Do Social Interactions Facilitate Cooperative Behavior? Evidence from a Group Lending Experiment in India

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Abstract

Exploiting experimental variation in repayment meeting frequency across microfinance groups, we show that more frequent interaction reduces social distance between group members and enhances their social capital. One year after the end of the loan cycle, clients in groups which met more frequently exhibit greater cooperation when offered the choice of including other group members in a lottery and thereby lowering individual expected lottery payoff while increasing expected group payoff. Higher expectations of reciprocal behavior by group members due to an improved ability to monitor each others' actions rather than greater altruism or only learning about types appears to drive this result.

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1 Introduction

It is widely held that social interactions yield significant economic returns by facilitating cooperation and thereby enabling individuals to reap gains from trade when commitment is not possible (Carter and Castillo, 2003; Grootaert, 2000; Krishna, 2001; Knaff and Keefer, 1997; Temple and Johnson, 1998). These ideas have a long-standing theoretical foundation in the literatures on repeated games and, more recently, network theory (e.g. Kreps et al., 1982; Karlan et al., 2009), and are supported by numerous empirical studies (see, for instance, Putnam, 1993; Alesina and Ferrara, 2002).[1] The presumed importance of social interactions also underlies scholars' concern over the recent declines in community membership in the United States (Putnam, 1995) and some low-income countries (Olken, 2008). However, empirical evidence on economic implications of these trends remains scarce largely due to the notorious difficulty of measuring the causal effect of interaction when social ties are endogenous (Manski, 1993, 2000).

A number of laboratory and field experiments show a robust positive association between social distance and cooperative behavior (individuals are more pro-social with friends at lower social distance). However, if individuals vary in their trustworthiness then some of this association is likely to reflect sorting of cooperative individuals into social networks. More generally, endogenous social ties make it near impossible to validate the basic economic model of returns to repeat interactions without randomly varying social distance.

The central contribution of this paper is to undertake this exercise. Using field experiments we generate random variation in the degree of social interaction between microfinance clients and then implement a modified trust game to estimate the impact of reduced social distance on prosocial behavior. By varying social distance holding network characteristics constant, we can isolate the causal influence of interaction on cooperative behavior that is generally confounded by endogenous selection into networks. The design of our trust game allows us to disentangle the effect of interaction on reducing opportunistic behavior from its

[1] Fafchamps and Lund (2003); Fafchamps and B.Minten (2002) provide empirical evidence on the importance of social interactions for trade in low-income countries; also see Durlauf and Fafchamps (2004)

effect on altruism and learning about types. Finally, the fact that the trust game is situated in the natural field context of sharing between micro-finance clients enhances the external validity, and policy relevance, of our findings.

Perhaps in no policy arena is the need for evidence on the returns to social capital more pertinent than microfinance. The most common model of micro-lending - that pioneered by the Grameen Bank - seeks to capitalize on group level trust and network externalities in order to increase the viability of lending to the poor. Yet, by typically requiring repayment in a group setting at regular intervals (Armendariz and Morduch, 2005), it has the potential to strengthen social ties and increase the overall social capital of group members.[2]

Our first field experiment varied whether microfinance client groups in urban India met once per week (now on, weekly groups) or once per month (monthly groups) over their loan cycle (Field and Pande, 2008). The average weekly group met 35 times while monthly clients met only ten times. Consistent with a multiple equilibria story (Glaeser et al., 2002), a change in meeting frequency caused large changes in social capital investment within a short time period: After five months, relative to a monthly group client, a client in a weekly group was 90% more likely to know her group members' family (by name) and to have visited them in their homes. She was also 16% more likely to know about social activities at another group member's house.

To evaluate the economic returns to such interactions, we experimentally measure cooperative behavior among clients. Collier (1998) describes social capital as a persistent externality resulting from social interactions that has the potential to increase trust and reciprocity.[3] To gauge whether our experiment generated such long-term externalities, we measured the difference between weekly and monthly clients' pro-social behavior with respect to other group members via a second field experiment analogous to a trust game approx-

[2]Regular repayment may promote fiscal discipline and help loan officers of microfinance institutions (MFIs) monitor clients who are at risk of default, while group meetings simply lower the MFI's transactions costs involved in collecting weekly payments.

[3]Alternatively, Putnam (1993) defines social capital broadly as "features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions".

imately one year after their loans were repaid. A random sample of clients were entered into (separate) lotteries and invited to enter fellow group members into their lottery. As in the standard laboratory investment game (Berg et al., 1995), there are potential gains from trade but contractual pre-commitment is not possible, so an individual's generosity towards other group members arguably measures "the resource potential of personal networks," the definition of social capital favored by Sampson et al. (1999).

We find that, relative to clients who met on a monthly basis, clients randomly assigned to meet weekly were 30% more likely to send a lottery ticket to a fellow group member. This may reflect increased altruism or greater trust and reciprocity among clients that know each other better. To disentangle these two motivations, we randomly varied the divisibility of the transfer, which constrained the receiver's ability to share earnings with the sender. We observe increased giving only when the prize was more easily divisible, indicating that more frequent interaction enhances the potential for cooperation rather than only altruism. This finding is consistent with laboratory experiments which reject that sending behavior in trust games reflects pure altruism (Carter and Castillo, 2003; Gneezy et al., 2000; Cox, 2000; Do et al., 2009), and supports the theoretical idea that networks create trust when agents use connections as social collateral to facilitate informal borrowing (Karlan et al., 2009). Survey data are consistent with the experimental findings: One year after completing the loan cycle weekly clients were twice as likely to attend social events together and almost a third more likely to say that they would help one another in the event of a health emergency.

To disentangle the importance of learning about types and monitoring on cooperative behavior, we exploit experimental variation in frequency of mandatory meetings for (a subset of) clients in two loan cycles: Their first loan cycle when clients are new to each other - and therefore still learning about one another's types - and in a subsequent loan cycle. While possible that learning about types is a continuous process, over 95% of the clients knew the names of all group members' husbands and children at the start of the subsequent cycle. We find that ticket giving is significantly higher among clients who were randomly assigned to high frequency meeting schedule in both their first and subsequent loan cycle. This

suggests, in addition to any learning, social interactions also increase cooperative behavior by improving clients' ability to monitor each other's actions and therefore employ punishment schemes to mitigate opportunistic behavior.

Taken together, our results suggest that greater social interaction among microfinance clients influences their social networks in a way that yields individual financial returns. Hence, our intervention can be viewed as a persistent and economically meaningful expansion of social capital.[4] Thus, not only are social externalities of regular group interaction an important component of the value of microfinance lending, but the endogeneity of social capital may have important implications for default and delinquency in group lending.

The rest of this paper is structured as follows. Section 2 discusses the related literature and Section 3 the study setting and basic theoretical predictions we take to the data. Section 4 describes how we varied repayment frequency, and estimates its impact on the frequency of interaction among clients. Section 5 provides experimental evidence on how meeting frequency affects cooperative behavior and Section 6 concludes.

2 Related Literature

Our study bridges two parallel but relatively unconnected literatures on the returns to social interaction.[5] First, a number of papers examine the relationship between survey measures of trust or civic engagement and miscellaneous personal and community characteristics, such as race and income heterogeneity (Costa and Kahn, 2003; Alesina and Ferrara, 2002), home ownership (DiPasquale and Glaeser, 1999), industrialization (Miguel et al., 2005), media access (Olken, 2008) and political institutions (Rahn and Rudolph, 2002). The general pattern of findings is that community characteristics that imply more frequent or steady interaction among individuals are associated with greater trust and civic engagement.However,

[4]Using detailed case studies on Grameen Bank clients L.Y.Larance (2001) showed that weekly meetings expanded members' networks, and that these networks facilitated economic and non-economic transactions.

[5]An important exception is Glaeser et al. (2000) who explicitly link the two literatures by analyzing individual determinants of social capital as measured by survey and experimentally-generated trust measures.

these studies are largely unable to isolate the social interaction channel from other channels through which community characteristics may influence attitudes and beliefs. A second shortcoming is the reliance on survey-generated measures of trust, which are often inconsistent with incentivized trust measures (Glaeser et al., 2000).

More recently, a number of papers explore the returns to social interaction using experimental trust measures generated from laboratory games (see, for instance Glaeser et al., 2000; Carter and Castillo, 2004; Karlan, 2005; Ligon and Schecter, 2008). Such measures are considered more reliable and meaningful indicators of cooperative behavior. Typically, the studies compare trust outcomes between pairs of individuals at varying degrees of social distance. However, while greater cooperation among friends is consistent with a model of economically gainful social interaction, pro-social behavior could, in theory, decrease with social distance simply because cooperative individuals are more likely to join networks.[6]

Here, we use field experiments both to measure trust, as in the aforementioned papers, and to generate random variation in social interactions. To the best of our knowledge, ours is the first paper to experimentally manipulate the social interaction of individuals outside of the laboratory and then examine its causal effect on pro-social behavior.[7] Given the notorious difficulty of addressing the endogeneity of social networks, the advantage of this approach cannot be understated. While a number of authors find that community participation is associated with higher levels of trust, and that trust between two individuals increases with the regularity of interaction, it is generally impossible to exclude the influences of reverse causality and omitted variable bias and isolate the returns to interaction.

