigner. We would expect that a larger SLOPE should induce borrowers to choose more socially distant cosigners. As figure 1 shows, this is indeed the case: average social distance increases from 1.3 for SLOPE=1 to 1.9 for SLOPE=4.

Discrete-choice approach. We next estimate the discrete-choice model we derived in section 2.1:

$$U_{ij} = \alpha * \text{Interest rate} + \beta * \text{Social Distance} + \gamma * \text{Geo. Distance} + \epsilon_{ij}$$

The results are shown in column (1) of table 2. Lending through a friend is equivalent to a 2.9 percent decrease in the monthly interest rate. For the average

[2]This is consistent with a body of work showing the importance of social distance in meeting friends, e.g., Marmaros and Sacerdote (2006)

[3]In this paper, we use the term "friend" for any network connection, whether vecino, amigo/compadre or relativo.

loan size of 330 USD the interest savings accumulate to 57 USD over 6 months (about 17 % of face value of the loan).

In columns (2) to (4) of table 2 we test whether the effect of social proximity is stronger for certain types of direct links. We include dummy variables to indicate whether the direct contact is a relative, a friend or a neighbor. We find that relatives and neighbors have a particularly large effect.

Finally, we test whether past financial interactions affect cosigning. In columns (5) and (6) we include a dummy variable to indicate whether the borrower has lent to or borrowed from the cosigner in the past. Intriguingly, we find that cosigner who received an informal loan from the borrower in the past are more likely to cosign. This result is consistent with "favor-trading".

Enforcement. Our second randomization allows us to explore *why* connections matter by separating the enforcement channel from other effects. Figure 2 compares the repayment rates on loans cosigned by friends versus loans cosigned by indirect friends and acquaintances. For friends, repayments rates increase by about 20 percent when the cosigner remains fully responsible for the loan. In contrast, with non-friends the repayment rates are unaffected by the second randomization. Moreover, the repayment rates for loans with fully responsible cosigners are not significantly different when the cosigner is a friend and when the cosigner is an indirect friend. We see the same pattern in figure 3, where we only focus on loans cosigned by direct friends and where we compare the repayment rates of loans where the cosigner spends more than 2 hours a week with the borrower (strong direct friend) or less than 2 hours a week (weak direct friend).

This observation is not consistent with a pure enforcement story because we would expect that repayment rates for socially distant cosigners should be lower independent of the second randomization. However, it is consistent with a story where enforcement interacts with a borrower's type. Assume that borrowers are either honest types who repay or non-honest types who do not repay a loan. Friends might be willing to cosign the loans of both honest and non-honest types because they have the means to make the borrower repay the loan. Indirect friends, on the other hand, would only want to lend to honest types because they cannot enforce repayment of the loan.

6 Conclusion

We find support that both prices and social relations matter for allocating credit in Peruvian shantytowns. Borrowers respond to interest rates but social connections have a very large effects. Cosigning by a friend vs. a stranger is equivalent to about 3 percent change in monthly interest.

Cosigners rely on multiple mechanisms when deciding whether to sponsor friends. In contrast, non-friends mostly sponsor high-quality borrowers. This result suggests that microfinance programs that rely on informal enforcement, such as group lending, might be necessary to reach a larger pool of borrowers.

References

Karlan, Dean, Markus Mobius, Tanya Rosenblat, and Adam Szeidl, "Trust and Social Collateral," *forthcoming in the Quarterly Journal of Economics*, November 2009, *124* (4).

Leider, Stephen, Markus M. Mobius, Tanya Rosenblat, and Quoc-Anh Do, "Directed Altruism and Enforced Reciprocity in Social Networks," *forthcoming in Quarterly Journal of Economics*, June 2009.

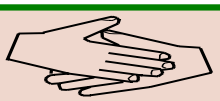
Lomnitz, Larisaa Adler, *Networks and Marginality: life in a Mexican Shantytown*, New York: Academic Press, 1977.

Marmaros, David and Bruce Sacerdote, "How Do Friendships Form?," *Quarterly Journal of Economics*, 2006, *121* (1), 79–119.

