

Does Social Capital Matter? Evidence from a Five-Country Group Lending Experiment

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Alessandra Cassar and Bruce Wydick

Department of Economics
University of San Francisco
2130 Fulton St.
San Francisco, CA 94117

e-mail: acassar@usfca.edu, wydick@usfca.edu

Abstract: Does social capital matter to economic decision-making? We address this broad question through an artefactual field experiment carried out in five countries: India, Kenya, Guatemala, Armenia, and the Philippines. From these experiments we obtain data on 10,662 contribution decisions on simulated group loans from 1,554 participants in 259 experimental borrowing groups. We carry out treatments for social homogeneity, group monitoring, and self-selection. Our results show the influence of different types of social capital to vary depending on context, and that certain treatments, such as peer monitoring, can have perverse as well as beneficial effects on group performance. We also distinguish between *spiritual* capital and *social* capital among Christian, Hindu, and Muslim groups in our five countries, finding modest evidence for the effect of spiritual capital on individual repayment performance, controlling for the influence of religion on social capital.

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1. Introduction

In recent years, economists have become increasingly fascinated by the role that *social capital* plays in facilitating economic transactions. Particularly in communities that are relatively homogeneous and close-knit, social capital may facilitate a general sense of trust and goodwill surrounding economic exchange. Social capital may also facilitate the flow of information, serving a screening function that curtails adverse selection. Further, it may help hold people more accountable for their actions, mitigating moral hazard as economic decisions are placed within the context of long-term relationships, and where reputation is important.

Understanding the effect of social capital on economic decision-making has been the subject of a broad literature. This literature has pointed to the positive effects of social capital on economic growth (Knack and Keefer, 1997), reducing corruption (LaPorta et. al., 1997), community governance (Bowles and Gintis, 2002), preventing crime (Case and Katz, 1991), curtailing moral hazard in the workplace (Ichino and Maggi, 2000), and financial development (Guiso, Sapienza, and Zingales, 2004).

Yet it is often the case that social capital variables are endogenous to outcome variables, presenting a challenge to causal inferences. Some rigorous studies on the economic effects of social capital have used instrumental variables to address problems of correlated unobservables (e.g. Knack and Keefer (1997) or exploited differences in regional social capital within a country to identify its effects (e.g. Putnam, 1993; Ichino and Maggi, 2000). Our study addresses the challenge of causal inference through experimental methods. We carry out a group lending experiment in five countries with five very different cultural contexts to test the effect that different types of social capital have on an individual's propensity to contribute to a joint liability loan.

Our experiments were carried out in Armenia, Guatemala, Kenya, India, and the Philippines among a total of 1,554 participants in 259 simulated borrowing groups across these five countries. In our group lending experiment, each subject in a group is given a "loan" and then

must choose a ball at random from a black bag that contains five green balls and one red ball. Drawing a green ball means a successful investment from which the subject earns a positive return, giving the subject the opportunity to contribute to the repayment of the group loan. Drawing the red ball implies a negative shock to the borrower in which the borrower is unable to pay her share of the group loan. Subjects choose balls with replacement, so that there is a one-sixth probability that any of the subjects draws the red ball, even after it has already been drawn. If at least half of the subjects in a group contribute, group lending continues for a subsequent round with each member receiving an additional loan. This process of group repayment, if sustained for more than a few rounds, can make each member better off relative to non-repayment, if their non-repayment triggers group loan termination. Consequently, each individual faces a trade-off between contributing to the group loan (to help the group to continue to receive loans) and withholding her contribution (increasing her individual payoff for a particular round). Because each group lasted an average of 6.86 rounds before breakdown from insufficient repayment occurred, our study generated 10,662 observations from which to draw in our analysis.

Our five-country experiment is designed to examine the more general question of the effect of social capital on economic decision-making, but also to test some hypotheses in the literature that are germane to microfinance and group lending. A number of theories have been advanced in the field of microfinance seeking to explain why group lending is often associated with high repayment rates. In short, these theories posit that a significant measure of the success of group lending is derived from its ability to harness the social capital that is pervasive within traditional societies in order to overcome credit market failures.¹ Leading theories argue that (1) Self-selection of borrowing groups implies an assortative matching process, based on local information, in which safe borrowers join with other safe borrowers, while risky borrowers are

¹ Some of the original work showing that the informational flows and close-knit relationships within traditional societies could overcome information asymmetries in credit markets was undertaken by Udry's (1994) study on credit relationships in Nigeria. Udry showed that the implicit terms of credit contracts were designed to accommodate shocks to both borrowers and lenders during the term of a loan, making them less sensitive to asymmetric information issues than credit contracts in more developed economies.

culled from the portfolio or are forced to internalize the consequences of their behavior, thus mitigating adverse selection problems (Van Tassel, 1999; Ghatak, 1999); (2) Peer monitoring between jointly liable borrowing group members helps mitigate the hidden action that spawns moral hazard in credit transactions (Stiglitz, 1990; Banerjee, Besley, and Guinnane, 1994; Wydick, 2001); (3) Social ties and the resulting potential for sanctions between members may also help mitigate moral hazard problems in joint liability lending contracts when borrowers enjoy a social leverage with one another that extends beyond the lending contract (Floro and Yotopolous, 1991; Besley and Coate, 1995).

Information about other people, about what they are doing, and the potential to influence their behavior, each represent a different facet of social capital. Accordingly, we designed our treatments in our group lending experiment around these phenomena. We implemented group self-selection treatments as part of our work in three of our countries, allowing subjects to bring a self-selected group of six to the experiment site with who then formed their partners in the experiment. These self-selected groups comprised 16.1% of the groups in Guatemala, 50% in Kenya, and 34.5% in the Philippines. In two of our countries, some of our groups were comprised of actual self-selected group borrowers from a local microfinance institution (MFI), in India (52.8%) and the Philippines (10.9%).

In two countries we implemented a monitoring treatment, comprising 14.5% of the groups Guatemala and 25.4% in the Philippines. In our normal set-up, chairs were facing away from the other subjects around a circle, so that subjects chose balls and made contributions choices privately with the experimenter. In the monitoring treatments, subjects performed both of these tasks in front of the group so that others could observe not only what color ball each drew, but whether or not another member drawing a green ball was choosing to use her good fortune to contribute to the group loan. After observing contributions of the other members,

we allowed subjects to alter their decisions by flipping contribution decision cards until subject decisions converged to a Nash equilibrium.

To test for the importance of social ties, social homogeneity, and the potential for social sanctions on economic behavior, we exogenously formed the remaining groups in terms of homogeneity and heterogeneity over key social reference groups. In our 26 groups in Armenia, we formed groups exogenously over a main source of social conflict in that country, between pre-Perestroika and post-Perestroika generations. In Guatemala we formed homogeneous and heterogeneous groups based on subjects' residence in one of two rival towns adjacent to one another. Because evangelical Protestants now make up nearly half of the country's population, we also purposely formed homogeneous and heterogeneous groups of evangelicals and of Catholics, with each subject announcing his or her residence and religion to the others as part of a personal introduction before the experiment. In 23 of our 46 groups in Kenya we did the same with Muslims and Christians, and similarly in 30 of our 55 groups in the Philippines with homogeneous and heterogeneous groups of Muslims and Christians. Our Indian site was the most religiously diverse, and in 33 of our 70 groups in Chennai we created homogeneous groups of Hindus, Muslims, and Christians along with groups of half Hindus and Christians and half Hindus and Muslims.

In each of our country sites we had subjects fill out a survey in which they answered questions about the depth of their relationship with others in the group, how long they had lived in the area, questions regarding the depth of their religious commitment, their views of people from other groups, answers to the three standard questions on societal trust from the General Social Survey, and information on other standard control variables.

We will summarize briefly some of the main results from our study, providing more results and more details of these results in the main body of the paper. In general we find some basic factors to influence contribution decisions in virtually every context. For example, we find

widespread evidence of reciprocity: Subjects who have been victim to a greater number of negative shocks (red balls) contribute more often when they draw a green ball and have the opportunity to contribute. In virtually all of our countries we find a positive correlation between a person being more trusting of others in society (based on their answers to the standard GSS questions) and group loan contribution decisions. Across countries, we generally find age to facilitate the rate of contribution, and education level to be irrelevant. We also find in our group self-selection treatments that when subjects self-selected with borrowers with whom they knew, contribution rates increased. But there are also a number of surprising results, some of which yield new insights into the relationship between social capital and economic decision-making.

One of the starkest results from our study regards the dramatically lower rates of individual contribution rates and lending group duration in the Nairobi, Kenya experiments relative to the other country sites. While the average individual contribution rate (contributions to the group loan after drawing a green ball) for the 1,278 subjects in the other four countries was 87.5%, among the 276 subjects in Nairobi it was only 41.8% ($p = 0.000$). While contribution rates in the other four countries were sufficiently high that the average experimental borrowing group was able to continue to receive loans for 7.95 rounds, in Nairobi the average group duration was only 1.80 rounds ($p = 0.000$). The explanation for this substantial difference became clear from the exit interviews carried out with subjects after game play. Subjects in Nairobi began the experiment with the belief that others would fail to contribute to the group loan. We demonstrate that given this belief a decision not to contribute is rational, but in Kenya such priors created a self-fulfilling prophecy in which lending was terminated at an early stage, and final payoffs to the subject/borrowers were much lower than in the other countries.

One of the most important findings from our study is that the effects of different types of social capital are highly contextualized. Furthermore, much of the evidence from our study points to the danger of over-generalizing about the nature of social capital in developing

countries and its effect on economic behavior. That different aspects of social capital appear to exhibit diverse effects across cultures suggests the external validity of work in behavioral economics and social capital carried out in a single context may be quite limited. In this respect our results support existing research such as Henrich et. al. (2001), in which the authors found substantial differences in plays of the ultimatum game when carried out in 15 different small-scale societies across Africa, Asia, and Latin America.

Our data indicate that the importance of social homogeneity to economic decision-making is fairly weak, and seems to depend on context. In certain areas of our study homogeneity seems to matter significantly to group loan contribution, in other areas only a little, and in most contexts it doesn't seem to matter much at all. For example in Guatemala, in some of our estimations belonging to a borrowing group that was homogeneous in religion was significantly influential in inducing subject contributions to the group loan, but in India and the Philippines homogeneity of religion played no significant role.