Our paper is also related to the largely laboratory-based experimental literature that

[6]Both pro-social and non-pro-social types may exist, with pro-social types ("people" people) more likely to form networks. In this case, consistent with laboratory experiment results pro-social behavior would increase as social distance falls even if repeated interaction does not facilitate cooperation.

[7]In this sense, our paper is related to peer effects studies that exploit random variation in living arrangements to study the effects of social interactions on behavior (Sacerdote, 2001; Kremer and Levy, 2008; Kling et al., 2007). We compliment these studies by focussing on the impact of increased frequency of interaction rather than the impact of changes in who one interacts with.

seeks to disentangle incentives to cooperate. Multiple papers use variations of the classic Berg et al. (1995) investment game to parse out motives for giving (Carter and Castillo, 2004; Forsythe et al., 1994). Perhaps closest to our approach is Gneezy et al. (2000), who use a sequence of trust games with varying constraints on the amount that can be repaid in the second round to show that individuals contribute more when large repayments are feasible. In a series of experiments with Harvard undergraduates Do et al. (2009) distinguish altruistic giving from reciprocity by varying the condition of anonymity. Since giving to friends increases when sender's identity is made known to the receiver, they conclude that reciprocity is an important motivation for generosity to friends. In a related field experiment in Paraguay, Ligon and Schecter (2008) attempt to disentangle four motives for giving to others - benevolence, altruism, sanctions, and reciprocity within a social network - by varying information and anonymity in a standard dictator game, and find evidence of all four.[8] Our game differs in that the potential for reciprocal behavior is implicit rather than explicitly ascertained.

By introducing a real-world choice over risk-sharing in a setting in which clients are likely unaware that they are participants in an experiment, our trust game falls in the category of "natural field experiment". In contrast, all the above studies are "framed" or "artefactual" field experiments, where subjects know that they are experiment participants, with their behavior subsequently recorded and scrutinized. List (2006) and Benz and Meier (2008) show that moving from the realm of framed to natural experiments can significantly alter outcomes. As discussed in Harrison and List (2004), this is a key dimension along which field experiments are potentially superior to laboratory experiments and which has not previously been achieved in the experimental literature on trust.

[8]Laboratory experiments that randomly vary continuation probabilities in repeated games also provide evidence on incentives to cooperate – e.g. Bo (2005) shows that cooperation is higher in infinitely repeated laboratory games.

3 Background

3.1 MFI Setting

Our partner micro-finance institution 'Village Welfare Society' (VWS) started operations in the Indian state of West Bengal in 1982. In 2006 (when we initiated our field experiments), it had eighteen branches spread across five districts in West Bengal and roughly 6.75 million dollars in outstanding loans to over 56,000 clients. Its end-year financial statement for 2006 reported a repayment rate of 99%.

The VWS client base reflects typical MFI practices: it only lends to women (most of whom are married), and targets those with a household income below two dollars a day. Most clients work in the informal sector: less than 10% of households in our experiment have any member who earns a fixed salary. Like most MFIs, VWS targets entrepreneurial clients: Over 70% of households in our experimental sample own some type of micro-enterprise and over 80% of the women are literate (Table 1). In creating loan groups VWS follows a neighborhood approach – clients in a single neighborhood are approached, trained in loan procedures and formed into a group with one member chosen as group leader (the Appendix describes VWS group formation protocol).

The neighborhood-based approach that characterizes group lending implies that group members are typically acquainted with each other prior to joining a loan group. In our sample, roughly 70% of the clients had a direct connection before joining the loan group. That said, the strength of these ties was relatively low: At the first group meeting only 35% of clients report either having visited all their group members or having been visited by them in their homes.

After the loan is disbursed, the loan officer conducts weekly repayment meetings in the group leader's house. The first two weeks are for group nurturing and training. Loan repayment starts in the third week. During each meeting, which lasts between 15 and 30 minutes, clients take an oath (in which they promise to repay regularly and observe joint

liability), the loan officer collects payment from each member and marks their passbooks.[9] A client's repayment behavior is, therefore, public to all other group members. Women socialize while waiting their turn and while repaying may describe any problems they face in making repayment. The loan officer may also take the opportunity to discuss new initiatives or procedural changes at the bank, or answer questions from clients.

At any point after twenty weeks, clients can repay the remaining balance in one installment and graduate to a larger loan. Typically clients finish repaying at different points in time; in our sample the median weekly VWS group met 37 times during a single loan cycle.[10]

3.2 Analytical Framework

Clients in our experiment are relatively poor and face frequent shocks to their household income and health. In our sample 29.4% faced health shocks in the twelve months prior to taking out a loan. Since they have limited access to financial services and formal insurance, the returns to reciprocal economic behavior are presumably significant. However, the absence of formal contract enforcement mechanisms is likely to limit such behavior.

In such an environment, more frequent loan repayment meetings have the potential to improve micro-finance clients' ability to engage in cooperative behavior by lowering the cost of learning about fellow group members. Learning occurs at group meetings through information exchanged between clients in conversation before and after meetings, as well as by observing each other's repayment behavior and interaction with others during the meeting. We assume that information increases with each additional meeting, though not necessarily in a linear fashion, such that by the end of the loan cycle, clients on the weekly repayment schedule have significantly greater information about fellow group members. For a given total number of meetings, meeting at a higher frequency can improve the precision

[9] If unable to make it to a meeting, then a client can repay at a center. This occurred very rarely.

[10] The general VWS guideline for continuing group meetings is if a majority of clients in a group have repaid their loan, then they ask remaining clients to come to the branch to make payments.

of the information revealed and further enhance learning.

Greater information may improve cooperative behavior through two channels. First, since many do not know each other, forcing new clients to interact more often enables them to more quickly learn whether another client is a type with whom she would like to form a long-term relationship, either because she learns that an individual is a trustworthy type, or simply because she learns that she has enough in common with the other person to invest in future interaction beyond the loan cycle. As a result, assignment to weekly repayment schedules should broaden new clients' social networks. Within a social network, clients' interactions can be modeled as an infinitely repeated game, in which case cooperation can be sustained through self-enforcing reward and punishment schemes that limit opportunistic behavior. Second, information gleaned from more frequent interaction improves clients' ability to enforce reciprocal agreements with individuals both within and outside of networks by improving their ability to monitor other clients' actions.[11,12]

An alternative channel is that frequency of interaction could increase the extent of directed altruism. Hence, our experiment first seeks to distinguish between the relative importance of reciprocal behavior and direct altruism in driving any observed changes in pro-social behavior. Given evidence that reciprocity rather than altruism underlies pro-social behavior in our experiment, we provide further evidence on the relative importance of learning about types versus greater ability to enforce punishments in sustaining reciprocal behavior. To do so, we make use of the fact that the value of interaction for learning about types should largely matter in early stages of interaction, when clients do not know each other well. In contrast, if repayment frequency is, in part, an improvement in monitoring technology then reciprocal behavior among clients should depend on frequency of meeting even after type has been revealed.

[11]This prediction assumes imperfect information about others' actions and that clients are not infinitely patient, in which case an improvement in monitoring technology would not result in greater cooperation.

[12]For clients outside of the network, cooperative behavior can potentially be sustained in a finitely repeated game (the loan cycle) using a trigger punishment strategy if there is uncertainty about types.

4 Meeting Frequency and Social Interactions

4.1 Experimental Design and Data

We created variation in the frequency of social interaction between MFI group members by randomizing group meeting frequency across a hundred first-time VWS borrower groups, which were formed between April and September 2006, in peri-urban Kolkata. In forming these groups loan officers followed current VWS protocol and aimed for a group size of ten-members; in practice, group size ranged between eight and thirteen members, with 77% of the groups consisting of ten members. In line with VWS policy, clients received a uniform Rs. 4000 (˜$100) loan.

After finalizing the groups and loan terms (but before the loan was disbursed), we randomly assigned thirty groups to the standard VWS repayment schedule of weekly repayment and seventy groups to a monthly repayment schedule.[13] No clients dropped out after the repayment schedule was announced. Clients repaid their Rs. 4000 loan through 44 weekly installments of Rs. 100 if they were on the weekly repayment schedule (starting two weeks after loan disbursal) and eleven Rs. 400 installments if they were on a monthly repayment schedule (starting the second month after the loan was disbursed).