Singerman, Diane, *Avenues of participation: family, politics, and networks in urban quarters of Cairo*, Princeton: Princenton University Press, 1995.

A Sample Client Card

Manos Juntas
Programa de Crédito



Manzana : L
Lote: 2

Estimado **Sr(a). JORGE VENTOCILLA GONERO** y **Sr(a).**

Alternativa los invita a participar de un nuevo servicio de crédito. El mismo, ofrece créditos flexibles, ágiles y personalizados, por intermedio de garantes comunitarios, a todos los vecinos de *Community Name*. El crédito es de libre disponibilidad.

PASO 1: ¿Qué es lo primero que necesita antes de iniciar el trámite?

Contar con un garante. Usted como residente de la comunidad *Community Name*, puede escoger un garante de la siguiente lista:

	Tasa (soles)		Tasa (soles)		Tasa (soles)
Jesus Gonzales Tiícla	4.25%	Elizabeth Sierra Chávez	4%	Claudia Catalán	4%
Martha Norma Castro Espinoza	3%	Luis Santos Barilles	4%	Rosa Pari Condori	3.5%
Rosa Edith Panduro Ramírez	3.25%	Aura Sandoval Valiente	4%	Andres Diosquez	3.5%
Julia Sabina Maguiña Toledo	3.75%	Julia Bustinza Choque	3.75%	Ivan Diaz Mallma	3.25%
Pedro Francisco Salazar Aquino	3%	Guisella Vargas Valdivia	3.25%	Carmen Diaz	4.5%
Delia Rodriguez Encarnación	3.5%	Balvina Alcalde Vizconde	3%	Jesus Lopez	3.25%
Gladys Selene Alvarado Saldaña	3.25%	Manuel Medrano Gómez	3.5%	Marisol Julca	4%
Aurelio Pedro Oscanoa Rosas	3%	Alfredo Fernando Castillo	3%		
Manuel Amador Chávez Lezama	4%	Melquiades Huayta Tafur	3%		

Nota: La tasa de interés que ofrece cada garante difiere para cada solicitante. La tasa se ha decidido por sorteo.

PASO 2: ¿Cómo iniciar el tramite y en dónde?

Una vez que elija un garante, debe presentar: número de DNI, nombre completo y dirección de usted y de su cónyuge. Lo puede hacer personalmente en la reunión semanal de los miércoles o mediante una llamada telefónica al promotor.

Dirección: Contáctese con el **Sr. Carlos XXXXX**, los días miércoles de **3 a 5** de la tarde en cualquiera de las siguientes direcciones: mz L2 lote 20, mz L1 lote 34, o mz L Lote 38.

Teléfono: XXX-XXXX, XXX-XXX
Celular: 9 XXX-XXXX

PASO 3: ¿Que documentación debe llevar la semana siguiente de iniciado el trámite?

Deberá asistir acompañado por su cónyuge a la reunión semanal para llenar y proveer los siguientes documentos:

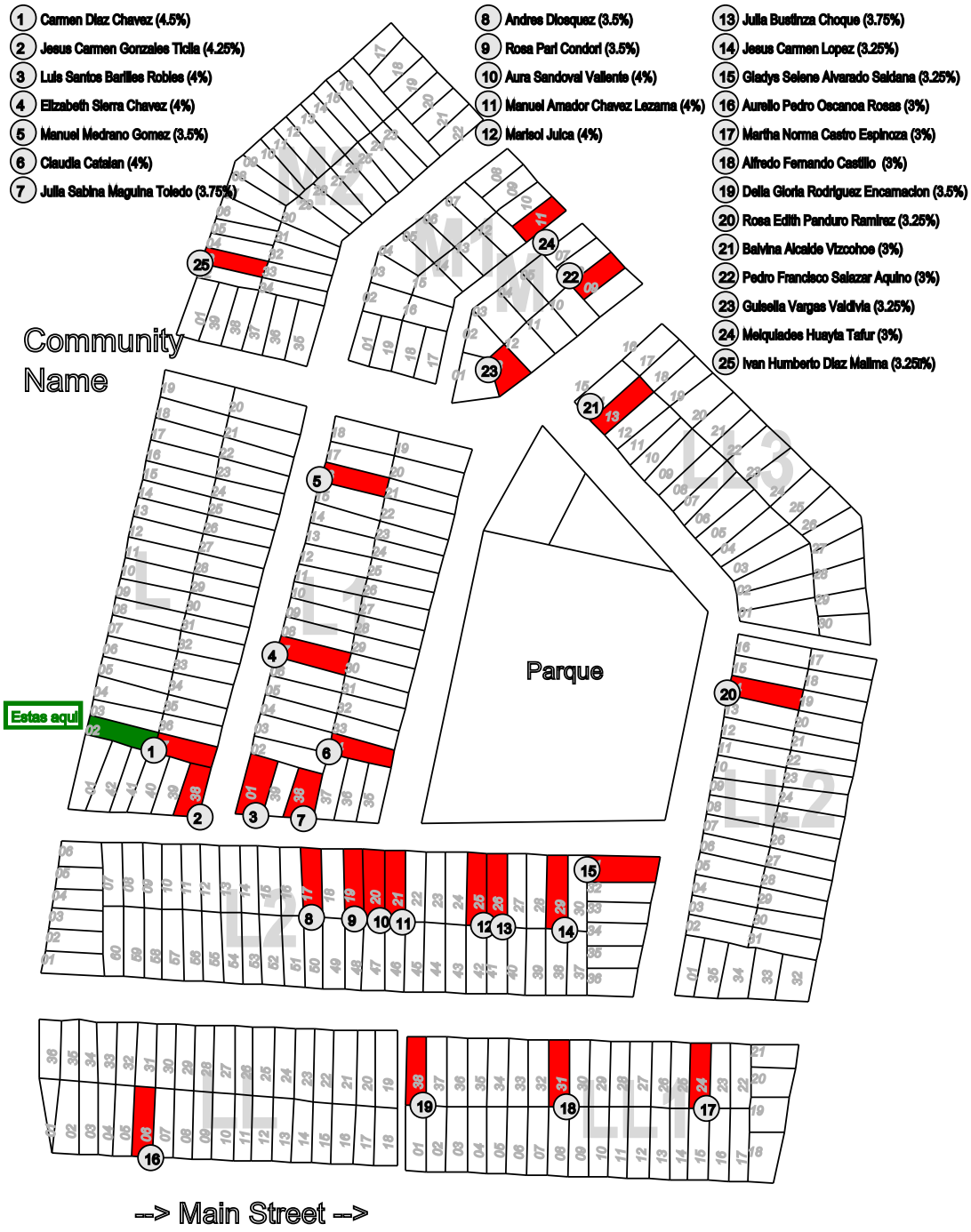
- Fotocopia de su DNI y el de su cónyuge
- Ficha de Información Económica Básica
- Contrato de Crédito
- Pagaré

Los montos del crédito van desde S/.50.00 a S/.2000.00 o $15.00 a $650.00 dólares.
Los créditos se pagarán en cualquiera de las Sucursales del Banco Continental.

alternativa
Centro de Investigación Social y Educación Popular

Emeterio Pérez Nro. 348 Télefono: (051)-481-5801
Urb Ingenieria . Distrito de San Martin de Porres Lima - Perú

Front page (community name, sponsor names and phone numbers were anonymized)