We find moreover, that certain facets of social capital may exhibit surprising effects, which may generate unanticipated Nash equilibria when isolated for study in group interaction. An example from our study concerns the effects of monitoring. Unlike our normal treatments in which subject shocks and contributions were hidden information, in our monitoring treatments subjects observed the color of the ball drawn by each member of the group in each round as well as their contribution decision. Our prior, based on standard theory, was that we would find little if any instances of defection with perfect monitoring. Yet what we find is that mutual monitoring did not improve repayment rates in the experiment, and in the Philippines resulted in lending being terminated an average of three rounds earlier than without monitoring. Indeed there appear to be two counteracting effects from monitoring: a "shame" effect, which tends to encourage members to contribute (especially when others in the group are contributing), and a "retaliation" effect, in which other members were observed to flip their

cards *en masse* towards non-repayment when observing a defecting member drawing a green ball and choosing not to repay.² Because the latter typically resulted in immediate termination of lending to the group, we find that the retaliation effect at least counteracts the shame effect, and if anything outweighs it.

Another finding from the study that is perhaps less surprising is that real-world microfinance borrowers are different from the general population in important ways: In both India and the Philippines, where we included real-world microfinance borrowers in a large fraction of our experimental population, their rates of contribution were significantly higher than our remaining sample of subjects who fit the external profile of microfinance borrowers based on observable characteristics, but were not actual microfinance borrowers. Moreover, we find that subjects from real borrowing groups who had already taken loans contributed at a higher rate than borrowing groups in our study who were formed, but hadn't yet taken loans, evidence that group lending seems to not only harness social capital, but *create* social capital in the process of joint borrowing and repayment. Such results give us reason to think this phenomenon may apply in other contexts as well; economic activity may very likely create social capital rather than just simply harness existing social capital to facilitate transactions.

In this study we try to test for the importance of *spiritual* capital as opposed to strictly *social* capital. The direct effect of religion on economic behavior (while setting aside its effect on creating greater social cohesion) has been the source of an increasing body of work in economics.³ The subjects in our group come from five distinct religious categories: Hindu, Muslim, Catholic, Evangelical/Protestant and secular non-religious persons living in a post-communist state (Armenia). Most of our country sites were chosen in part because they contained some degree of religious diversity, allowing us to examine associations between

² The retaliation effect witnessed in our experiment can be compared to that which has been documented repeatedly in experiments using the Ultimatum game, in which players often reject a positive offer from an initial player at a cost to themselves. See, for example, Guth and Tietz (1990).

³ For an excellent review, see McCleary and Barro (2006).

religious affiliation, depth of religious practice, trust, and implicit trustworthiness of others when religion is common knowledge between subjects. What we find is that controlling for other variables, evangelical Protestant borrowers appear to exhibit higher group loan contribution rates in Guatemala and Kenya, although the overall effect across countries is not significant due to a lack of significance in India. However, contribution rates do not seem to increase among evangelical Protestants with greater religious commitment. In Mann-Whitney tests for simple differences in means, we find Catholic and Hindu subjects to exhibit significantly higher repayment rates than others, but we find that these higher repayment rates are primarily a function of religion adding to social capital. Because regression results control for other factors such as education, gender, generalized social trust, and so forth, social variables absorb some of the variation that may embody important characteristics of those pertaining to these religious categories. We also find that Muslim subjects to exhibit significantly lower contribution rates in our sample both in OLS estimations and in Mann-Whitney tests against non-Muslims.

Following this introduction, Section 2 of our paper presents a description of our group lending experiment, experimental settings in our five country sites, and an analysis of the strategic interdependence characterizing the experiment. Section 3 examines our main results across our five country sites, focusing on the social homogeneity, monitoring, and self-selection treatments carried out in the experiments. In Section 4 we add variables to our basic framework that include religion and depth of religious commitment to try to separately analyze the effect of religious belief and the perceived belief of others as factors in group loan contribution. Section 5 summarizes and concludes.

2. The Experiment

2.1 Experimental Design

The group lending experiment that we employ in each of the five country sites is the group lending game originally developed by Abbink, Irlenbusch, and Renner (2006) with some

modifications and adjustments for particular treatments. We favor the game because it contains three important properties that capture key aspects of group lending: The first is that it incorporates dynamic incentives. Field research has indicated that a major reason borrowers repay group loans is to maintain access to future loans.⁴ The second is that it incorporates a key form of moral hazard: difficulty in eliciting repayment even when a project yields a sufficient return. The third is that the structure of the game allows for private information; investment shocks are private information in the standard execution of the game, but the game can easily be adapted to allow for a peer monitoring treatment.

Our experimental setup consisted of a circle of chairs facing away from the center of the circle (except for the monitoring treatments, in which the chairs faced inward.) Each member of the group introduced him or herself to the other five members of the borrowing group, giving a short introduction which included his or her religion.⁵ The experimenter read directions, answered clarifying questions, and carried out three pre-determined trial runs of the experiment with the group, asking questions to the subjects after the trial runs to ascertain their knowledge of how the experiment worked.

In the experiment each of the six subjects is given a "loan" equal to approximately US\$0.50. For example, in India the initial loan to each subject was 20 rupees. This creates a jointly liable loan for 120 rupees that must be repaid at 20 percent interest for a total of 144 rupees. The experimenter then passes a black bag with six colored ping-pong balls to each subject, who draws one ball, notes the color of the ball with the experimenter, and then returns the ball to the bag. The color of the ball is then marked with ink on a card held by the subject. There are five balls in the bag, five green and one red. Except in the case of the monitoring treatment, only the experimenter and the subject know the color of the ball each has randomly chosen. After the subjects have chosen balls, the experimenter makes another trip around the

⁴ See for example, Wydick (2001) which reports that 86% of microfinance borrowers when asked why they choose to repay their share of a group loan respond that they do so to maintain access to MFI credit.

⁵ Religious introductions were performed in Guatemala, Kenya, India, and the Philippines.

circle to record the contribution of each group member to the joint liability loan. If the subject draws a red ball, the subject receives a negative shock on her investment; she loses her principal and cannot repay her share of the group loan. If she receives a green ball, then must choose whether or not to contribute to repayment of the loan by displaying a decision card privately to the experimenter. For example in India (the Philippines), the payoff to a successful investment was 48 rupees (pesos). With all six members contributing to a loan in India, each member would contribute 24 rupees to pay off the 144 due on the loan and keep 24 rupees. However, if the number of contributors is smaller, as with real-world group lending, the contribution of the other members must increase.

For example, in India if the number of contributors ended up being four, each would have to contribute 36 rupees, while keeping only 12 rupees as a payoff from that round. Since it requires 144 rupees to pay off the group loan, full repayment is impossible if fewer than three borrowers contribute to repayment. Thus if three or more borrowers contribute, the group receives another loan in a subsequent round, but if less than three contribute, lending ceases and the experiment ends with subjects receiving their payoffs accrued from each round. Subsequent to each round, the experimenter informed players about the total number of contributors (but not their identities), and if repayment was sufficient to foster another loan. After the experiment, subjects filled out a questionnaire with approximately 50 questions pertaining to demographic, social, and religious variables, including the three standard General Social Survey questions gauged to ascertain an individual's level of societal trust.⁶

There were minor differences in the way our research team implemented the group lending experiment in the different country sites. We attempted to create similar payoffs

⁶ We used three GSS questions in each country that included the question on *trust* "Generally speaking, would you say that most people can be trusted or that you can't be to careful in dealing with people?", the question on *fairness*, "Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?", and the question on *helpfulness*, "Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?". Because these questions are highly related, in our estimations we create a composite index equal to the number of answers reflective of a positive level of societal trust from the three questions.

between countries such that if a group was moderately successful (say, lasting six or seven rounds), the net payoff to each subject would equal approximately one day's wages in the course of less than two hours. Members of groups lasting more than ten rounds, however, earned up to two or even three days wages in some cases, but cross country differences were not exact. Moreover, the experiment is most easily carried out when using numerical payoffs easily divisible by as many small integers as possible, such that an exact cross-country conversion was infeasible in any respect given the use of five different currencies.

Secondly, our research team was divided across countries, so that at each country site, the experiment was carried out by two or three different experimenters (with some overlap), so that while we made every effort to minimize differences in execution between countries through uniform training sessions, small differences in presentation undoubtedly exist.

Another difference concerned our effort to minimize the tendency toward end-game defections manifest in any finitely repeated game. After the 10th round (sixth round in Armenia), slightly different devices were used to bring the experiment to a close in different countries. In Armenia and Guatemala, a coin was flipped so that there was only a one-half probability of continuing to the next round. In the Philippines and India, the probability of a negative shock to a borrower's experiment increased from $1/6$ to $1/2$ after the tenth round, generating approximately the same probability of termination. In Kenya, lending groups collapsed sufficiently in early pilot testing that no such device was deemed necessary. All of these end-game implementations were unannounced to borrowers at the beginning of the game, except in Armenia where borrowers knew that the probability of continuation would be one-half beginning in the seventh round. Interestingly, while the theory of finitely repeated games would predict higher rates of defection in such a setting, group loan contribution rates in Armenia were 91.8%, second only to Guatemala.

While any significant impact from these differences should be absorbed by the country fixed effect, any specifically cross-country analyses should take these caveats into consideration.

2.1 Sites and Subjects

In each of our country sites our subjects were borrowers who fit the typical profile of a microfinance borrower: living in a relatively poor neighborhood with relatively low levels of formal schooling, average age about 34 years old, and disproportionately women (80.8 percent). Subjects were typically recruited in collaboration with local NGOs (non-government organizations). In India and the Philippines we ran a large fraction of our experiments on actual microfinance borrowers who were current borrowers with a local MFI, such that real microfinance borrowers make up 16.6 percent of our subjects in the study as a whole. Some of the non-microfinance borrowers had participated in programs of the local NGO or were recruited off the street for the experiment. When we ran treatments allowing for self-selection of borrowers, we spread the word generally among a segment of the local population fitting our profile, giving a rough description of the activity, and encouraged subjects to arrive at the experiment site in self-selected groups of six.

Our study provides a rich variation of contexts to study the effects of social capital on economic decision-making:

2.1.1 Berd, Armenia

The data from our 26 groups in Armenia, which formed the basis for our initial study using the group lending experimental methodology (Cassar, Crowley, and Wydick, 2007), comprises only 6.25 percent of the observations used in the present five-country study. In Armenia we carried out our experiment at the Artig Business Company in Berd, Armenia (population. 8,700) in April, 2005. All of the subjects in Armenia were women, and in Armenia as in the other country sites, subjects were required to be at least eighteen years old. Because of the strident changes in Armenian culture since the collapse of the old Soviet Union, the biggest

social division between local residents was generational: pre- versus post- Perestroika generations, where the difference in social outlook and social values was said to differ between the two considerably. We therefore randomly assigned subjects to groups to exogenously generate measures of generational diversity.