We administered a baseline survey to 99% of clients as soon as group formation was completed. In Table 1 we use these data to provide a randomization check. Panel A shows that both monthly and weekly groups had, on average, ten members and similar group-level income dispersion, loan disbursement date, and degree of connectivity. Panel B provides a client-level randomization check. The co-variates are jointly insignificantly different across weekly and monthly groups, but two covariates differ significantly. First, none of the weekly clients but 8% of the monthly clients are Muslim. Second, monthly clients have lived in their current neighborhoods for slightly longer. While the latter is potentially worrisome, it

[13] We originally intended to divide monthly repayment groups into two arms: One that met weekly and one that met monthly. In practice, weekly meetings among clients required to repay monthly broke down almost immediately, and these clients ended up meeting on a monthly basis for most of their loan cycles.

is important to note that monthly clients were not more likely to know each other before joining the group. We have verified that all results are robust to excluding Muslim clients.

We also collected regular measures of group interactions for every client throughout her loan cycle. Starting late May 2006, at the end of the group meeting the loan officer asked each client a few questions on her knowledge of, and outside group meeting interactions with, other group members. Since complete privacy could not be guaranteed, loan officers asked clients to aggregate their interactions across group members to maintain some degree of anonymity. For most clients we have interaction data for the entire loan cycle, where the loan cycle length varies since clients often repaid early.[14] Our regressions consider data from the first five months – no client repaid her loan before the sixth month. In the group meeting clients were asked whether they had been visited by all group members in their home, and whether they had visited all other group members in their homes. For both outcomes, we construct an indicator variable that equals one if the client responded in the affirmative at any group meeting during the first five months. Since group repayment meetings occur at the group leaders' house, these two outcomes capture the breadth of client interactions outside of these meetings. As expected, the two outcomes are highly correlated. The second set of measures capture client knowledge of her group members. The first is whether the client said she knew the names of family members of her fellow group clients and the second is whether she knew if any of her group members had relatives visit in the last thirty days. For the first measure, we again construct an indicator variable that equals one if the client responded in the affirmative at any group meeting during the first five months. For the second, we average across all responses for a client in the first five months. For the family of outcomes, we expect the coefficients on the variables of interest to go in the same direction. To avoid drawing inferences based on selected outcomes, we also report effects for "Social

[14]Due to the delay in starting the survey 1.9% of clients (20 clients) are missing two months of data, 4.8%(49 clients) are missing data for 45 days and 7.8% (80 clients) are missing data for one month. Seventeen clients repaid within six months of their first meeting (1.7%) and another 45 repaid in the first seven months (4.4%). As a robustness check, we have rerun all regressions using group meeting data for months 3-5 of the loan cycle. By the third month all groups had at least one month of meetings

Interactions Index" which averages across these four outcomes (Kling et al., 2007).[15]

4.2 Meeting Frequency and Extent of Interactions

Across all clients, we observe a significant increase in social interactions over the course of the loan cycle. As illustrated in Figure 1, over the first five months of the loan the fraction of clients who had visited all group members in their homes increased gradually from 35% to 43% (the statistics are very similar for the fraction of clients who were visited by all group members, and knew the names of family members of other group clients). Similarly, the fraction of clients who knew whether their group members had been visited by relatives increased five-fold from 2% to 10%. The gradual nature of the change in interaction suggests a "dose response" to mandatory meetings. Hence, social interactions should increase more among weekly clients with more opportunity to form friendships with fellow clients.

Column (1) of Table 2 reports the first stage result from our experimental manipulation. Randomization of loan repayment schedule across loan groups induced exogenous variation in meeting frequency: On average, clients on the weekly repayment schedule met thrice as often as monthly clients (35.1 times versus 9.8 times).

To examine whether increased frequency of group meetings led to greater social interactions among group members outside of meetings, we use the self-reported data on social interactions collected during group meetings. To balance the number of observations per client across weekly and monthly clients, we randomly draw one observation per month per weekly client. Since client responses to these questions were possibly influenced by being asked in a group setting, we aggregate the data to the group level g, and estimate the following Ordinary Least Square (OLS) regression:

$$y_g = \beta_1 W_g + X_g \gamma_1 + \delta M_g + \alpha_g + \epsilon_g \tag{1}$$

W_g is an indicator variable for whether the group met on a weekly schedule, M_g is the month

[15]The index is the equally weighted average of the four variables, with each variable normalized by subtracting the mean for monthly clients and dividing by the standard deviation for these clients.

of group formation and α_g is a loan officer fixed effect. We report specifications without and with group-level controls (X_g) reported in Table 1.

Columns (2) and (3) of Table 2 reveal a large effect of weekly assignment on the Social Interaction Index. Moving from monthly to weekly repayment leads to a four standard deviation increase in social interactions. This effect is robust to the inclusion of controls (column (3)). In columns (4)-(7) we consider the index components.[16] In column (4) and (5) we see that while, on average, only 10% of clients in a monthly group report visiting or being visited by their group members, the corresponding number for weekly clients is roughly 100%. In column (6) we observe a similar sized disparity for whether, on average, the client knows the name of her group members. In column (7) we see that only 0.3% of monthly clients but 10% of weekly clients know whether their group members were visited by relatives (these patterns in the data also hold up at the client level and for the lottery sub-sample).

The magnitude of these results is strikingly large, and consistent with a multiple equilibria story – a change in meeting frequency tips the nature of social interactions among group members from being a relatively rare occurrence to being the norm.

5 Do Social Interactions Increase Cooperation?

5.1 Experimental Design

To examine whether more frequent interaction increases cooperative behavior we conducted a second field experiment with a random sample of our clients roughly fifteen months after they had taken out their first loan.[17] From a sample of 450 clients, we were able to contact 432 (two clients had died and sixteen were away from Kolkata). These clients were spread across 98 groups, yielding a final sample of 129 weekly and 321 monthly clients.

[16] For ease of interpretation we consider the non-normalized group averages as the outcome.

[17] We piloted the lottery among 128 clients and then randomly drew a sample of 450 clients from the remaining 900 in which to conduct the final lottery.

Surveyors approached each client in her house, and invited her to participate in a lottery. At the same time the client was also interviewed about her current interactions with members of her first VWS group. The survey questions included questions similar to those asked during the group meetings, and provide a long-run measure of social capital. In addition, the survey asked clients the widely used General Social Survey (GSS) questions on trust, fairness and helping others (see, for instance, Knack and Keefer, 1997; Glaeser et al., 2000; Karlan, 2005) and, finally, elicited perceptions of the trustworthiness of the average group member.[18]

Prior to administering the survey, we conducted a modified trust game with the client. The experimental protocol was as follows: The client was told that her name had been selected for inclusion in a random draw for 200 Rupees of gift vouchers that could be redeemed at a local retailer affiliated with VWS.[19] The lucky draw was framed as a promotion for the new VWS retail store. She was told that the pool of names entered into the lucky draw included ten other clients from another bank branch outside of her neighborhood (such that they are unlikely to know her). These ten other participants could not enter other individuals into the lottery. However, if she agreed to enter the draw (all clients agreed), then she could enter other members from her first VWS group into the draw. Hence, she was the only lottery participant who could influence the odds of winning. She could potentially increase the number of lottery participants from 11 to as many as 20, and increasing the fraction of group members in the draw from 9% to 50%, while decreasing her probability of winning from 9% to 5%. The client was provided detailed payoff matrices before she made

[18]To gauge her perceptions of trustworthiness, the client was described the following scenario: "Imagine that a person is walking down the street and sees someone in front of him/her drop their purse. Upon inspection, this person finds that the purse contains Rs 200 and the name and phone number of the owner. The person who has found the purse must decide whether to keep it and its contents or return it to its owner." She was then asked to rank (on a scale of 1 to 5, where 1 is will not return and 5 is will definitely return) the likelihood that her average group member would return the wallet. The full 1-5 scale was described as follows: "1-Would not return the money. 2- Unless someone knows she has got the wallet, would not return it. 3-As likely to return as not. 4- Will return, but might take up to a week. 5- Will return immediately."

[19]The amount reflected VWS managers' view of what constituted an "appropriate" sized prize.

her choice (on the importance of providing this information, see Charness et al. (2004)). The client was also told that group members she entered into the lottery would be given a lottery ticket and told who had entered them. The Appendix provides the script and Figure 2a the picture used to explain payoff matrices.

We are interested in whether a client who was required to meet her group members more often was more likely to enter them into the lottery. If group meetings increase social capital in an economically meaningful way, then we would expect such a client to be more willing to share the odds of winning with her group members.

Our field experiment is analogous to a standard laboratory trust game (Fehr et al., 1993): Pairs of individuals are separated, and one member of the pair (the sender) has the opportunity to send a lottery ticket to her partner (the receiver). Doing so increases the pair's pool of potential earnings since their joint chances of winning the lottery rise from 9% to 17%. If the receiver wins the lottery and, hence, the transfer, she has the option of sending money back to the sender. Hence, there are mutual gains from cooperation (if the receiver always sends back half her earnings, the sender's expected lottery earnings rise from 18 to 25 Rupees and the receiver's expected earnings rise from 0 to 8.3 Rupees), but costs to the individual if the gift is not reciprocated (if the receiver does not share her earnings with the sender, then giving a ticket to the receiver reduces the sender's expected lottery earnings since her individual probability of winning the lottery falls from 9% to 8% as the pool of lottery entrants rises to twelve). In contrast to the typical trust game, we do not explicitly ask the receiver for the amount she wishes to send back. However, the sender and receiver have frequent opportunities to meet and engage in reciprocal exchanges. Figure 2b graphs how client's expected payoff changes with ticket giving (under alternative assumptions about sharing). The top line shows how client payoff increases with ticket giving, if members she shares with always split the prize with her. The bottom line shows the reduction in payoff if none of the members share with her.