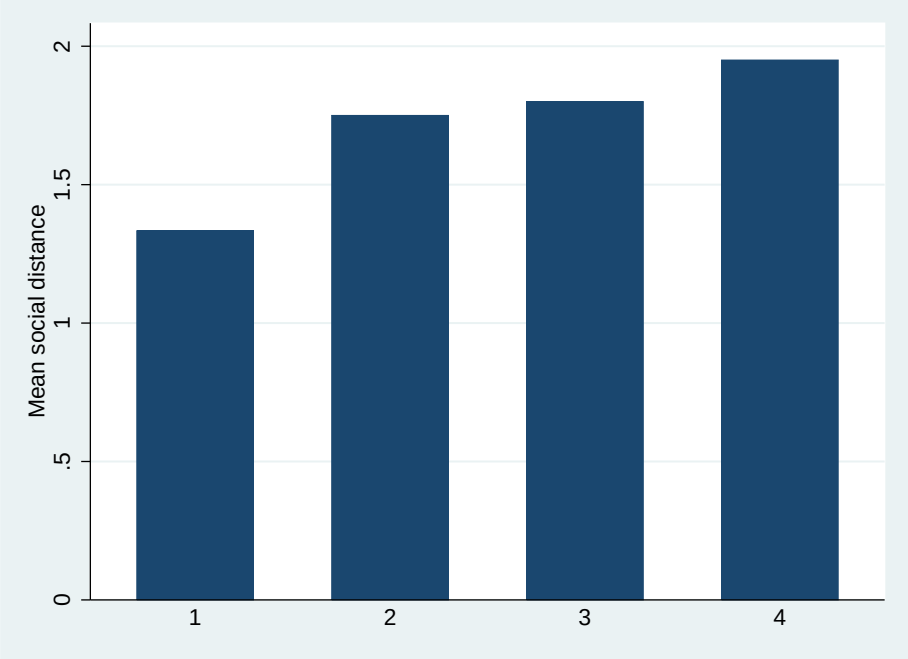
Back page (community name and street names were anonymized)

Table 1: Summary statistics for two shantytown communities in Peru

	Mean	Standard Dev.		Mean	Standard Dev.
Demographic Variables			*Social Network Variables*		
Female	0.50	0.50	Number of contacts	8.60	4.15
Age	35.84	14.37	Share of "neighbors"	0.59	0.49
Secondary Ed.	0.71	0.21	Share of "friends"	0.39	0.49
Household Inc.(S/.)	887.39	1,215.74	Share of "relatives"	0.02	0.15
Business-owner	0.20	0.40	Avg. size of loan (S/.)	75.88	121.20
			Geographic dist.	41.16	49.17

NOTE - The table shows summary statistics for adults (age at least 18). Income and loan amounts are reported in Peruvian New Soles (S/.). The exchange rate at time of the survey was 3.25 S/. for 1 USD. Network variables are calculated for the non-directed network where a pair of individuals are classified as connected if one of them names the other as a friend. Geographic distance is reported in meters.

Figure 1: Average social distance between client and cosigner by slope



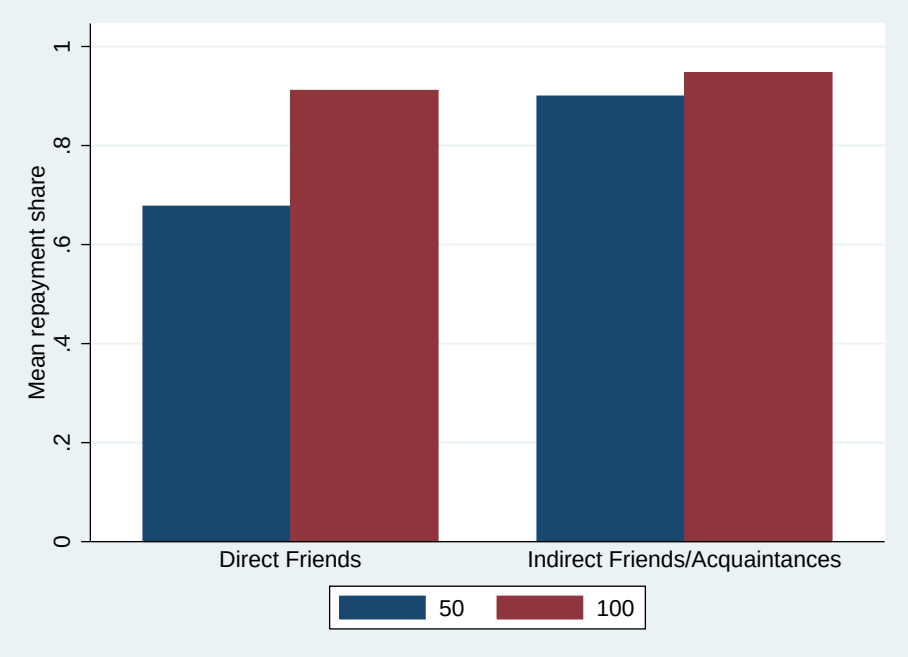
NOTE - Average social distance between borrower and cosigner for all realized loans was calculated for each SLOPE.