2.1.2 San Pedro Atitlan, Guatemala

Our 62 group experiments in Guatemala were carried out in the adjacent towns of San Pedro Atitlan and San Juan Atitlan (population of both approximately 4,000) in June-July, 2006. In Guatemala 90.1 percent of our subjects were women, none being recipients of microfinance loans. All of our subjects were of Mayan ancestry, typically speaking the native Tzutujil as a first language and Spanish as a second language. Many female subjects earned income from weaving traditional clothing and selling it to local buyers. Other occupations for female subjects included selling bread on the streets to tourists or operating small, family stores. Men in the area typically make a living harvesting coffee, in construction, or in the local tourist industry. In Guatemala, 10 of the groups were self-selected, but in the remainder we formed groups that were purposely homogeneous and heterogeneous by religion, since a major social division in Guatemala lies between Evangelicals and Catholics, who each make up about 50 percent of the population in the Western Highlands. There is also considerable rivalry between the two neighboring towns due to conflicts over ownership of coffee-growing land. Therefore we also created groups that were homogeneous and heterogeneous by town of residence so that in each group we had two parameters of possible heterogeneity, by religion and by town. Among nine of the groups in Guatemala we randomly carried out the monitoring treatment, in which subjects could observe positive and negative investment shocks and the contribution decisions of others.

2.1.3 Chennai, India

We carried out the experiment on 70 groups in Chennai, India (formerly known as Madras, population 4.3 million) in coordination with Growing Opportunity Finance, a local MFI

affiliated with Opportunity International, a major worldwide microlender. The experiments were carried out in December 2006 and January, 2007. Out of the 70 experimental groups, 37 of them were groups of six borrowers taken from actual microfinance borrowing groups. Because borrowing groups with the institution averaged 15-20 members, we often created two or three experimental groups from a single real-world borrowing group. The remaining 33 groups were made up of non-MFI subjects, but who fit the general microfinance borrower profile. From these we created exogenously formed groups that were homogeneous and heterogeneous with respect to the three major religious groups in Chennai: Hindus, Christians, and Muslims. In Chennai itself, the distribution of the population by religion is approximately 82 percent Hindu, 9 percent Muslim, and 8 percent Christian, the most notable social division in local culture. The distribution of groups we formed based on religion was as follows: 10 homogeneous groups of all Hindus, 6 homogeneous groups of all Christians, 9 heterogeneous groups of three Christians and three Hindus, 3 homogeneous groups of all Muslims, and 5 heterogeneous groups of Muslims with either Hindus, Christians or both.

2.1.4 Nairobi, Kenya

In Nairobi (population 2.9 million), our experiment was carried out on 46 experimental groups at two experimental sites, one in Kibera, an inner-city slum of Nairobi and another site on the outskirts of the city, in Ongata Rongai. The experiments took place July-August 2006 and January-February 2007. Nairobi has experienced a tremendous amount of population inflow from outlying areas in Kenya, and even from neighboring countries where there has been civil unrest. Estimates of the percentage of Muslims in Kenya vary, but the consensus seems to be that approximately 10% of the population is Muslim, where in some areas tensions run high between the two groups. To test for the effects of social homogeneity, Muslims were over-represented in our sample. With exactly half (23) of our groups, we created groups that were either all-Muslim or all-Christian or half of each. The remaining 23 groups were self-selected,

coming to the site together to participate in the experiment. The Nairobi experiment had the highest percentage of male subjects (58.7 percent), and while we ensured that all of the subjects fit the general microfinance borrower profile, none had participated in a microlending program.

2.1.5 Davao, Panabo, and Cotabato Cities, the Philippines

Each of the three sites for our 55 groups from the Philippines was located on the island of Mindanao, a region of the Philippines well-known for tensions between Muslim and Catholic social groups. From decades of fighting between Muslim separatist groups and the Philippine army, religion has become a transparent social distinction on the island. Experiments were conducted on sites in Davao City (population 1.4 million), Panabo City (population 134,000) and Cotabato City (population 162,000). Participating in the study were 11 (exogenously formed) homogeneous Catholic groups, 10 homogeneous Muslim groups, and 9 heterogeneous groups with three Muslims and three Catholics. There were also 25 self-selected groups, 14 of which received the monitoring treatment. Of the 11 self-selected groups without the monitoring treatment, six were new microfinance borrowers involved with the Panao Multi-Purpose Cooperative, an MFI, while the remaining self-selected groups were taken from local vendor's market associations. The subjects in the Philippines were 70.1 percent female.

2.2 Understanding the Incentive Structure of the Group Lending Game

A brief analysis of the experiment helps to understand the incentives faced by subjects, which, as we will demonstrate, replicate some of the important aspects of the strategic interdependence involved with actual group lending. Let $G = \{1, 2, \dots, N\}$ represent a borrowing group of N members denoting $i \in G$ as a representative member. Further, let p represent the probability of a successful investment by any member, a probability that is constant and independent across i . R is the gross return on an individual investment, and D is the collective amount due on the group loan between the N members. Note that the game is always calibrated

such that $D = \frac{RN}{2}$, *i.e.* that at least half of the group must contribute for the loan to be repaid, and for lending to continue for another round. Further, let n represent i 's *expectation* about the number of the other $N - 1$ members $\sim i$ in G who will contribute to the loan given a successful investment, and let k be the *actual number* of contributors in a round given the probability $(1 - p)$ of a failed investment.

The Contribute strategy yields a lower payoff to a subject for the immediate round, but results in an expected probability δ_C that at least $N/2$ members contribute to the group loan repayment in that round. The Withhold strategy results in a higher (per round) payoff of pR , but reduces the likelihood of a subsequent loan to $\delta_N < \delta_C$. Given these probabilities δ_N and δ_C of continuation, the Contribute strategy will yield a higher payoff than a Withhold strategy if

$$\frac{p \left(R - \frac{NR}{2(p^n + 1)} \right)}{1 - \delta_C} > \frac{pR}{1 - \delta_N}, \text{ where given } N = 6 \text{ we have} \quad (1)$$

$$\delta_C = 1 - \sum_{k=0}^{\frac{N}{2}-1} \binom{n+1}{k} p^k (1-p)^{n+1-k} = \frac{(n+1)!}{(n+1)!0!} p^0 (1-p)^{n+1} + \frac{(n+1)!}{n!1!} p^1 (1-p)^n + \frac{(n+1)!}{(n-1)!2!} p^2 (1-p)^{n-1}$$

$$\text{and } \delta_N = 1 - \sum_{k=0}^{\frac{N}{2}-1} \binom{n}{k} p^k (1-p)^{n-k} = \frac{n!}{n!0!} p^0 (1-p)^n + \frac{n!}{(n-1)!1!} p^1 (1-p)^{n-1} + \frac{n!}{(n-2)!2!} p^2 (1-p)^{n-2}.$$

By substituting in our probability $p = 5/6$, we can use (1) to obtain the optimal strategy for subject i given the number of the remaining five players she expects will contribute to the group loan when they are able. What becomes clear from this exercise is that as n grows, the optimal strategy of member i switches from Withhold to Contribute. Clearly when beliefs are such that $n \leq 2$, it is optimal for i to play Withhold. Because the game will end after the current round, the payoff from contributing is zero and the expected payoff to Withhold is pR , or, normalizing R to unity, 0.833. When three other players contribute, using (1) we find that the expected whole-game payoff from Contribute is 0.90 and from Withhold it is 1.98; thus with

$n = 3$ it still pays to Withhold. With $n = 4$, however, Contribute begins to edge ahead of Withhold, yielding 7.22 versus 6.32. At $n = 5$, Contribute yields an expected whole-game payoff substantially greater than Withhold, 40.16 versus 23.48. This creates an incentive structure in which optimal strategies are governed by expectations about others. Consequently, trust between members is thus crucial to cooperative play, sustainability of the exercise, and, ultimately, payoffs.

But like real-world group lending, beliefs about the motives and strategies of other members are likely to change as the exercise progresses. Group members will update their priors about others' play based on the number of contributors k announced at the end of each round. If, for example, the number of contributors is consistently averages less than five out of six, then a prior that all of the other members are playing the Contribute strategy may be revised downward.⁷ A large number of non-contributors in a particular round (which plausibly could have been caused by the bad luck of several negative shocks to investments) may quickly trigger a subsequent round in which group members revise their priors over n downward, inducing them to play the Withhold strategy, and thus ending the game abruptly.

3. Results: Does Social Capital Matter?

3.1 Subject Backgrounds

Figure 1 shows group duration by round for each country. We present data on experimental outcomes, personal characteristics of subjects, treatments, social capital and religion variables for each country and for the entire study in Table 1. The mean age of our subjects varied little between the five countries, ranging from 31.4 years in Kenya to 36.1 years in Armenia with a standard deviation equal to approximately 10 in all countries. Education, however, very substantially with the average subject lacking middle school education in Guatemala, but having middle school education in Armenia and somewhat beyond this in the

⁷ This would hold true, of course, if member i is playing the Contribute strategy.

Philippines. The fraction of female subjects ranged from 0.45 in Kenya, 0.70 in the Philippines, and 0.90 in Guatemala, to entirely female in Armenia and India.

The average fraction of a subject's life lived in the region of the experiment varied from 0.41 in Kenya, where many slum dwellers had relocated to Nairobi from outlying areas, to 0.946 in Guatemala, in which there is traditionally very little mobility between rural towns. In Armenia the average number of other subjects in the six-person experimental group known by a subject was only 1.43, in the other four countries it ranged between 3.20 and 3.54 out of five. Roughly half of our subjects operated their own enterprises in the sample (about two-thirds in India), and about one quarter were wage workers (just over a third in the Philippines).

The fraction who had experience taking a formal loan varied substantially between the five countries: 0.051 in Armenia, 0.100 in Kenya, 0.176 in India, 0.339 in Guatemala, and 0.423 in the Philippines. We compiled a simple index of societal trust for each subject based on the number of "yes" (trusting) answers to the three standard GSS questions. The level of societal trust varied somewhat between countries, but not overwhelmingly, ranging from 1.33 (lowest trust) in Kenya to 1.87 in the Philippines. Overall Hindu subjects made up 18.8% of our total sample (coming only from India), Muslims made up 18.5% of our sample (coming from India, Kenya, and the Philippines), Catholics 31.2% (in Guatemala and the Philippines), and Evangelical Protestants 27.9% (in Guatemala, India, and Kenya).