An individual's decision to enter a group member into the lottery measures either trust (since enforceability of the exchange relies on trust and reciprocity and may be hindered by

coordination problems) or altruism. To disentangle these two channels, we introduced a second client-level variation in the experimental protocol: For a randomly chosen half of the 450 participants, the lottery prize took the form of one 200-rupee voucher while the other half could win four 50-rupee vouchers. A voucher could only be used by one client (see Web Appendix Figure 1 and the Appendix for text). The idea was to introduce barriers to the divisibility of the lottery earnings that make coordinating on, or enforcing, the cooperative strategy more difficult. If ticket-giving is purely motivated by altruism then the divisibility of the prize should not influence ticket exchange.

Table 1 also provides a randomization check for the sample entering the lottery. We consider group-level (Panel A), client-level (Panel B) and pair-level (Panel C) variables. A comparison of columns (1) and (2) with columns (4) and (5) shows that the lottery sample is representative of the experimental population. Columns (7) and (8) show that our separate group and voucher randomizations are balanced, and column (9) that the cross-randomization (group and voucher) is balanced at the client level (the voucher randomization occurred at the individual level).

5.2 Results

5.2.1 Meeting Frequency and Trust

In Table 3, we start by examining whether meeting frequency affected client's perceptions of trustworthiness of VWS group members. In column (1) we consider a client's perceptions of her average group member's trustworthiness as measured by the likelihood that the average group member would return a wallet containing money to the owner. Moving from a monthly to a weekly meeting schedule increases the perceived trustworthiness of the average group member by 0.15-0.20 points. In column (2) we report regressions where we use data on a client's responses to a hypothetical question on whether she believes that a particular group member would help her in the event of illness. This variable is separately defined for each group member, giving us a total of 4020 observations (on average, 8.9 observations per client). In cases where we interviewed both members of pair we randomly choose one

observation (the regression specification is of the form of equation (2), which is described in the next subsection). Strikingly, weekly clients are 38 percent more likely to report that a fellow group member would provide assistance in such an emergency.

5.2.2 Meeting Frequency and Ticket Giving

For each client in a participant's loan group, we record whether the participant chose to enter her into the lottery. Figure 3 shows the overall distribution of lottery tickets across clients. Roughly 40% of the clients did not give any tickets, 10% of the clients gave one ticket, and similar percentages gave up to four tickets. After this, the number of tickets declines significantly. There is a slight increase right at the end – roughly 5% of the clients gave tickets to all group members.

We have examined the role of different covariates in explaining ticket giving. In line with the existing social capital literature clients who had spent time (over the last 24 hours) participating in community and political activities were more likely to give tickets. Clients are also more likely to give tickets to group members who live nearby (less than 100 meters away) and to their group leader. In so far as the group leader coordinates payment by group members, it is unsurprising that she is perceived as more trustworthy. Interestingly, the group leader does not reciprocate by giving more tickets to her group members. One possibility is that each group member perceives her tie to a group leader as a strong tie, while a group leader perceives her tie with the nine group members as a weak tie. The idea that perceived strength of ties matters is also consistent with the fact that, by far, the most important predictor of ticket giving is knowing the member prior to taking out the loan. Clients are 15% more likely to give a lottery ticket to a member they knew before joining the loan group. The fact that the set of significant determinants of ticket giving includes measures, such as low inter-household distance, that facilitate monitoring suggests that increased ability to monitor may indeed be an important determinant of pro-social behavior.

In Table 4 we examine the relationship between meeting frequency and ticket giving.

In our regressions, the outcome of interest y_{gmi} for lottery client i belonging to group g is whether she gave group-member m a ticket and we estimate:

$$y_{gmi} = \beta_1 W_g + X_g\gamma_1 + X_{im}\gamma_2 + X_i\gamma_3 + \delta_1 M_g + \delta_2 D_g + \alpha_g + \epsilon_{gmi} \quad (2)$$

where the variables are as defined in equation (1). We include a control for number of days between loan disbursement and survey (D_{gr}). Our additional controls are defined at the group-, pair- and individual- level (X_g, X_{im} and X_i respectively). We cluster standard errors at the level of randomization, i.e group-level. However, errors may also be correlated at the respondent level: conditional, on giving one group member a ticket we may expect the likelihood that she gives a second group member a ticket to be lower. Therefore, we cluster standard errors along two dimensions – across groups and individuals – using the multi-way clustering approach suggested by Cameron et al. (2006) and Thompson (2006).[20]

Columns (1) and (2) of Table 4 show that, relative to her monthly counterpart, a client in a weekly group is 6 percentage points more likely to give a ticket to a group member. The result is robust to including a broad set of controls (column 2).[21] In Column (3), we see that increased ticket giving by weekly repayment clients is motivated by increased giving to neighbors and "other family" (non-immediate family members). The fact that the interaction between weekly and immediate family as well as between weekly and friends are insignificant provides an important check for the argument that increased monitoring is motivating pro-social behavior (given that in relationships between immediate family members or friends, we do not expect repayment schedules to be the crucial determinant of pairwise opportunities for mutual monitoring).

As discussed earlier, an increase in social interactions between two group members has the potential to both increase altruism between them and strengthen norms of reciprocal

[20]Clustering standard errors at the pair rather than the individual level has little effect on the results.

[21]In general, group-level implications of increased weekly ticket giving are less straightforward: Bloch et al. (2007) show that increased subgroup social capital can increase overall group fragility. However, the fact that total group-level ticket giving was higher for weekly groups suggests that, in our setting, the overall effect among group members is positive.

behavior. To investigate whether altruism is driving the result we examine experimentally whether divisibility of the lottery gift matters. In column (4) we see that among clients assigned to the four 50-rupee voucher lottery, weekly clients are 12% more likely to give a ticket. In contrast, we see no such difference among clients assigned to the one 200-rupee voucher variation (column 5). The fact that ticket-giving is only higher among weekly clients when the lottery prize is easily divisible (i.e. four 50-rupee voucher option) suggests that more frequent meetings did not increase directed altruism toward group members (if they had, ticket giving would be independent of voucher divisibility). Rather, it appears that expectations of reciprocity underlie the main result.[22] Importantly, in Web Appendix Table 1 we show that the extent of social interaction among client pairs is similar in magnitude for the group that received the one 200 Rupee lottery voucher offer and the group that received that four 50 Rupee voucher offer, verifying that random variation in subgroup composition does not drive our results.

We conducted a brief survey among the 47 clients who had been given a ticket by their group member and had subsequently won a lottery. We were able to survey 39 of these clients. Nearly all clients (85%) knew who had given them their winning ticket. Of those who knew who had given them the winning ticket, one quarter reported increased post-lottery sharing with this group member. 27% of clients who knew the group member who gave them their ticket reported sharing with this group member previous to the lottery, while only 17% of those who did not know the ticket giver reported having shared with whichever group member they thought was most likely to have given them the ticket. The most commonly shared goods among group members were food and sarees. We observe two instances of group members loaning to one another. In both instances, clients reported knowing the identity of the ticket giver. Of those clients who reported sharing with group members either before or after the lottery, 60% were on weekly repayment schedules (59% of surveyed indirect lottery winners were on weekly repayment schedules).

[22]Anecdotal evidence from conversations with clients also suggested that they believed multiple vouchers increased the likelihood that those they gave tickets to would share any future winnings.

5.3 Channels of Influence

What sustains expectations of reciprocity? We start by showing that initial differences in meeting frequency translated into longer run differences in social interactions among group members. Then, among the subset of lottery clients who continued as VWS clients, we exploit experimental variation in the frequency of meeting of their current loan group to disentangle the relative importance of learning about types and ability to monitor. Finally, we examine alternative hypotheses about whether meeting frequency directly influenced client's financial behavior and therefore perceived trustworthiness.

5.3.1 Long Run Social Interactions

Our lottery and survey was conducted more than one year after clients had finished paying their initial loan (the average final payment date and survey data was April 2007 and July 2008 respectively). We have 4020 observations on pairwise social interactions, and in cases where we sampled multiple members from a group we have two reports on the interaction between the pair. To maintain symmetry, we randomly select one of the two observations reducing our sample to 3144 observations. Table 3 reports the results. We start by considering the summary measure of interactions in columns (3)-(6). For comparability with the Table 2 results, we first report group level outcomes in columns (3) and (4). More than a year after clients have graduated from their loan group, weekly groups remain significantly more likely to interact than monthly groups, although the extent of interaction is attenuated. In columns (5) and (6) we estimate the impact of weekly meeting on the social interaction index using our pairwise data and find a similarly large effect. Moving from a monthly to weekly schedule leads to a 0.13 standard deviation increase in social interaction between a client and another group member

In columns (7)-(10) we examine the different components of the index (again, for expositional ease we focus on the non-normalized variables). Two measures are directly comparable to the group meeting questions – the number of times the client has visited the group member in her house and been visited by her (over the last thirty days). We

also asked whether the client still talks to the group member about her family and whether they celebrated the main Bengali festival (Durga Puja) together.[23] Across all measures we observe greater social interactions among weekly clients relative to monthly clients, though the individual estimates are noisier.