Table 2: Conditional logit estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Interest	-.802	-.801	-.800	-.884	-.785	-.804
	(0.3)***	(0.306)***	(0.3)***	(0.307)***	(0.301)***	(0.3)***
Relative		2.359				
		(0.871)***				
Friend			-.232			
			(0.33)			
Neighbor				0.93		
				(0.325)***		
Lent to					0.701	
					(0.355)**	
Borrowed						0.248
						(0.433)
SD=1	4.830	4.624	4.882	4.510	4.695	4.813
	(0.897)***	(0.905)***	(0.9)***	(0.913)***	(0.9)***	(0.898)***
SD=2	2.534	2.448	2.518	2.626	2.544	2.542
	(0.852)***	(0.854)***	(0.852)***	(0.856)***	(0.852)***	(0.852)***
SD=3	1.624	1.607	1.615	1.672	1.630	1.626
	(0.785)**	(0.784)**	(0.785)**	(0.79)**	(0.784)**	(0.785)**
Distance	-.006	-.007	-.006	-.006	-.006	-.006
	(0.002)**	(0.003)***	(0.002)**	(0.003)**	(0.002)**	(0.002)**
Obs.	3021	3021	3021	3021	3021	3021

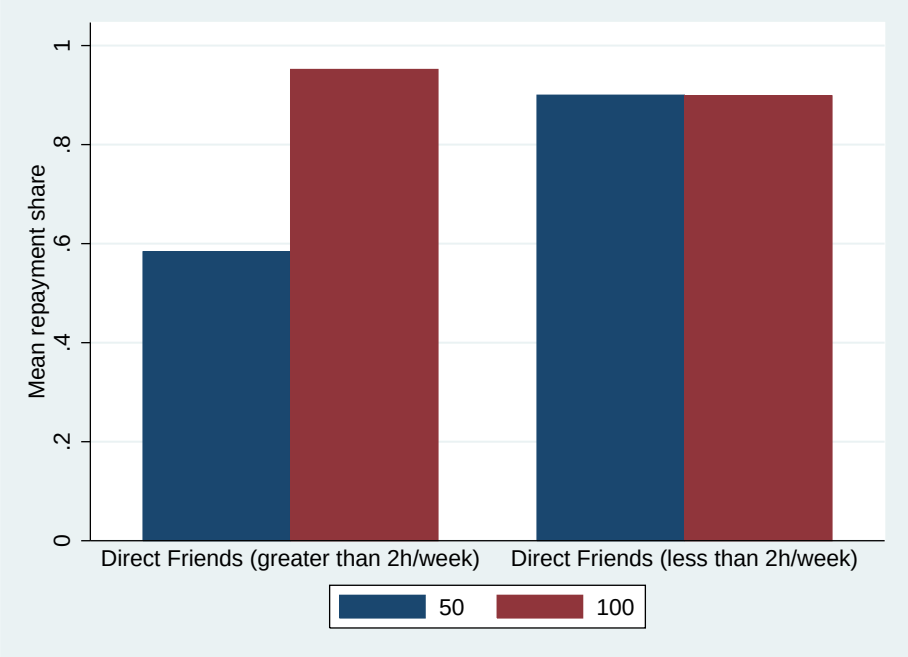
NOTE - Column (1) estimates our basic conditional logit model. Columns (2) to (4) test whether the proximity effect is stronger for certain types of links. Columns (5) and (6) whether past financial interactions across a link make cosigning more or less likely. The estimates suggest that if the borrower has recently lent himself to the cosigner, the cosigner is more likely to sponsor the borrower's loan.

Figure 2: Difference in repayment rates for loans where borrower and cosigner are direct friends (left) and indirect friends (right)



NOTE - Repayment rates are calculated for each group of loans when the loan is due (6 months).

Figure 3: Difference in repayment rates for loans where borrower and cosigner are direct friends and spend more than 2 hours a week together (left) and less than 2 hours a week together (right)



NOTE - Repayment rates are calculated for each group of loans when the loan is due (6 months).