3.2 Influence of Social Capital on Repayment Decisions

We present here three basic sets of estimations: (1) On individual contributions by round⁸ given that a subject had a successful investment and had the opportunity to contribute; (2) On the total number of contributions by each subject divided by the number of opportunities to contribute; and (3) On the duration of groups in the experiment in terms of

⁸ The number of rounds on which we take estimations in Table 2 excludes the first round because we incorporate lagged shock variables; we also exclude all rounds after 10 in all estimations because of the diminished probability of continuation after this point and subjects' then-realization of this fact.

number of lending rounds, where higher contribution rates generally lead to more rounds of borrowing. Each offers distinct advantages in yielding insight into the effects of social capital variables and group interaction on group loan contributions. The advantage of pooled logit estimations on individual contributions by round (given in Table 2) is that they are able to incorporate situation-specific attributes in the experiment such as responses to previous period shocks to self and others. The disadvantage with these estimations is that they overweight the contribution decisions of individuals in "successful" groups that were able to receive loans for more rounds. For this reason we view the OLS estimations on average individual contribution rates (given in Table 3) as perhaps the best measure of individual responses to social variables. Table 4 shows regressions based on group longevity in the experiment. The advantage with these estimations is that in some sense they do capture the "success" of a group based on individual and social characteristics and treatments. However, because a random confluence of negative shocks may play a leading role in terminating lending in any particular round, the estimated effect of social capital variables on decision-making is less precise.

3.3 Country Differences

As seen in Table 1, there are substantial country differences in outcomes between our country sites. Contribution rates were 94.4% in Guatemala, 91.2% in Armenia, 88.0% in India, 78.7% in the Philippines, but only 41.8% in Kenya. These differences seem to be consistent with the expectations that group members took into the experiment about the behavior of other members. Based on (1) group members should contribute to the loan if they believe at least four of the other five members will contribute to the loan when they draw a green ball. In four of the five countries, this appeared to be the case, although at any point in the experiment, a confluence of red balls drawn in one round may have caused those expectations to be revised downward. However, in each country we randomly carried out exit interviews with subjects asking them to tell us to explain their repayment strategy for the game. It was clear from these

interviews in the Nairobi sites that subjects frequently played the Withhold strategy from the onset of the game because they believed other group members would do likewise. These priors coming into the group lending game created a set of self-fulfilling prophecies that resulted in 32 of the 46 groups terminating after the first round. The lack of confidence in fellow group members greatly reduced the whole-game payoffs for all members in the Kenya experiment relative to the other countries. Subjects playing Withhold in groups that failed in the first round earned 100 Kenyan shillings. In contrast, group members in the solitary group that reached 10 rounds in Kenya earned about 450 shillings, comparable to what subjects earned in the other countries with higher contribution rates.

3.4 Response to Negative Shocks

As seen in Table 4, negative shocks to investment (random drawings of red balls) have a strong and significant effect on the longevity of groups. Especially when a random cluster of red balls are drawn in a single round it can either terminate the game by its own accord (especially when combined with one or more group members playing Withhold), or result in a downward revision of priors about the rate of contribution among other members. Based on the latter phenomenon, we would expect the propensity to play Contribute to decline based on the number of shocks to others in previous rounds. We observed a remarkable example of this in India, where, by random bad luck, three of the six members of the group drew red balls in the first round (an unlikely event with probability 0.0046), while the other three drew green balls and chose to repay. Since this was a normal run of the experiment without monitoring, of course each member had reason to believe such an event was caused by a large number of other members playing Withhold in the first round. In the second round, four members then chose to play Withhold, ending the game. As seen in the individual and round-level logit estimations in Table 2, this phenomenon is manifest in Guatemala, but not significantly in the other country sites. This phenomenon may be counteracted in some instances, where to some subjects it may

seem increasingly important to contribute when the game is teetering on the brink of termination.

We find some evidence of reciprocity in the data. The more negative shocks a subject receives, the more likely she is to contribute to the group loan when she has an opportunity to contribute. In Table 3 the coefficient on "Mean Shocks Received--Self" is positive in every country (except Kenya), significant at $p < 0.05$ in Armenia and India and $p < 0.01$ in the entire five-country estimation. We were surprised, however, at the rationale some subjects used to justify their decisions in exit interviews. One subject in India maintained that she played Withhold subsequent to receiving a negative investment shock to make up for the lost income from the previous round.

3.5 Personal Characteristics

We generally found personal characteristics to have relatively little bearing on a subject's decision to play Contribute or Withhold. A possible exception is age, which was positively and significantly associated with higher contribution rates in Kenya in the individual and group estimations in Tables 2, 3, and 4, and of borderline significant in the Philippines and in Kenya in the group estimations. The measured effect, however, appears fairly large in the group estimations, where a one-standard-deviation increase in the mean age of a group (5.08 years in Kenya, 6.36 years in the Philippines) is associated with a 1.03 and 0.87 increase in the number of rounds a group was able to sustain loan repayment.

We find little effect on group loan contribution from additional years of education among our subjects across countries. The coefficients on education carry roughly equal positive and negative (insignificant) signs across countries, positively significant only in group estimations in Kenya at just the 10% level.

Just over 80% of our 1,554 subjects were women. Table 7 shows overall mean contribution rates of women in the study to be dramatically higher than men, 79.7% to 57.3%, a

finding entirely consistent with the established wisdom in microfinance that women repay microfinance loans at higher rates than men. Interestingly, however, while the coefficient on gender has a positive sign in virtually every estimation, it is significant only in the logit estimations in Table 2 in Guatemala, and only at the 10% level, the reason being that control variables such as trust measures absorb some of the higher repayment performance of women.

3.6 Economic Characteristics

Our prior coming into the experiment was that business owners might display higher contribution rates than wage earners. But the data from our experiment not display any systematic associations between general labor force delineations (wage earners and business owners) and contribution rates in the group lending game as seen in Tables 2, 3, and 4. Contribution rates were generally insignificant for business owners across countries. For wage workers we find no identifiable pattern of significance across countries.

Previous experience with formal borrowing also displays no consistent effect across countries on individual contribution rates. While in Guatemala the association is positive at the 5% level, the Philippines yields the opposite result. For the other countries the relationship is insignificant. In the estimations on group longevity, there appears to be a weakly positive relationship between previous borrowings in India, but it remains negative in the Philippines.

3.7 Social and Trust Variables

Three of our control variables attempted to capture very general aspects of social capital amongst our subjects: fraction of a subject's life lived in the region of the experiment, number of acquaintances within the experimental borrowing group, and general societal trust as measured by responses to three standard questions from the General Social Survey (GSS). Results from the estimations yields no identifiable pattern across countries for the first two variables, although personal acquaintance matters to contribution rates in Guatemala ($p < 0.01$), and the fraction of life lived in the region seems to have some special contextual effect unique to the Philippines

with $p \leq 0.10$ in both the individual estimations in Tables 2 and 3 as well as the group estimations in Table 4.

We do, however, find responses to the GSS questions to have a highly significant effect on contribution rates. The variable we create is a simple index of the number of affirmative answers to the three GSS questions that concern whether they generally believe that others in society are (1) trustworthy, (2) fair, and (3) helpful. The GSS coefficients have the expected positive sign for every country in every estimation, and are significant on the individual round estimations at the 1% level in Guatemala, Kenya, and the Philippines, and for the five-country estimations on individual contribution in Tables 2 and 3.

The significance of general social trust within one's societal context yields some general insights for economic development: Across our five experiment sites, subjects were acquainted with about 2/3 of the other subjects. Even if a subject were to believe every subject whom she knows to be a contributor, a subject must possess some degree of trust in the contributions of the unknown remaining 1/3 to rationalize her own decision to play Contribute. Here we uncover some evidence in the links between trust, trustworthiness, risk, cooperation, and prosperity. Kenya and Guatemala have the lowest reported scores on the GSS questions (affirmative answers on 44.5 and 44.7% of the three questions compared with an average of 58.4% in the other three countries). In Guatemala personal acquaintance with other group members appears to compensate for a lack of general societal trust, helping to foster a 94.4% contribution rate. However, in Kenya the number of acquaintances carries an (insignificant) negative sign; personal acquaintance in the Nairobi slums fails to make up for a lack of general trust.

3.8 Group Homogeneity Treatments

While Cassar, Crowley, and Wydick (2007) found that clan homogeneity displayed a significant effect on group loan repayment, we cannot find consistent evidence, controlling for other factors, that group homogeneity fosters contribution rates in our five-country study. Our

treatments for homogeneity focused around what were perceived as the greatest social divisions within each particular societal context. In Armenia our treatments concerned the significant societal tensions between the pre- and post- Perestroika generations. In Guatemala one of the treatments concerned subject residency between one of two rival towns, San Pedro Atitlan and San Juan Atitlan. Serious conflict has emerged over recent decades between these two small towns over religious differences, specifically the larger number of Catholics in San Juan, and problems associated with tourism and drug trafficking in San Pedro. Moreover, income from tourism in San Pedro has been used to purchase coffee farms in San Juan, such that some of the workers of these fields are no longer owners, but employees of the plantation owners in San Pedro.

Most of our heterogeneity treatments were implemented across religious boundaries, a critical social delineation in four of our five countries. In Guatemala, we formed experimental borrowing groups which were homogeneously Catholic, homogeneously Evangelical, and three of each, with similar homogeneous and heterogeneous borrowing group treatments among Muslims, Hindus, and Christians in India, Muslims and Christians in Kenya, and Muslims and Christians in the Philippines. We did not take specific denominational data on Christians in India, Kenya, and the Philippines, but the overwhelming majority of Christians in our subject pool were Evangelical/Protestant in the former two countries and in Catholic in the latter, and are classified as such in our estimations. We also included a variable for homogeneity of groups by gender although this was not carried out as a specific treatment.

While we expected to find significant associations between our homogeneity treatments and contribution rates/group longevity, we cannot find any consistent pattern of significance across countries for groups homogeneous by religion, age, residence, or gender. Although in Table 2 our Guatemalan individual estimations by round on religious homogeneity and town homogeneity are statistically significant, the significance disappears in Table 3 for individual contribution rates. This leads us to believe that their significance in Table 2 is inflated by a

disproportionate weight in these estimations placed on successful groups. The results are not robust to an alternative specification that equally weights all groups.