5.3.2 Learning versus Monitoring

As discussed in Section 3.2 more frequent meetings may encourage cooperative behavior through either of two channels. In particular, improving monitoring technology can facilitate schemes to reward and punish opportunistic behavior. Alternatively, more interactions may result in better information about client types.

To examine the relative importance of these two channels, we exploit a further field experiment. At the time of surveying clients for the lottery, 209 of the 432 clients had continued as VWS clients and were on their third loan cycle. Of these, 137 clients entered a new field experiment where they were again randomized into weekly and monthly groups. The new loan groups had five members (as against ten members in the first loan cycle). While some of the client's current group members are new, on average 65% of her current group members are from the first intervention. The numbers are very similar across clients who are currently on the weekly and monthly schedule. We examine whether, conditional on initial meeting frequency, current meeting frequency matters. In doing so, we can observe whether forcing clients who know each other well to interact more regularly also increases prosocial behavior. If there is no role of monitoring technology, then pro-social behavior should not be sensitive to the frequency of interactions once type has been revealed. We estimate regressions of the form

$$y_{gmi} = \beta_1 W1_g \times W2_g + \beta_2 M1_g \times W2_g + \beta_3 W1_g + X_g\gamma_1 + X_{im}\gamma_2 + X_i\gamma_3 + \delta_1 M_g + \delta_2 D_g + \alpha_g + \epsilon_{gmi} \tag{3}$$

[23]The last social capital measure was determined after numerous focus groups in which we asked clients the most important events for socializing in the community.

where $W1_g$ and $W2_g$ denotes being on weekly repayment schedule in first and current intervention respectively and $M1_g$ is a dummy for being on monthly schedule in the first intervention. The other variables are as defined in equation (2). In column (1) of Table 5, we see that the likelihood of having group members from the first loan cycle in current group is relatively high (2.5 out of 4 other members) and independent of repayment frequency. In Column 2, the dependent variable is the total number of required MFI meetings across the first and current intervention. A client who was on the monthly schedule in both loan cycles had met, on average, 12 times while a client on the weekly cycle in both cycles had met roughly three times as often.

In column (3) we see that clients randomly assigned to the weekly schedule in both their first and third loan cycle are significantly more likely to engage in pro-social behavior than those who were initially on the weekly schedule but later assigned to the monthly schedule: ticket-giving is more than 70% higher among the former group.

Finally, in column (4) we see that a parallel significant difference in the extent of social interactions between the pair (as reported in the lottery survey). This suggests hat the observed increase in pro-social behavior is accompanied by increased opportunities for pairwise monitoring.

5.3.3 Financial Behavior

An alternative explanation of increased pro-social behavior among weekly repayment clients would be that increased frequency of repayment encourages financial responsibility, and clients anticipate higher returns from pro-social giving to group members who are financially responsible. In Table 6 we use group meeting data from the first loan cycle for the clients entering the lottery to examine this possibility. Taking the client-level average over all group meeting observations, we find that weekly clients are 3.4% less likely to be present at meetings (column (1)). In column (2) we observe that weekly clients are only .1% more likely to repay at meetings than their monthly counterparts, and in column (3) we use administrative data to show that weekly repayment clients are an insignificant 1.7% less likely to default. These

results suggest that it is not the case that weekly clients have significantly better financial behavior which might motivate higher expected returns to giving. It is also worth noting that the default result is driven by only 9 defaulting monthly clients, and our results are robust to excluding these clients.

6 Conclusions

A key assumption in the social capital literature has been that social interactions encourage norms of reciprocity and trustworthiness. In fact, participation in groups is often used to measure an individual's or a community's social capital (see, for instance Narayan and Pritchett, 1999). However, in this literature, whether the observed correlation between social distance and trust reflects the causal effect of interaction on cooperative behavior is unclear. Our results provide evidence that repeat interactions facilitate cooperative behavior by enabling individuals to better implement schemes of punishments and rewards that mitigate opportunistic behavior. Further, we provide causal evidence that small policy-induced variations in community participation increase trust in a strikingly short amount of time. These findings are consistent with the idea that a combination of positive externalities and inherent complementarities in social capital creates the possibility for multiple equilibria and, as a result, underinvestment in social capital (Glaeser et al., 2002). Our findings suggest potentially large gains from policies which facilitate interaction and help coordinate investment, especially in low income countries where formal institutions are often weak.

Aside from the general value of social capital for these communities, our findings have potentially important implications for micro-finance and the design of microcredit contracts. In addition to improving individual economic well-being for repayment prospects, greater within-group trust could help them to better insure each other against default, or more frequent interaction could help members monitor each other's investment behavior. It is certainly the case that numerous claims have been made that social capital improves the financial performance of micro-finance clients. For instance, Karlan (2005) shows that micro-

finance clients who are more trustworthy in a trust game are also better financial clients. Furthermore, we find evidence in our experimental data that clients assigned to meet more frequently find it easier to pay off their loans early (Field and Pande, 2008).[24] However, since repayment frequency may influence delinquency through several channels, it is impossible to isolate the role of trust on loan outcomes in this experiment.

In light of our findings, an important question is in what settings can we expect MFI lending activity to enhance social capital formation? One striking finding is the low initial level of social capital among women in our study - a large number of neighbors from similar socio-economic backgrounds get to know each other well enough to cooperate only with the outside stimulus of microfinance. Previous work on the determinants of social capital formation suggests low network density in settings characterized by high mobility, ethnic or linguistic fractionalization and low social status (Alesina and Ferrara, 2002; Glaeser et al., 2002, 2000; Sampson et al., 1999). Hence, our findings are likely to be most readily applicable to the fast-growing urban and peri-urban areas of cities in developing countries (such as Kolkata), where there is an increasing microfinance presence.

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[24] In particular, we find that monthly clients are less likely to repay their loans early, and are more likely to work extra hours the day before their loan is due.

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7 Appendix

VWS Group Formation Protocol

First, a loan officer surveys the demographic make-up of a potential neighborhood. If it is deemed appropriate then s/he conducts a meeting to inform potential clients about the VWS loan product and invites them to a five-day Continuous Group Training (CGT) program. This program runs for an hour each day, and introduces clients to the benefits and responsibilities associated with the loan product. Each potential loan group (with a minimum group size of ten individuals) is assigned a separate CGT program. At the end of the five-day training, the loan officer forms women who were considered sufficiently informed and interested into a group, identifies (with group members) a group leader and offers each member of the group a loan.[25]

Probability Script for Main Lottery

In the lottery, you and ten other VWS clients will receive a ticket. Additionally, you have the option of selecting additional members of your VWS loan group that you would like us to give tickets to. You can tell us not to give anybody else in your VWS loan group a ticket, you can tell us to give each person in your group a ticket, or you can tell us which specific members you would like us to give tickets to.

Now, we will quickly review what effect giving out tickets may have on chances of winning. In picture 1 in which you dont give out any tickets to members of your VWS group, you would have a 1 in 11 chance of winning. In picture 2, you choose to have us give a ticket to four other members of your VWS group and there are 15 tickets total. In that case, you would have a 1 in 15 chance of winning and each of the members of your VWS group you gave a ticket to would have a 1 in 15 chance of winning. In picture 3, you choose to have us give a ticket to nine other members of your VWS group and there are 20 tickets total. In that case, you would have a 1 in 20 chance of winning and each of the members of your VWS group you gave a ticket to would have a 1 in 20 chance of winning.

These are only a few examples of what odds of winning you may have after you decide how many tickets to give out. Remember that whether or not you give out tickets to other

[25]Group leader selection criteria include: (i) communicates well with group members and VWS staff; (ii) is responsible and well accepted by group members; (iii) has a house or place to organize group meeting.

members of your first VWS loan group, you still get to keep the lottery ticket we have given you. Now, before we continue, do you have any questions about how the lottery will work?

Additional Script for one 200 Rs. voucher: If you win the lottery, you will receive a single 200 Rs. voucher that is redeemable at the VWS village bazaar at Nimta branch. You can choose to use the voucher yourself or to give the voucher to someone in your first VWS group. Either way, the voucher must be used within two weeks or it is no longer valid. Additionally, only one person can redeem the voucher at the VWS store and the entire value of the voucher must be used when the voucher is redeemed (so, for example, you cannot use 100 Rs. one day and save 100 Rs. for another day). To summarize, if you win the lottery, you will be asked to sign the 200 Rs. voucher when you receive it. However, you are still free to decide whether to keep or give away the voucher that you receive.

