Incentive of risk sharing and trust formation: Experimental and survey evidence from Bangladesh

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Abstract

Using data from a unique household survey and an artefactual field experiment conducted in rural Bangladesh, this study evaluates the impact on trust in community members of an incentive to maintain a risk-sharing arrangement between villagers. Risk sharing is a major opportunity for cooperation in rural economies, and the experience of cooperation could facilitate trust. In order to test this hypothesis, this study characterizes the incentive for risk sharing by the patterns of exogenous income shocks in the real world and risk preference, and trust in community members is elicited experimentally. The empirical results from dyadic regression demonstrate that villagers connected by a stronger incentive form higher level of trust. It is also found that villagers are more likely to share risks in villages that have stronger incentives. These findings suggest that the introduction of formal insurance, which reduces the incentive of risk sharing, could break down trust.

JEL Codes: C91, D12

Keywords: Trust formation; risk sharing; experiment; Bangladesh

1. Introduction

Interpersonal trust is an essential element for socioeconomic development, particularly in developing countries. In rural communities, where members often engage in cooperative behavior without a contract enforcement institution, – such as irrigation maintenance, credit transactions, and mutual insurance – trust in the community members, namely *particularized trust*, plays an important role (Bardhan 2000; Bouma et al. 2008; Carter and Castillo 2005; Hayami 2009; Karlan et al. 2009; Wade 1988). Furthermore, trust in strangers, *generalized trust*, also encourages cooperation in one-shot situations (Fukuyama 1995; Yamagishi and Yamagishi 1994). Therefore, it is important for policymakers and researchers to better understand their formation mechanisms.

Previous studies suggest that these two types of trust are accumulated through different processes; particularized trust is formed through repeated interactions between the community members (Banfield 1958; Shapiro et al. 1992), while generalized trust is determined by one's personal predisposition (Platteau 1994a; 1994b; Uslaner 2002; Yamagishi and Yamagishi 1994). However, while various determinants of generalized trust are discussed in the literature,[1] the formation mechanism of particularized trust is not relatively known. Some studies find that particularized trust increases with the proximity between individuals, such as ethnicity (Bouckaert and Dhaene 2004; Fershtman and Gneezy 2001), neighborhood (Etang et al. 2011), friendship (Binzel and Fehr 2013), and when low communication costs are involved (Fisman and Khanna 1999).[2] Although these findings are insightful, they do not explain the mechanism of particularized trust formation. This study attempts to address this question by exploiting experiment and survey data collected in rural

[1] Generalized trust is found to be attributed to the income level of the community and its inequality, political characteristics, market competition, and industrialization (Berggren and Jordhal 2006; Bjornskov 2006; Bohnet and Baytelman 2007; Miguel et al. 2006; Huck et al. 2012).

[2] See Lévy-Garboua et al. (2006) for further review.

Bangladesh.

One likely explanation for the formation of particularized trust is grounded in the experience of cooperation. Experiencing cooperation with an individual can facilitate particularized trust in him or her, because it reduces uncertainty regarding his or her trustworthiness, and develops a social preference toward him or her (Banfield 1958; Shapiro et al. 1992). In fact, previous studies have shown that individuals who experienced collective actions with their community members exhibit higher trust (Durante 2009; Feigenberg et al. 2010; Gneezy et al. 2015; Schechter 2007a; Shoji et al. 2012).

In the rural society, risk sharing arrangements for coping with negative shocks, such as income loss and sickness, is a major opportunity for cooperation: given the large income volatility and poor access to the formal insurance market, villagers help each other by lending money and providing food (Fafchamps 2010). However, the extent of cooperation among individuals varies with their incentive to share risk (Coate and Ravallion 1993; Fafchamps 1999; Kimball 1988; Kocherlakota 1996; Ligon et al. 2002). This suggests that the incentive of risk sharing could foster particularized trust. However, there is also a counterargument: people do not need to trust others if their cooperation is guaranteed by the incentive (Gambetta 1998; Sitkin and Roth 1993; Yamagishi and Yamagishi 1994). Therefore, the impact of incentive on particularized trust is not theoretically unambiguous.

The goal of this study is to test whether two villagers linked by a stronger incentive to share risk form higher particularized trust. I use experimental and survey data of 1,920 dyads, collected from 279 randomly selected households in 16 Bangladeshi villages. The incentive of risk sharing between individuals is characterized by their income correlation over eight agricultural seasons, as well as by the trustee's income volatility and risk preference. This study elicits particularized trust by modifying the experimental design of Berg et al.

(1995). One distinction of the current study's design is that it is conducted under both anonymous and non-anonymous settings, in order to elicit generalized and particularized trust, respectively. The maximum amount of payoff from this game is equivalent to nine days' worth of income in the study area. Furthermore, this study addresses the possibility that behavior in the game is affected by motives other than particularized trust, such as generalized trust, pure altruism, warm glow, risk preference, and the wealth effect.

The empirical results obtained through the dyadic regression approach suggest the positive effect of the incentive of risk sharing on particularized trust. Particularized trust is higher when incomes are negatively correlated between the trustor and trustee, and when the trustee faces higher income variation and is more risk-averse. Proximity between the trustor and trustee in terms of gender, occupation, and religion has insignificant effects. This study also confirms that villagers are more likely to share risks in villages where there is a higher extrinsic incentive to do so.