3.9 Self-Selection Treatment

In Guatemala, Kenya, and the Philippines, we allowed subjects to form their own self-selected experimental borrowing groups. These are distinct from the *actual* borrowing groups that took part in the experiment in India and the Philippines. Our desire was to test whether self-selection would be likely to increase contribution rates (Ghatak, 1999; Van Tassel, 1999). An original implementation of the group lending game, among a population of university students, showed that self-selected groups displayed greater volatility in outcomes, higher contribution rates in early rounds, but with contribution rates falling (and groups collapsing) more rapidly in later rounds (Abbink et. al., 2006).

What we find in our self-selection treatments is that self-selection alone does not yield an improvement in contribution rates or group performance, and in fact by itself seems to have a significantly negative effect ($p < 0.01$ in all five-country estimations). However, when we interact the self-selection treatment with acquaintance between individuals, we find a strongly significant and positive association with contribution rates and group performance from this interaction: When subjects select others whom they know to become their fellow group members, rather than randomly selecting strangers off the street, it matters. Because the latter is what we would expect in a real-world group borrowing self-selection process, our results seem to provide some evidence that self-selection is helpful to group lending repayment rates.

3.10 Monitoring Treatment

We believe one of the most interesting findings from our study is the effect of monitoring. About 15% of our groups in Guatemala and 25% of our groups in the Philippines were characterized by a monitoring treatment, in which the chairs of the subjects were re-directed inward so that information about investment shocks (the color of balls drawn by subjects) and

contribution choices were observable to all. After subjects took turns drawing balls, the experimenter elicited contributions simultaneously from group members by having them flip their cards to Contribute or Withhold. Subjects were allowed to change their cards in response to the decisions of others until the group converged to a Nash equilibrium, a process that usually took less than one minute. Our prior before implementing the monitoring treatment was that no-one would dare to play Withhold after publicly drawing a green ball. Our prior was incorrect.

First, we observed numerous instances of defections, even with public monitoring. As Table 7 shows, the contribution rate of 73.8% with the monitoring treatment was insignificantly different from the rate of the standard non-monitoring treatment in Mann-Whitney tests. We observed two types of behavioral responses. In some groups, the contributing subjects appeared to take a "grin-and-bear-it" approach with a solitary non-contributor, faithfully maintaining their contributions to the group loan despite the brash actions of the non-contributor. This behavior was maintained in several cases as non-contributors doggedly played Withhold throughout experiments lasting seven rounds or more.

The other clear pattern both in the data and observed during the experiment was that a Withhold decision by a group member would trigger a reciprocating response by a former contributor, who would flip her sign to Withhold, which would generate a chain reaction of Withhold plays by other players to end the game. It is somewhat unclear whether either the initial reactions or subsequent reactions to a Withhold play were retaliatory or strategic in nature, Withhold of course being the optimal strategy when it is clear decisions are being made in a final round. The data clearly show contribution rates to be significantly lower in the final round of a monitoring treatment, 0.528, than in the standard non-monitoring treatment, 0.576, ($p < 0.01$).

The estimations in Tables 2, 3, and 4 on the monitoring treatment dummy are mostly insignificant, with a positive sign in Guatemala and a negative sign in the Philippines. However,

the overall effect in estimations on the five-country data reveals a significantly negative relationship ($p < 0.10$) between monitoring and group longevity.

This finding contrasts with the literature on microfinance, which has often underscored the importance of peer monitoring (Stiglitz, 1990; Besley, Banerjee and Guinnane, 1993). However, what we observe in our experimental results is that the effects of peer monitoring are not universally positive for individual contribution and group performance. Consider any scenario in which players have an incentive to match strategies in effort or contribution when there is imperfect information about the actions of peers. Perfect information may validate members' claims of an inability to repay, preventing a cascade of non-repayment. But with perfect information individual defections can quickly induce a downward spiral, especially when revenge adds a non-economic motive for responding to defection with defection. With imperfect information about true contribution decisions, a negative decision by one member may not trigger a downward spiral of defections in response because other players may attribute the defection to unavoidable mishap (the proverbial red ball). In the context of group lending, coordination on the non-repayment equilibrium may ultimately yield the greatest disadvantage to the lender, a point originally made by Besley and Coate (1995) about group lending in a full information context.

3.11 Effect of Actual Microfinance Borrowing

We included a dummy variable in our estimations for experiments in India and the Philippines that were carried out with actual microfinance borrowing groups. These borrowers were affiliated with *Panao Multi-Purpose Cooperative* and *Growing Opportunity Finance*, respectively, two well-established microfinance institutions in the respective countries. In estimations on individual contribution rates, we find the coefficient on a subject being an actual microfinance borrower to be positive in all cases and significant at the 5% level in India, indicating a contribution rate that is 10.1 percentage points higher. We ask the question then, does this

positive effect appear to come from some type of self-selection into microfinance, or from the cumulative experience of repaying actual microfinance loans together in a borrowing group, *i.e.* does group borrowing activity *harness* existing social capital or *create* social capital?

To probe this question, we intentionally carried out some of our estimations on nascent groups, who were newly formed, but in various stages of their eight-week orientation course. They had not yet received actual loans. Other groups were veteran microfinance borrowing groups with between one and five six-month loans under their belts. Mann-Whitney tests for differences in contribution rates in Table 7 show contribution rates to be higher for experienced borrowers relative to inexperienced borrowers 93.5% to 82.1% ($p = 0.079$).⁹ Including a dummy variable for "experienced group" in an estimation of all experiments carried out on actual microfinance borrowers in India, we find the contribution rates of the experienced group members to consistently carry a positive sign in alternative specifications, significant at roughly the 10% level in estimations that include our variables on religion, but not significant in all specifications. (We do not include these results here for space concerns, but they are available upon request.)

A likely reason for this result is that experienced members may have developed a stronger sense of societal trust, and this greater level of trust was picked up by a higher rate of positive response to the three GSS questions in the survey. In their responses, experienced borrowers had an average of 1.82 positive responses while the average among the experienced borrowers was 2.00. Thus while our regression results yield borderline results as to whether social capital is created through the process of group borrowing and collective repayment, we do uncover some evidence that microfinance lending is able to build social capital within borrowing groups over time. The results of our experiments are consistent, for example, with those of

⁹ One possible explanation for this result would be that nascent borrowing groups include those that have not yet failed due to non-repayment, while veteran groups survive because they have been able to repay. However, borrowing groups in the area surveyed have exhibited virtually perfect repayment rates and very low levels of attrition, ruling out a difference caused by borrowing group failure or dropout.

Charness, Rigotti, and Rustichini (2007), who demonstrate in a series of experiments that group membership and group identity have powerful effects on economic behavior, especially when play is manifest to the relevant group, leading subjects to select options that favor the group. These results are important for microfinance because they suggests that the all of the benefits of microfinance may not be found simply through impact studies on individual household consumption and welfare, but that there are externalities from group lending in the creation of social capital that spill over into the larger community.

4. Spiritual Capital vs. Social Capital

Does religion have a measurable outside effect distinguished from its social effects? Questions about the effect of religious beliefs on economic behavior have been the subject of inquiry since Weber's famous *Protestant Ethic* (1905). Recently there has been a resurgence of interest in the influence of religion on economic behavior. For example, McCleary and Barro (2006) carry out empirical estimations on cross-country data to explore the relationship between religion and economic growth. While they fail to find any positive and significant correlation between religious attendance and economic growth, they do find beliefs in heaven (and particularly hell) to have a positive influence on work ethic and, to some extent, economic growth. One aspect of their study that seems particularly important is their attempt to distinguish the effect of religious beliefs from the social capital associated with religious activity. Summarizing their research by maintaining that “beliefs related to an afterlife appear to be crucial as economic influences,” they conclude that the direct effect of spiritual beliefs appear to be greater than the social networks that are part of religious activity.

This kind of attempt to distinguish *spiritual capital* from purely social capital is an important step in trying to disentangle the many faceted influences of religion on economic behavior. While religion may contribute to the creation of social capital through fostering closer ties within a community, it may also create spiritual capital, the propensity to act

honestly or altruistically as motivated by religious beliefs irrespective of the social rewards or punishments that accrue from such behavior via peers.

There are serious methodological challenges faced by researchers in trying to understand the relationship between religion and economic variables. First, in some cultures where genuine religious belief has fostered any kind of positive distinction in the ethical behavior of adherents, incentives arise for others to claim religious affiliation if these claims are a relatively inexpensive signal. Thus genuine belief that yields a more honest or ethical set of behaviors among adherents will naturally lead to a social equilibrium characterized by hypocrisy of fraction who claim the faith (Wyduck, 2008). Because there remain incentives to claim adherence to that particular faith until the average behavior within the pool is sufficiently watered down to equal that of the general population, naïve regression estimates that seek to explain economic or behavioral variables from stated religious affiliation will underestimate the true impact of genuine religious belief on behavior.

Second, however, there are serious problems with endogeneity issues in trying to identify the relationship even between genuine religious belief and economic behavior. Wealth and poverty may influence spiritual beliefs (perhaps justifying certain economic behaviors that have led to the accumulation of wealth, or blaming outside factors for the perpetuation of poverty) or it may be that both belief and a given type of economic behavior are caused by a third variable such as non-religious culture or geography.

We make no claim in this study to be able to fully address these two problems, and we know of no research which has been able to do so. Here we add a set of religious variables to our estimations in Tables 2, 3, and 4 to our social capital variables. In an attempt to address some of the issues related to the first concern, we not only include religious dummy variables for Catholic, Evangelical/Protestant, Hindu, and Muslim, but also a variable reflecting stated religious commitment (time spent in meetings, religious

attendance, etc.) and an interaction term between the two. Furthermore, we include a variable for the number of other members from the perspective of subject i of the different religious groups. Our aim from this exercise is to try to obtain a measure of trustworthiness of those in a given religious group based on the judgment of peers within their community who have a financial stake in the accuracy of their judgment. With respect to the endogeneity issue, we believe that the use of experimental data overcomes the reverse causality problem because unlike regular income, monetary payoffs from the experiment should have no effect on belief. However, it is still conceivable that a missing third variable could influence both contribution rates and beliefs not picked up via our controls for personal characteristics, pure social capital, or country fixed-effects.