Additional Script for four 50 Rs. vouchers: If you win the lottery, you will receive four 50 Rs. vouchers that are redeemable at the VWS village bazaar at Nimta branch. You may choose to use all four vouchers yourself, to give away 1-3 of the vouchers to members of your first VWS group and keep the rest for yourself, or to give away all of the vouchers to members of your first VWS group. In any case, the vouchers must be used within two weeks or they are no longer valid. Additionally, the entire value of each of the vouchers must be used when the voucher is redeemed (so, for example, you cannot use 25 Rs. of a 50 Rs. voucher one day and save 25 Rs. for another day). To summarize, if you win the lottery, you will be asked to sign each of the 50 Rs. vouchers when you receive them. However, you are still free to decide whether to give away or keep each of the four vouchers that you receive.

Table 1. Group, Client-level, and Pair-level Randomization Check

	All Clients			Lottery Clients					
	Weekly	Monthly	Diff: (1) and (2)	Weekly	Monthly	Diff: (4) and (5)	Diff: 4-50 Rs. Voucher Prize	Diff: 1-200 Rs. Voucher Prize	Diff-in-Diff: (7) and (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Group-level									
Number of Clients	10.230	10.300	-0.137	10.241	10.304	-0.141			
	[0.679]	[0.709]	(0.131)	[0.689]	[0.713]	(0.135)			
Income Dispersion	1.366	1.340	0.054	1.393	1.331	0.087			
	[0.807]	[0.515]	(0.128)	[0.834]	[0.521]	(0.131)			
Month of Formation	5.667	5.657	-0.236	4.862	4.797	-0.052			
	[1.561]	[1.371]	(0.284)	[3.148]	[2.933]	(0.696)			
Fraction of Clients Surveyed				0.424	0.432	0.009			
				[0.162]	[0.176]	(0.039)			
Direct Connectivity	0.743	0.721	0.091	0.716	0.684	0.058			
	[0.308]	[0.321]	(0.071)	[0.247]	[0.237]	(0.054)			
Overall Effect: F stat			*0.700*			*0.010*			
Overall Effect: p value			*0.404*			*0.938*			
N	30	70		29	69				
Panel B: Client-level									
Age	33.38	33.46	0.280	32.736	33.792	-0.567	-1.836	-0.127	-1.319
	[8.33]	[8.39]	(0.683)	[7.790]	[8.421]	(0.742)	(1.281)	(1.312)	(1.759)
Literate	0.853	0.838	0.000	0.872	0.851	0.001	0.012	-0.008	0.017
	[0.355]	[0.369]	(0.033)	[0.335]	[0.356]	(0.047)	(0.055)	(0.055)	(0.075)
Married	0.876	0.865	0.006	0.880	0.891	-0.017	-0.035	-0.022	-0.0221
	[0.330]	[0.342]	(0.026)	[0.326]	[0.312]	(0.034)	(0.052)	(0.047)	(0.067)
Household Size	3.974	3.915	0.061	4.072	4.013	0.114	0.320	-0.081	0.407
	[1.148]	[1.41]	(0.100)	[1.144]	[1.474]	(0.145)	(0.222)	(0.206)	(0.291)
Household Enterprise	0.755	0.680	-0.005	0.800	0.653	0.054	0.057	0.076	0.007
	[0.431]	[0.467]	(0.036)	[0.402]	[0.477]	(0.054)	(0.068)	(0.069)	(0.093)
Log of Household Income	10.43	10.12	0.139	10.539	10.074	0.210	0.253	0.272	0.048
	[1.48]	[1.48]	(0.131)	[1.411]	[1.541]	(0.523)	(0.295)	(0.228)	(0.356)
Fixed Salary	0.072	0.137	-0.040	0.064	0.129	-0.024	-0.005	-0.041	0.026
	[0.259]	[0.259]	(0.026)	[0.246]	[0.335]	(0.029)	(0.046)	(0.050)	(0.065)

Muslim	0.000	0.077	-0.089	0.000	0.109	-0.092	-0.111	-0.074	-0.031
	[0.000]	[0.268]	(0.036)	[0.000]	[0.312]	(0.040)	(0.040)	(0.038)	(0.053)
Can Visit Parents	0.880	0.868	0.027	0.810	0.862	-0.039	-0.004	-0.072	0.084
	[0.326]	[0.338]	(0.025)	[0.394]	[0.345]	(0.044)	(0.064)	(0.067)	(0.084)
Years in Neighborhood	15.33	17.00	-1.786	14.840	17.475	-2.472	-3.633	-1.252	-1.508
	[10.27]	[10.15]	(0.703)	[10.17]	[10.38]	(0.993)	(1.309)	(1.660)	(2.198)
Overall Effect: F stat			*1.450*			*0.480*	*0.680*	*0.010*	
Overall Effect: p value			*0.229*			*0.487*	*0.409*	*0.927*	
N	306	710		125	303				
Panel C: Pair-level									
Age Difference				8.058	8.352	-0.391	-0.289	-0.593	0.381
				[6.883]	[7.101]	(0.510)	(0.544)	(0.617)	(0.611)
Income Difference				0.806	0.806	-0.055	-0.076	-0.055	-0.025
				[1.143]	[1.182]	(0.091)	(0.115)	(0.099)	(0.106)
Education Level Difference				0.381	0.384	-0.019	-0.039	-0.016	-0.005
				[0.486]	[0.486]	(0.031)	(0.040)	(0.036)	(0.038)
Religion Difference				0.000	0.029	-0.029	-0.047	-0.017	-0.021
				[0.000]	[0.169]	(0.014)	(0.024)	(0.010)	(0.012)
Direct Connection				0.705	0.700	0.011	0.034	-0.026	0.054
				[0.456]	[0.458]	(0.052)	(0.052)	(0.074)	(0.066)
Overall Effect: F stat						*0.570*	*0.280*	*0.870*	
Overall Effect: p value						*0.450*	*0.599*	*0.352*	
N				1172	2848				

Notes

[1] Income Dispersion is the group-level standard deviation of log household income. Month of Formation refers to calendar month of group formation ("4" for groups formed in April, 2006, and so on). Direct Connectivity is the group-level fraction of pairs who knew one another before loan. Fixed Salary is an indicator variable for whether the client earns a fixed salary. Can Visit Parents is an indicator variable for whether client can go unescorted top her parents' house. Years in Neighborhood is the number of years client has been living in current neighborhood. Direct Connection is an indicator variable for whether group members knew one another prior to loan cycle. The pair-level variables are the absolute values of the respective differences between the surveyed lottery client and each of her group members.

[2] In Panels A-C, all tests are based on regressions with loan officer fixed effects. Client-level and pair-level tests also include month of loan group formation fixed effects and group-level clustering, and client-level and pair-level tests for lottery clients control for Days to Lottery, the number of days between loan disbursement and lottery survey. The differences in differences statistics presented are the coefficients and standard errors on the interaction terms from regressions that interact Weekly with an indicator variable for whether lottery client entered 4-50 Rs. voucher lottery, and include the corresponding randomization check variable as the dependent variable.

Table 2. Meeting Frequency and Social Interaction: Short Run (Group-level)

	Number of MFI Meetings	Social Interaction Index (Short Run)		All Members Visited Me in My Home	I Visited All Members in Their Homes	Know Names of Family Members	Know if Relatives Visited
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Weekly	25.53	4.534	4.592	0.884	0.883	0.890	0.109
	(0.67)	(0.251)	(0.377)	(0.046)	(0.046)	(0.046)	(0.013)
Mean of Monthly	10.07			0.101	0.105	0.100	0.003
	[1.183]			[0.246]	[0.246]	[0.244]	[0.015]
Controls	N	N	Y	Y	Y	Y	Y
N	100	100	100	100	100	100	100

Notes:

1 All Members Visited Me in My Home is the indicator variable “Have all of your group members visited your house?” I Visited All Members in Their Homes is the indicator variable “Have you ever visited houses of all group members?” Know Names of Family Members is the indicator variable “Do you know the names of the family members of your group members?” Know if Relatives Visited is the indicator variable “Do you know if any of your group members had relatives come over in last 30 days?" For Columns (4)-(7) we take group averages of the maximum value for Columns (4)-(6), and the mean for Column (7). Social Interaction Index is the average of the normalized versions of the Columns (4)-(7) variables.

2 Mean of monthly is the average value of the dependent variable for monthly groups with standard deviations in brackets.

3 We report OLS regression results which include loan officer fixed effects. Columns (3)-(7) include group-level variables found in Table 1.

Table 3. Meeting Frequency and Social Interaction/ Trust Measures: Long Run

	Pairwise Trust Measures		Group-level		Client-level					
	Trust Group Member	Would Help if Sick	Social Interaction Index (Long Run)		Social Interaction Index (Long Run)		Number of Times Met		Talk Family	Attend Durga Puja Together
							Her House	My House		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(6)	(9)	(10)
Weekly	0.208	0.082	0.307	0.305	0.130	0.167	1.367	0.941	0.065	0.077
	(0.115)	(0.035)	(0.186)	(0.187)	(0.075)	(0.065)	(0.728)	(0.711)	(0.031)	(0.033)
Mean of Monthly	4.327	0.216					3.149	3.140	0.176	0.153
	[1.130]	[0.411]					[8.086]	[8.064]	[0.380]	[0.361]
Controls	Y	Y	N	Y	N	Y	Y	Y	Y	Y
N	432	3144	98	98	3144	3144	3144	3144	3144	3144

Notes

1 Trust Group Member is the client response on a scale of 1 and 5 (5 is the maximum) regarding the likelihood that the average group member would return a wallet with 200 Rs. that was found on the street. Would Help if Sick is the indicator variable "If you had a sick family member and had to leave your house for a few hours for an emergency, would you ask X to come to your home and look after him/her?" Number Times Met in Her House and Number of Times Met in My House refer to the past 30 days, with values top coded at "30". Talk Family is the indicator variable "Do you still talk to X about her family." Attend Durga Puja Together is the indicator variable "During the most recent Durga Puja, did you attend any part of the festival with X?" Client-level Social Interaction Index is the average of the normalized versions of the four Columns (7)-(10) variables. Group-level Social Interaction Index is the average of the normalized versions of the group-level means of the four Columns (7)-(10) variables.

2 Mean of monthly is the average value of the dependent variable for monthly clients with standard deviations in brackets.

3 We report OLS regression results derived using loan officer fixed effects, both group-level and client-level clustering for Columns (2), (5)-(10), and only group-level clustering for Column (1). Columns (1)-(2), (6)-(10) include controls for the variables in Table 1 and for loan group leader. Column (4) controls for the variables in Table 1, Panel A.

Table 4. Meeting Frequency and Pro-Social Behavior

	Gave Ticket				
	All Lotteries			Four 50 Rs. Vouchers	One 200 Rs. Voucher
	(1)	(2)	(3)	(4)	(5)
Weekly	0.064	0.067	0.003	0.134	0.015
	(0.039)	(0.038)	(0.042)	(0.056)	(0.056)
Immediate Family			0.492		
			(0.080)		
Weekly*Immediate Family			-0.069		
			(0.121)		
Other Family			0.313		
			(0.048)		
Weekly*Other Family			0.185		
			(0.079)		
Friend			0.198		
			(0.046)		
Weekly*Friend			-0.021		
			(0.089)		
Neighbor			0.102		
			(0.027)		
Weekly*Neighbor			0.086		
			(0.054)		
Group Member is Leader		0.098	0.077	0.098	0.071
		(0.019)	(0.018)	(0.028)	(0.024)
Mean of monthly	0.219			0.197	0.241
	[0.414]			[0.398]	[0.248]
Controls	N	Y	Y	Y	Y
N	4020	4020	4020	2029	1991

Notes

1 For each client in the sample we have (on average) nine observations for the nine group members she could choose to give a ticket. The dependent variable "Gave Ticket" equals one for a group member if the client chose to give her a ticket in the lottery. "Immediate Family", "Other Family", "Friend", and "Neighbor" are indicator variables for pairwise relationship type before the start of the loan cycle. "Controls" refers to the inclusion of the variables in Table 1 and a control for loan group leader.

2 All regressions include loan officer fixed effects, and two-way clustering at the group level and client level. We report means of monthly clients with standard deviations in brackets.

Table 5. Repayment Schedule Persistence

	Number of Group Members from First loan	Number of Pre-Lottery MFI Meetings	Gave Ticket	Social Interaction Index (Long-Run)
	(1)	(2)	(3)	(4)
Weekly in First Intervention* Weekly in Current Intervention	0.027	5.915	1.087	2.310
	(0.352)	(3.035)	(0.550)	(0.884)
Monthly in First Intervention* Weekly in Current Intervention	0.301	8.681	0.435	2.092
	(0.266)	(1.927)	(0.352)	(0.456)
Weekly in First Intervention	0.130	29.260	0.020	1.188
	(0.301)	(1.243)	(0.211)	(0.274)
Mean of Monthly in First Intervention and Monthly in Current Intervention	2.509	12.260	0.300	0.031
	[1.255]	[2.155]	[0.459]	[0.852]
Overall Effect: F-statistic (1)	*0.010*	*3.800*	*3.910*	*6.830*
Overall Effect: p-value (1)	*(0.940)*	*(0.055)*	*(0.053)*	*(0.012)*
Overall Effect: F-statistic (2)	*1.280*	*20.290*	*1.530*	*21.080*
Overall Effect: p-value (2)	*(0.260)*	*0.000*	*(0.222)*	*(0.000)*
Overall Effect: F-statistic (3)	*0.390*	*0.590*	*3.420*	*0.090*
Overall Effect: p-value (3)	*0.535*	*(0.444)*	*(0.070)*	*(0.760)*
Specification	Client-level		All pairwise obs	One obs per pair
N	137	137	1264	1111

Notes

1 We consider only clients from First Intervention who are also in our Current Intervention. Number of Pre-Lottery MFI Meetings is the total number of times the client's First Intervention and current loan group met to repay before the client was surveyed for lottery. Gave Ticket is as defined in Table 4. Social Interaction Index is as defined in Table 3.

2 Mean of Monthly in First Intervention and Monthly in Current Intervention is the average value of the dependent variable for this subset of clients with standard deviations in brackets.

3 We report OLS regression results which include First Intervention and Current Intervention loan officer fixed effects. We include Current Intervention group-level clustering for Columns (1)-(2), and both First Intervention group-level and client-level clustering for Columns (3)-(4). Regressions in Columns (3)-(4) include controls for the variables in Table 1 and for loan group leader, as well as Current Intervention loan group fixed effects. F-test 1 is of "Weekly in First Intervention, Weekly in Current Intervention-Weekly in First Intervention, Monthly in Current Intervention." F-test 2 is of "Monthly in First Intervention, Weekly in Current Intervention-Monthly in First Intervention, Monthly in Current Intervention." F-test 3 is the differences-in-differences statistic generated from F-tests 1 and 2.

Table 6. Meeting Frequency and Group Meeting Indicators

	Present	Payment Made at Meeting	Default	VWS Borrower at Time of Survey
	(1)	(2)	(3)	(4)
Weekly	-0.034	0.001	-0.017	0.096
	(0.022)	(0.001)	(0.016)	(0.078)
Mean of monthly	0.824	0.996	0.016	0.288
	[0.184]	[0.046]	[0.127]	[.027]
N	432	432	432	432

Notes:

1 For each client, we take the mean value for Columns (1)-(2). Clients are in default if they have not yet repaid and more than eight weeks have passed since their loan came due.

2 Mean of monthly is the average value of the dependent variable for monthly clients with standard deviations in brackets.

3 We report OLS regression results which include loan officer fixed effects and group-level clustering. All regressions include the variables included in Table 1 and a control for loan group leader.