We carry out these estimations using Catholic as our base religious category, and we exclude Armenia from our estimations because our survey there did not track religious variables. What we discover in the OLS estimates given in Tables 5 and 6 is that the sign on the dummy for Evangelical/Protestant is uniquely positive across our three countries where evangelicals took part in experiments. The positive coefficients are significant at the 5% level in the estimations on individual contribution rates given in Table 5 in Kenya and in the group longevity estimations in Table 6 in Guatemala. In Kenya, these effects as we measure them are quite substantial, where the contribution rate of a subject classified as Evangelical/Protestant is higher by 35.6 percentage points off a base contribution rate of 41.8% in Kenya. Increasing religious commitment among evangelicals, however, does not have a discernable effect on individual contributions or group longevity and group members don't seem to increase their contribution rates when more evangelicals are in their group.

Muslim subjects participated in our experiments in Kenya, India, and the Philippines. Our estimations for our Muslim variables show the Muslim dummy to be negative and significant in the overall estimations on individual contribution at the 5% level in Table 5. Much

of this significance comes from their lower contribution rates in Kenya relative to evangelicals, which is not clearly manifest in the Kenyan country estimation because Muslim is used as the base category. Interestingly, while Muslim contribution rates are lower, trust of Muslims actually seems to be higher shown by the significant increase in contribution rates based on the number of other Muslims in the group, yielding the virtually the reverse of our finding for evangelicals. In the group longevity estimations in Table 6, the Muslim variables carry positive signs but are all statistically insignificant.

Coefficients on our dummy variable for Hindu in Table 5 and the number of Hindus in a borrowing group in Table 6 and their accompanying variables are all insignificant. This is also true for the same variables identifying Catholic subjects. But a look at simple Mann-Whitney tests in Table 7 for differences in individual contribution rates between each of our four religious groups shows that Catholic and Hindu subjects actually contributed at a rate significantly higher than non-Catholics and non-Hindus. These apparently contradictory findings are reconciled by the fact that the OLS results control for other variables that may be characterize followers of different religions, such that they only yield the additional explanatory power of being Catholic *given* an expressed level of societal trust, knowledge of fellow group members, age, gender, education, etc.

The results do seem to suggest that much of the higher repayment rate observed by Catholic and Hindu group members is embodied in the social capital variables. In contrast, that a subject is an evangelical Protestant appears in some estimations to offer some explanatory power over and above the religion's effect on the purely social capital variables. Given the lack of corroborating evidence from the effect of additional religious commitment (and trustworthiness reflected by the decisions of other group members), we cannot from these results draw firm conclusions on the effects of spiritual capital apart from religion's contribution to social capital, although we appear to find very modest evidence in favor of such.

5. Summary and Conclusion

Does social capital matter? Results from our five-country group lending experiment suggest that it does, though occasionally in unexpected ways. We present international results from an experiment in which subjects have an incentive to contribute to a joint-liability loan so that the group is more likely to continue to receive additional loans. However, any member can fair better individually by withholding contribution in a given round. The stakes were high in our game relative to the income earned in our five countries; subjects could earn between half and day and two to three days' wages in less than two hours depending on their own performance and their group's performance in the experiment. We show that trust is important in the group lending game: A subject has an incentive to contribute if she believes a critical number of other group members will also contribute, at least four out of five other members in a group of six. We believe that there are several main findings from our research in five countries with this experiment:

(1) Trust matters. Individuals with greater trust in their society (as revealed by their responses to GSS questions) displayed higher contribution rates, yielding benefits that spilled over to other members of their group.

(2) When people lack confidence in the economic behavior of others, bad outcomes for all are likely to result. This we observed in Kenya, where the average contribution rate was only 41.8% and where lending was terminated with borrowing groups after only 1.8 rounds, and low contribution rates were explained by low expectations of contribution rates by others.

(3) The effects of social and religious homogeneity as defined by specific categories are not as strong as one might expect, are difficult to generalize, and are very context-specific. We find very mild evidence that, controlling for other variables, religious homogeneity fosters trust and group contribution in some countries such as Guatemala and India, but overall the evidence is underwhelming.

(4) The ability of people to monitor one other in group lending environments, and possibly in other situations such as work in teams, can yield negative as well as positive effects on individual behavior. When information is imperfect, non-contributions of capital (or effort) are not as contagious within a group because they can be attributed to unavoidable shocks. However, with perfect information, such behavior may trigger either retaliation or optimal defections by other agents, quickly yielding an inferior outcome for the group.

(5) Social capital does not just exist innately in developing countries, but can be created through repetitive and cooperative group effort. We present evidence that among our real-world borrowing groups that contribution rates were higher among experienced borrowing groups relative to real borrowing groups that had been formed and were in orientation, but had not yet taken an actual loan.

(6) We attempt to empirically distinguish between the effects of religion on economic behavior into its contribution to social capital and spiritual capital, finding that within our sample Catholic and Hindu adherents are characterized by a higher contribution rate that appears to operate through their effect on creating higher levels of trust and social capital. The additional explanatory power yielded by Evangelical/Protestant variables on contribution rates suggests an effect that is not manifest as strongly in the creation of added social capital as Hindu and Catholic adherents but more in the creation of spiritual capital.

Finally, our research finds large and significant differences between the five countries in economic behavior and the effect of identical treatments on economic behavior. This cannot help but re-emphasize the caveats regarding the external validity of experiments and drawing general inferences from experimental and non-experimental results on economic behavior obtained from a single cultural context, especially in research devoted to understanding the relationship between social variables and economic outcomes.

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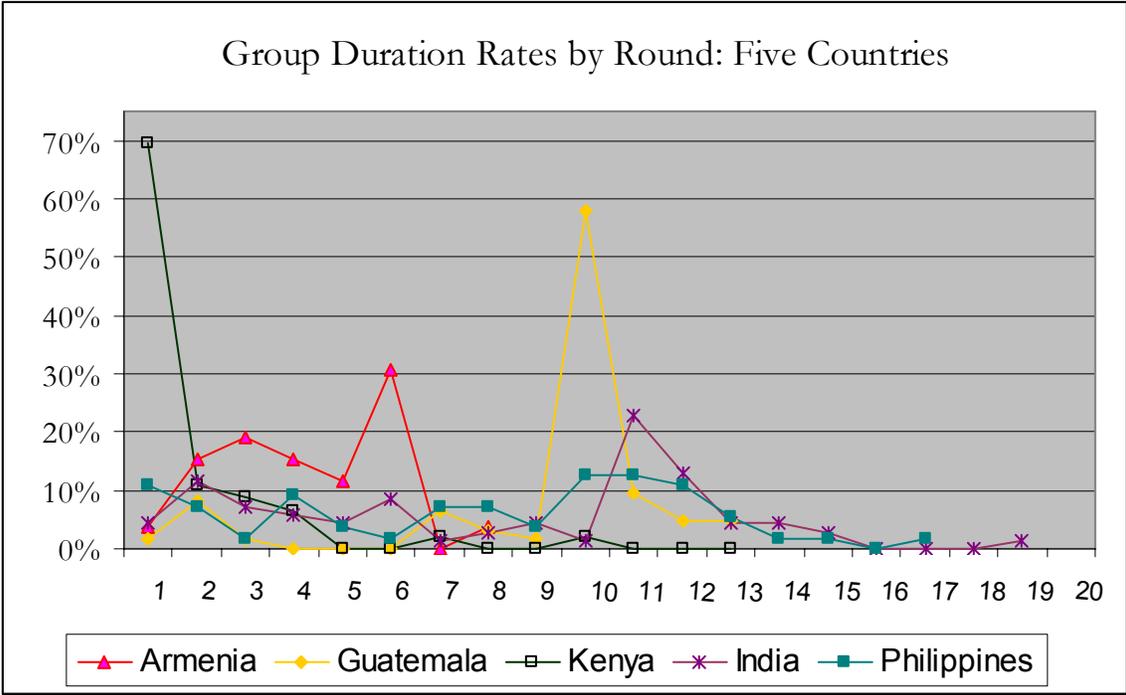


Figure 1: Group Duration Rates by Round and Country

Table 1: Summary Statistics
(Means with standard deviations in parentheses)

Variable:	Armenia	Guatemala	India	Kenya	Philippines	All Countries
Number of Groups	26	62	70	46	55	259
Number of Subjects	156	372	420	276	330	1,554
Subject Contribution Rate in Experiment	0.918 (0.275)	0.944 (0.244)	0.880 (0.325)	0.418 (0.494)	0.787 (0.410)	0.793 (0.404)
Number of Rounds Lasted in Experiment	4.27 (1.78)	9.16 (2.85)	8.21 (4.46)	1.80 (1.73)	7.91 (4.30)	6.84 (4.38)
No. of others w/ same Religion in Group ¹	3.487 (1.50)	3.455 (1.48)	3.451 (1.59)	4.732 (0.847)	3.851 (1.53)	3.680 (1.52)
Fraction of Groups w/ Monitoring Treatment	0.00 (0.00)	0.145 (0.353)	0.00 (0.00)	0.00 (0.00)	0.254 (0.436)	0.088 (0.284)
Fraction of Groups w/ Self-Select. Treatment	0.00 (0.00)	0.161 (0.368)	0.00 (0.00)	0.500 (0.501)	0.454 (0.498)	0.2239 (0.417)
Fraction of Groups Real MF Borr. Groups	0.00 (0.00)	0.00 (0.00)	0.528 (0.499)	0.00 (0.00)	0.1097 (0.313)	0.1662 (0.372)
Age	36.14 (13.83)	34.21 (10.661)	35.32 (10.005)	31.38 (10.06)	34.01 (10.57)	33.95 (10.70)
Fraction Female	1.00 (0.00)	0.9005 (0.299)	1.00 (0.00)	0.4504 (0.498)	0.697 (0.460)	0.808 (0.394)
Mean Education: 1 = prim, 2 = mid, 3 = hs	1.983 (1.43)	0.933 (0.665)	N.A.	1.618 (0.769)	2.23 (0.802)	1.605 (0.864)
Fraction have Own Business	0.5381 (0.361)	0.411 (0.492)	0.688 (0.463)	0.481 (0.505)	0.475 (0.500)	0.4864 (0.499)
Fraction who are Wage Workers	0.00 (0.00)	0.161 (0.368)	0.145 (0.352)	0.322 (0.468)	0.369 (0.483)	0.2374 (0.426)
Fraction who have Taken Loans in Past	0.051 (0.221)	0.339 (0.474)	0.176 (0.381)	0.100 (0.301)	0.423 (0.494)	0.241 (0.428)
Fraction of Life Lived in Experiment Area	0.486 (0.304)	0.9464 (0.177)	0.7935 (0.294)	0.4120 (0.354)	0.502 (0.332)	0.675 (0.354)
Fraction Number of Subjects Acquainted	1.435 (1.29)	3.54 (1.50)	3.46 (2.20)	3.202 (1.83)	3.49 (1.38)	3.305 (1.855)
Number of three GSS Questions Ans. "Yes"	1.663 (0.465)	1.341 (0.867)	1.724 (1.029)	1.336 (0.813)	1.877 (0.903)	1.592 (0.952)
Faction Hindu	0.00 (0.00)	0.00 (0.00)	0.628 (0.483)	0.00 (0.00)	0.00 (0.00)	0.1888 (0.381)
Fraction Muslim	0.00 (0.00)	0.00 (0.00)	0.0857 (0.280)	0.467 (0.499)	0.287 (0.453)	0.185 (0.389)
Fraction Catholic	0.00 (0.00)	0.618 (0.486)	0.00 (0.00)	0.00 (0.00)	0.624 ² (0.485)	0.312 (0.463)
Fraction Evangelical	0.00 (0.00)	0.3655 (0.482)	0.257 ² (0.437)	0.532 (0.498)	0.00 (0.00)	0.279 (0.449)

¹ Of same Pre- or Post Perestroika generation in Armenia. ² Data did not differentiate between Christian denominations in India and the Philippines, but Christian subjects in India were believed to be more than 90% evangelical Protestant and more than 90% Catholic in the Philippines.

Table 2: Individual Repayment Decisions

Dependent Variable: 1 = Individual with Successful Investment Contributes in Round X						
---Binary Logit on Pooled Panel Data---						
Variable	Armenia	Guatemala	India	Kenya	Philippines	5 Countries
Number of observations	<i>n</i> = 427	<i>n</i> = 1,964	<i>n</i> = 1,766	<i>n</i> = 146	<i>n</i> = 1,212	<i>n</i> = 5,965
Intercept	0.617 (2.136)	-0.496 (0.88)	1.687*** (0.417)	-2.617 (1.964)	2.989*** (0.572)	0.741*** (0.232)
Lag Shock to Subject	0.053 (0.325)	0.174 (0.273)	0.371 (0.235)	-0.623 (0.552)	-0.396* (0.217)	0.047 (0.113)
Lag Shocks to Others	-0.136 (0.137)	-0.188* (0.117)	0.108 (0.098)	0.057 (0.276)	0.026 (0.102)	0.021 (0.051)
Age	0.012 (0.009)	0.009 (0.01)	-0.004 (0.008)	0.055** (0.025)	-0.001 (0.008)	0.008** (0.004)
Frac. of Life Lived in Area	0.093 (0.349)	-0.374 (0.581)	-0.386 (0.262)	0.476 (0.587)	0.487** (0.242)	0.053 (0.13)
Num. of Others Same Religion ¹	0.002 (0.078)	0.161*** (0.067)	0.082* (0.05)	0.155 (0.289)	-0.246*** (0.065)	-0.005 (0.027)
Num. of Acquaintances	-0.004 (0.088)	0.349*** (0.087)	0.079* (0.048)	0.006 (0.143)	-0.163** (0.077)	0.032 (0.027)
GSS Questions	0.147 (0.112)	0.602*** (0.118)	0.086 (0.074)	0.676*** (0.279)	0.193** (0.091)	0.198*** (0.041)
Education	-0.087 (0.996)	-0.124 (0.163)		0.11 (0.248)	-0.162 (0.105)	
Business Owner	-0.191 (0.292)	0.044 (0.201)	-0.333* (0.204)	-0.168 (0.538)	0.062 (0.174)	-0.064 (0.087)
Pastloan	-0.223 (0.497)	0.427** (0.218)	-0.018 (0.211)	-0.358 (0.67)	-0.421** (0.184)	-0.057 (0.1)
Female		0.505* (0.31)		-0.236 (0.434)	-0.026 (0.18)	0.081 (0.124)
Num. of Others in Same Town		0.194*** (0.071)				
Monitoring Treatment		-0.126 (0.433)			-0.362 (0.295)	0.124 (0.165)
SelfSelect Treatment		-0.447 (0.788)		-2.044 (1.478)	-1.499*** (0.474)	-1.308*** (0.293)
SelfSelect*Num.Acquaintances		-0.185 (0.176)		0.187 (0.322)	0.394*** (0.121)	0.169*** (0.068)
Wageworker		-0.746*** (0.231)	-0.777*** (0.203)	0.244 (0.428)	-0.198 (0.162)	
Borrower			0.743*** (0.23)		0.524 (0.385)	0.704*** (0.162)
Armenia						-0.479*** (0.148)
Guatemala						1.21*** (0.13)
Kenya						-0.605*** (0.186)
India						0.214* (0.134)
Log Likelihood	-246	-433	-605	-85.9	-593	-2230
Chi2	6.02	127	54.7	19.4	68.1	355

* $p \leq .1$; ** $p \leq .05$; *** $p \leq .01$ ¹ Of same Pre- or Post Perestroika generation in Armenia.

Table 3: Individual Repayment Decisions

Dependent Variable: Fraction of Times Repaid Divided by Opportunities to Repay						
---OLS Estimations---						
Variable	Armenia	Guatemala	India	Kenya	Philippines	5 Countries
Num. of Observations	n = 152	n = 313	n = 346	n = 202	n = 241	n = 1332
Intercept	0.803*	0.694***	0.879***	-0.3	0.797***	0.621***
	(0.434)	(0.127)	(0.087)	(0.207)	(0.143)	(0.054)
Mean Shocks Received---Self	0.274**	0.077	0.215**	-0.015	0.088	0.186***
	(0.143)	(0.092)	(0.095)	(0.268)	(0.149)	(0.058)
Mean Shocks Received---Others	-0.033	-0.134***	-0.016	0.076	0.042	-0.005
	(0.047)	(0.035)	(0.028)	(0.05)	(0.036)	(0.016)
Age	0.001	0.002	-0.001	0.014***	0.002	0.002***
	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)
Fraction of Life Lived in Area	0.055	0.017	-0.062	-0.018	0.103*	0.008
	(0.087)	(0.074)	(0.051)	(0.092)	(0.061)	(0.03)
Num. of Others Same Religion	-0.002	-0.002	0.008	0.024	-0.016	0.004
	(0.018)	(0.009)	(0.01)	(0.027)	(0.015)	(0.006)
Num. of Others in Same Town		0.003				
		(0.011)				
Num. of Acquaintances	0.005	0.034***	-0.019*	-0.016	-0.025	-0.001
	(0.021)	(0.011)	(0.01)	(0.026)	(0.022)	(0.006)
GSS Questions	0.033	0.041***	0.011	0.06	0.027	0.027***
	(0.027)	(0.015)	(0.015)	(0.04)	(0.023)	(0.009)
Education	-0.086	0.000		0.064	-0.017	
	(0.197)	(0.022)		(0.044)	(0.027)	
Business Owner	-0.043	0.032	0.023	-0.002	0.026	0.006
	(0.076)	(0.027)	(0.042)	(0.069)	(0.045)	(0.019)
Loan in Past	0.046	0.049*	0.028	-0.003	-0.139***	-0.001
	(0.129)	(0.028)	(0.04)	(0.11)	(0.046)	(0.022)
Female		0.043		0.056	0.022	0.019
		(0.052)		(0.068)	(0.046)	(0.027)
Monitoring Treatment		0.017			-0.105	-0.045
		(0.042)			(0.071)	(0.034)
SelfSelect Treatment		0.084		-0.261*	-0.289**	-0.198***
		(0.149)		(0.144)	(0.125)	(0.06)
SelfSelect*Num.Acquaintances		-0.028		0.037	0.059*	0.024*
		(0.032)		(0.037)	(0.032)	(0.014)
Wageworker		-0.03	-	0.142***	0.052	-0.026
		(0.04)		(0.045)	(0.071)	(0.042)
Borrower			0.101**		0.024	0.045
			(0.045)		(0.092)	(0.036)
Armenia						-0.045
						(0.037)
Guatemala						0.139***
						(0.031)
Kenya						-0.302***
						(0.032)
India						0.017
						(0.034)
Adj R-Squared	-0.0132	0.110	0.0425	0.0439	0.100	0.250

* p≤.1; ** p≤.05; *** p≤.01

Table 4: Borrowing Group Longevity

Dependent Variable: Number of Rounds Reach by Group in Microfinance Game, m =
 ---OLS Estimates---

Variable	Armenia	Guatemala	India	Kenya	Philippines	5 Countries
Num. of Observations	n=26	n=62	n=70	n=46	n=52	n=259
Intercept	-0.077 (11.321)	2.326 (6.844)	14.148*** (3.794)	-4.342 (3.984)	3.805 (5.372)	9.586*** (1.448)
Mean Shocks Received---Group	-1.48*** (0.494)	-3.828*** (0.749)	-2.133*** (0.578)	-0.232 (0.407)	-1.07 (0.697)	-1.811*** (0.258)
Proportion Female		2.465 (4.266)		-0.766 (1.452)	0.934 (1.699)	-0.039 (0.95)
Mean Age in Group	-0.018 (0.038)	0.036 (0.071)	-0.083 (0.091)	0.134* (0.074)	0.154 (0.1)	-0.008 (0.028)
Mean Education	3.33 (5.518)	0.512 (0.909)		1.514* (0.939)	0.682 (0.954)	
Mean Fr. of Life Lived in Area	-1.758 (2.318)	4.19 (5.161)	-0.723 (2.327)	1.909 (1.861)	3.680* (1.949)	1.000 (0.998)
Mean Business Owner	2.975 (2.39)	0.314 (1.318)	-2.532* (1.4)	0.505 (1.212)	0.059 (1.815)	-0.716 (0.633)
Mean Wageworker		0.323 (2.101)	-3.796* (2.302)	0.432 (1.425)	-1.959 (1.453)	
Mean Loan in Past	-2.288 (3.461)	-1.052 (1.662)	2.648* (1.373)	0.112 (2.808)	-3.175* (1.674)	0.298 (0.733)
Borrower			1.952 (1.428)		-1.852 (2.461)	0.841 (0.792)
Mean GSS Questions	0.174 (0.727)	1.538* (0.852)	0.059 (0.654)	0.356 (0.992)	0.266 (1.001)	0.288 (0.339)
Mean Num. of Acquaintances	0.02 (0.425)	0.312 (0.509)	-0.129 (0.389)	-0.56 (0.575)	-0.746 (0.683)	-0.154 (0.181)
Mean SelfSelect*Num.Acq.		0.549 (1.667)		1.031 (0.769)	2.443** (1.174)	1.242*** (0.449)
SelfSelect Treatment		-1.698 (7.616)		4.216* (2.506)	-9.674** (4.161)	-6.191*** (1.84)
Gender Homogeneity		-0.465 (1.202)		-0.991 (0.959)	-1.127 (1.129)	-0.512 (0.486)
Town Homogeneity		-0.455 (0.856)				
Religious Homogeneity	0.508 (0.776)	0.028 (0.713)	0.384 (0.769)	0.765 (0.747)	0.873 (0.983)	0.373 (0.339)
Monitoring Treatment		0.633 (1.019)			-2.504 (1.598)	-1.206* (0.69)
Armenia						-3.223*** (0.83)
Guatemala						1.412** (0.725)
Kenya						-5.303*** (0.642)
India						-0.362 (0.765)
Adj R-Squared	0.194	0.342	0.26	-0.054	0.423	0.542