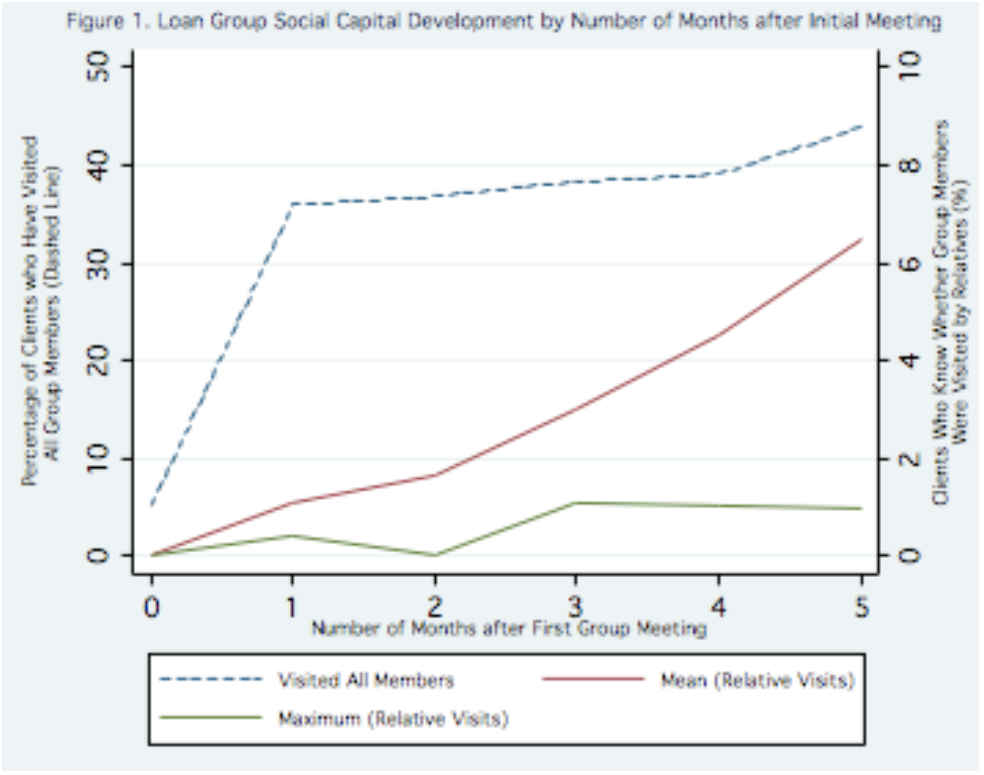
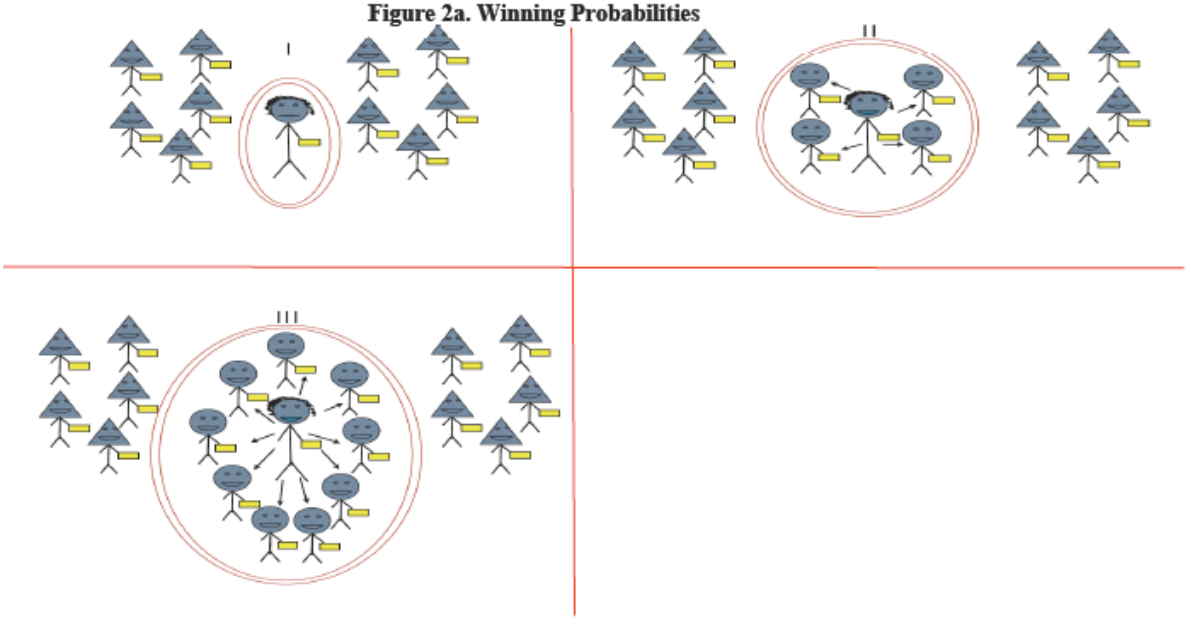


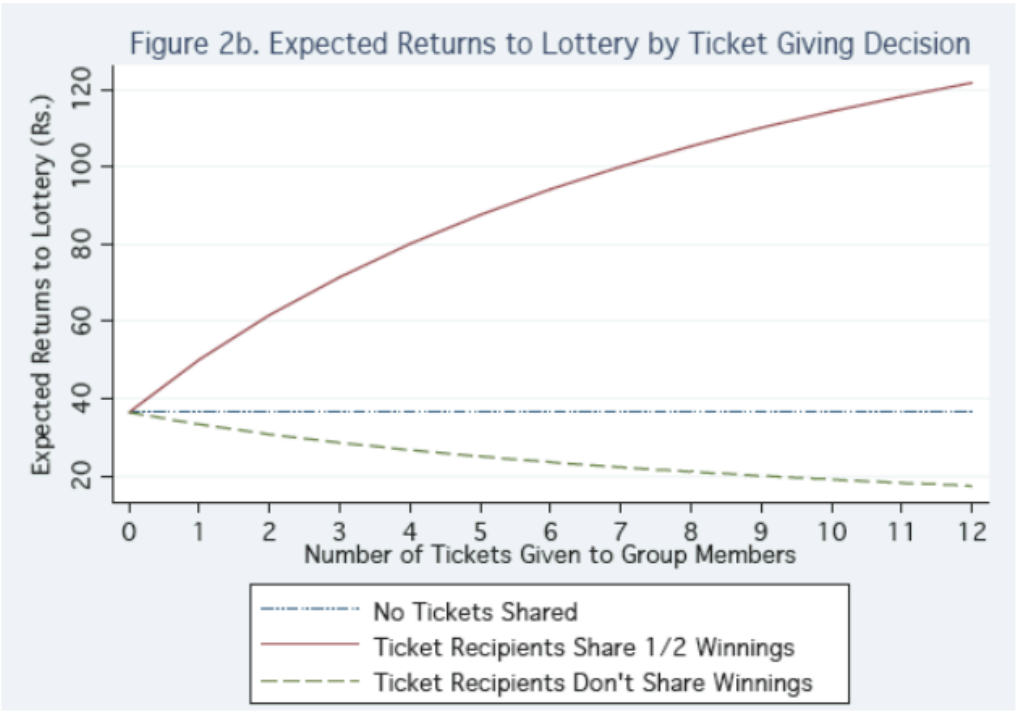
Figure 1. Loan Group Social Capital Development by Number of Months after Initial Meeting
Percentage of Clients who Have Visited All Group Members (Dashed Line)
Clients Who Know Whether Group Members Were Visited by Relatives (%)
0
10
20
30
40
50
0
2
4
6
8
10
0
1
2
3
4
5
Number of Months after First Group Meeting
Visited All Members
Mean (Relative Visits)
Maximum (Relative Visits)

Figure 2a. Winning Probabilities



Notes

This picture was used to explain how ticket-giving affected lottery probabilities. The explanation provided was 'In picture 1 in which you don't give out any tickets to members of your VWS group, you would have a 1 in 11 chance of winning. In picture 2, you choose to have us give a ticket to four other members of your VWS group and there are 15 tickets total. In that case, you would have a 1 in 15 chance of winning and each of the members of your VWS group you gave a ticket to would have a 1 in 15 chance of winning. In picture 3, you choose to have us give a ticket to nine other members of your VWS group and there are 20 tickets total. In that case, you would have a 1 in 20 chance of winning and each of the members of your VWS group you gave a ticket to would have a 1 in 20 chance of winning and each of the members of your VWS group you gave a ticket to would have a 1 in 20 chance of winning.'



Notes:
Figure 2b shows the expected returns to the lottery based on ticket giving decision, and extent of reciprocal behavior by ticket recipient.

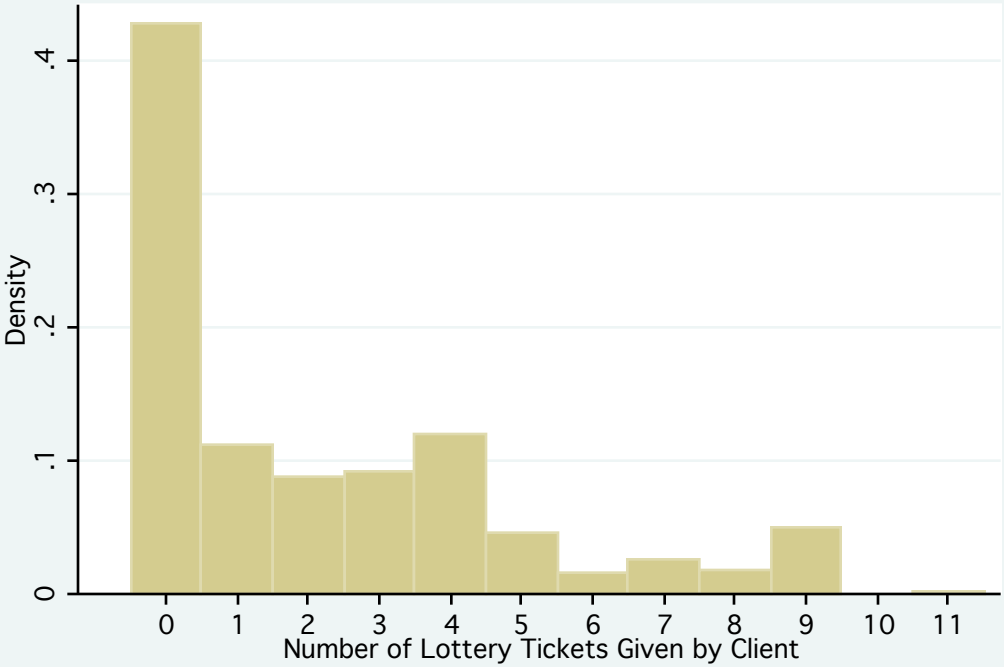



Figure 3. Client-level Distribution of Lottery Tickets