* p≤.1; ** p≤.05; *** p≤.01

Table 5: Individual Repayment Decisions--Including Spiritual Capital					
Dependent Variable: Fraction of Times Repaid Divided by Opportunities to Repay†					
---OLS Estimations---					
Variable	Guatemala	India	Kenya	Philippines	5 Countries
Num. of Observations	n=307	n=342	n=192	n=226	n=1140
Intercept	0.755*** (0.142)	0.836*** (0.111)	-0.401* (0.234)	0.732*** (0.171)	0.620*** (0.07)
Mean Shocks Received---Self	0.052 (0.095)	0.196** (0.097)	-0.039 (0.269)	0.088 (0.16)	0.158*** (0.065)
Mean Shocks Received---Others	-0.144*** (0.036)	-0.019 (0.029)	0.059 (0.051)	0.047 (0.038)	-0.006 (0.017)
Age	0.002 (0.001)	-0.001 (0.002)	0.014*** (0.004)	0.003 (0.002)	0.002*** (0.001)
Fraction of Life Lived in Area	0.002 (0.075)	-0.07 (0.052)	0.021 (0.098)	0.094 (0.067)	-0.011 (0.033)
GSS Questions	0.043*** (0.016)	0.018 (0.016)	0.046 (0.042)	0.031 (0.025)	0.027*** (0.01)
Female	0.031 (0.053)		0.069 (0.069)	0.025 (0.051)	0.017 (0.029)
Monitoring Treatment	0.008 (0.044)			-0.109 (0.074)	-0.037 (0.036)
SelfSelect Treatment	0.075 (0.152)		-0.266* (0.146)	-0.292* (0.153)	-0.192*** (0.062)
Num. of Acquaintances	0.034*** (0.011)	-0.019* (0.011)	-0.008 (0.027)	-0.028 (0.028)	0.00 (0.007)
SelfSelect*Num.Aquaintances	-0.029 (0.032)		0.022 (0.038)	0.062* (0.037)	0.021 (0.014)
Education	0.003 (0.023)		0.039 (0.047)	-0.016 (0.029)	
Business Owner	0.034 (0.028)	0.044 (0.045)	-0.041 (0.07)	0.023 (0.049)	0.005 (0.021)
Wageworker	-0.034 (0.041)	0.144*** (0.045)	0.031 (0.072)	-0.016 (0.044)	-0.044** (0.023)
Loan in Past	0.05* (0.029)	0.033 (0.041)	0.012 (0.116)	-0.158*** (0.05)	0.001 (0.023)
Borrower		0.123*** (0.047)		-0.01 (0.099)	0.062* (0.037)
Num. of Others in Same Town	0.002 (0.011)				
Num. of Others Same Religion	-0.001 (0.01)	0.019* (0.011)	0.024 (0.027)	-0.012 (0.016)	0.009 (0.007)
Religion Frequency	-0.013 (0.019)	-0.025 (0.024)	0.075 (0.05)	0.004 (0.028)	-0.008 (0.018)
Evangelical Dummy	0.136 (0.103)	0.071 (0.143)	0.356** (0.181)		0.091 (0.077)
Num. of Other Evangelical	-0.005 (0.011)	0.003 (0.012)	-0.032 (0.026)		-0.005 (0.011)
EvanD*RelFreq	-0.054 (0.04)	0.003 (0.057)	-0.055 (0.076)		-0.027 (0.03)
Muslim Dummy		-0.144 (0.163)		-0.102 (0.134)	-0.176** (0.073)

Num. of Other Muslim	0.05*			0.018	0.027**
	(0.022)			(0.027)	(0.013)
MuslD*RelFreq	0.039			0.07	0.042
	(0.058)			(0.068)	(0.028)
Hindu Dummy					0.003
					(0.087)
Num. of Other Indu					-0.012
					(0.015)
HundD*RelFreq					-0.02
					(0.032)
Guatemala					0.155***
					(0.038)
Kenya					-0.321***
					(0.047)
India					0.081
					(0.057)
Adj R-Squared	0.112	0.0513	0.044	0.0836	0.276
* p≤.1; ** p≤.05; *** p≤.01					

Table 6: Borrowing Group Longevity---Including Spiritual Capital					
Dependent Variable: Number of Rounds Reach by Group in Microfinance Game, m =					
---OLS Estimates---					
Variable	Guatemala	India	Kenya	Philippines	5 Countries
Num. of Observations	<i>n</i> = 62	<i>n</i> = 70	<i>n</i> = 46	<i>n</i> = 50	<i>n</i> = 231
Intercept	-4.494 (7.507)	13.831*** (4.692)	-6.003 (5.127)	-2.905 (6.843)	8.226*** (2.152)
Mean Shocks Received---Group	-3.869*** (0.756)	-2.225*** (0.61)	-0.368 (0.419)	-1.325* (0.735)	-1.885*** (0.283)
Proportion Female	4.551 (4.105)		-0.279 (1.626)	1.951 (1.794)	-0.079 (1.001)
Mean Age in Group	0.067 (0.067)	-0.083 (0.097)	0.137* (0.077)	0.203* (0.118)	0.019 (0.037)
Mean Education	0.514 (0.861)		1.491 (0.978)	1.023 (0.981)	
Mean Fr. of Life Lived in Area	4.722 (4.916)	-1.184 (2.43)	2.796 (2.007)	2.755 (2.321)	0.724 (1.142)
Mean Business Owner	-0.189 (1.288)	-1.877 (1.564)	0.175 (1.243)	-0.773 (2.083)	-0.689 (0.69)
Mean Wageworker	-0.881 (2.145)	-4.307* (2.422)	0.509 (1.44)	-1.599 (1.526)	-1.707** (0.83)
Mean Loan in Past	-0.955 (1.638)	2.46 (1.518)	-0.498 (2.903)	-3.448* (1.773)	0.337 (0.799)
Borrower		2.151 (1.526)		-1.49 (2.589)	1.103 (0.847)
Mean GSS Questions	2.051** (0.827)	0.28 (0.709)	-0.377 (1.098)	0.807 (1.077)	0.554 (0.379)
Mean Num. of Acquaintances	0.352 (0.488)	-0.098 (0.407)	-0.258 (0.611)	0.279 (0.902)	-0.058 (0.202)
Mean SelfSelect*Num.Acq.	0.401 (1.581)		0.671 (0.824)	1.002 (1.42)	1.059** (0.472)
SelfSelect Treatment	-0.01 (7.239)		-3.438 (2.594)	-3.34 (5.415)	-5.011*** (1.937)
Monitoring Treatment	1.148 (0.995)			-3.036* (1.722)	-0.865 (0.716)
Gender Homogeneity	-0.807 (1.142)		-1.184 (1.055)	-0.606 (1.202)	-0.286 (0.518)
Town Homogeneity	-0.441 (0.829)				
Religious Homogeneity	0.434 (0.692)	0.557 (0.814)	0.886 (0.76)	0.489 (1.093)	0.373 (0.385)
Mean Religious Frequency	0.73 (0.961)	-0.35 (1.131)	0.436 (1.474)	-0.767 (1.371)	-0.37 (0.734)
Num. Evangelical	1.228* (0.729)	-0.135 (1.14)	0.423 (0.539)		0.474 (0.415)
Num. Evan*ReligiousFreq.	-0.296 (0.281)	0.158 (0.47)	-0.099 (0.295)		-0.066 (0.176)
Num. Muslim		0.236 (0.621)		0.581 (0.547)	0.349 (0.31)
Num. Musl*ReligiousFreq.		0.094 (0.286)		-0.045 (0.294)	-0.047 (0.16)
Num. Hindu					-0.166

Num. Hind*ReligiousFreq.					(0.525)
					0.056
					(0.215)
Guatemala					1.691*
					(0.968)
Kenya					-6.12***
					(0.963)
India					-0.183
					(1.176)
Adj R-Squared	0.418	0.223	-0.061	0.416	0.548
* p≤.1; ** p≤.05; *** p≤.01					

Table 7: Mann-Whitney Tests for Differences in Means				
H ₀ : Avg. Contrib. Rate (Treatment=0) = Avg. Contrib. Rate (Treatment=1)				
Variable:	Observations*	Mean (Std. Dev.)	Mann-Whitney test	
Female vs. Male	1209 276	0.797 (0.323) 0.573 (0.427)	z = -9.043 Prob > z = 0.0000	
Self-Select vs. Non-Self-Select	322 1017	0.582 (0.428) 0.810 (0.316)	z = 8.214 Prob > z = 0.0000	
Monitor vs. Non-Monitor	133 1206	0.757 (0.361) 0.738 (0.344)	z = 1.201 Prob > z = 0.2296	
Borrower vs. Non-Borrower	243 1094	0.864 (0.280) 0.730 (0.371)	z = -6.014 Prob > z = 0.0000	
Experienced Borrower vs. Non-Exper. Borrower	30 123	0.935 (0.169) 0.821 (0.324)	z = -1.755 Prob > z = 0.0793	
Evangelical/Protestant vs. Non-Evangelical/Prot.	370 969	0.727 (0.398) 0.765 (0.343)	z = -0.499 Prob > z = 0.6176	
Catholic vs. Non-Catholic	425 914	0.819 (0.295) 0.725 (0.382)	z = -3.766 Prob > z = 0.0002	
Muslim Non-Muslim	245 1094	0.601 (0.416) 0.789 (0.336)	z = 8.583 Prob > z = 0.0000	
Hindu vs. Non-Hindu	255 1084	0.830 (0.297) 0.737 (0.371)	z = -3.660 Prob > z = 0.0003	
* Dataset includes all countries but Armenia, except for Female which includes Armenia and Experienced which includes India Borrowers only.				