This study closely relates to Gneezy et al. (2015), Durante (2009), and Shoji et al. (2012). Gneezy et al. (2015) conduct an anonymous trust game in two communities: sea fishermen who work in groups and lake fishermen who work individually. The authors demonstrate significantly higher trust among the former than among the latter, implying that the experience of group activities facilitates trust in the community members. Durante (2009) finds that weather shocks realized from the 16^{th} to 18^{th} centuries predict variation in the current generalized trust across European countries, presumably because the repeated experience of risk sharing over the centuries influenced the personal predisposition. Shoji et al. (2012) evaluate the causal impact of incentive for Sri Lankan farmers to contribute to community work – such as participation in community meetings and payment for religious festivals – on trust in villagers. The current study differs from theirs in that the former elicits

particularized trust toward each community member and examines the dyadic relationship, while the latter utilizes the measures of trust on the whole community. The use of trust measure at the individual level allows us to uncover the underlying mechanism of trust formation in more detail, by exploiting the variation in particularized trust within the community. Furthermore, Durante (2009) and Shoji et al. (2012) elicit trust by using subjective questions; however, existing studies seriously doubt the strength of such self-reported information (Glaeser et al. 2000). On the other hand, this study uses the experimental approach to quantify particularized trust.

This study attempts to make two further contributions to the literature. First, it is insightful to uncover the relationship between risk and trust in the context of developing countries. Since such countries suffer from poor access to formal insurance and contract enforcement institutions, both risk sharing and trust are essential to their economic development. However, the findings herein with regard to the positive association between incentive of risk sharing and trust predict that the introduction of formal insurance—which reduces the incentive—could break down trust. This could be important to better understand industrialization's effects on social capital, which has long been discussed (Miguel et al. 2006; Polanyi 1944/1957). Second, this study suggests the potentially negative effect of social proximity on trust. While previous studies find the positive effects of social proximity on trust, there also exist studies that present insignificant effects (Aoyagi et al. 2014; Johansson-Stenman et al. 2009). The findings of this study might in part explain their results: proximity leads to positive income correlation, and therefore reduces the incentive to share risks.

The rest of this paper is organized as follows. Section 2 presents the conceptual framework and establishes the testable hypotheses of this study. Sections 3 and 4 describe the dataset and empirical strategy, respectively. Section 5 demonstrates the estimation results.

Finally, Section 6 concludes.

2. Conceptual Framework

2.1. Definition of Trust

This study defines trust in line with Coleman (1990) and Fehr (2009): *an individual trusts if she voluntarily places resources at the disposal of another party without any legal commitment from the latter*. Trust therefore is a behavior motivated by a trusting belief and trusting preference (Coleman 1990). A trusting belief indicates a subjective expectation about a trustee's behavior, under the situation where the trustee does not have an extrinsic incentive to behave in a prosocial manner (Ashraf et al. 2006; Barr 2003; Sapienza et al. 2013). Trusting someone in this sense means that the probability that he or she will perform an action beneficial for the trustor is sufficiently high. Trusting preference, on the other hand, is the willingness to take the risk of trusting behavior. This social preference is referred to as betrayal aversion (Bohnet and Zeckhauser 2004; Bohnet et al. 2008; Koehler and Gershoff 2003).

Although one could take prosocial behavior by knowing that his or her opponent does not have an incentive to betray him or her, such behavior is not considered trust, in the definition used here. Therefore, the definition used here differs from Hardin's (2002) *calculative trust*, which considers trust a rational expectation.[3]

2.2.Risk-Sharing Arrangements in Rural Economies

In developing countries, villagers' income fluctuates over time due to various risks, such as natural disasters, sickness, and unemployment. Given their poor access to formal insurance, they share risk to smooth consumption, by lending money and/or providing food to those who

[3] Hardin's definition is in line with what Shapiro et al. (1992) call *deterrence-based trust* and what Yamagishi and Yamagishi (1994) call *assurance*.

suffer from negative income shocks (Collins et al. 2009; Fafchamps 2010; Fafchamps and Lund 2003; Jack and Suri 2014; Platteau 1994a; 1994b; Udry 1994). Such a risk-sharing arrangement, therefore, plays the role of informal insurance, and it is a major source of cooperation in the village economy.

Existing studies show evidence of risk-sharing arrangements in the rural economies (Ogaki and Zhang 2001; Park 2006; Townsend 1994); however, it has also been found that limited commitment problems crucially restrict the efficiency of risk sharing (Albarran and Attanasio 2003; Charness and Genicot 2009; Coate and Ravallion 1993; Dubois et al. 2008; Fafchamps 1999; Foster and Rosenzweig 2001; Kimball 1988; Kocherlakota 1996; Kruger and Perri 2006; Laczó 2014; Ligon et al. 2002). Since participation in risk-sharing arrangements is voluntary for the villagers, they can deviate from the arrangement at any time, without incurring any cost; however, such villagers are excluded from future arrangements and end up in an autarky economy. Therefore, efficient risk sharing can be observed only when the extrinsic incentive to maintain the arrangement is sufficiently high for all villagers. The incentive increases with an increase in the lifetime utility under the arrangement and a decrease in the lifetime utility under autarky. The former increases when incomes are negatively correlated between individuals, as it enables them to pool more risk; the latter decreases when income variation over time is high, and this effect becomes especially large for risk-averse individuals.

2.3. Trust Formation Mechanism and Testable Hypotheses

Existing studies suggest that the incentive of risk sharing potentially facilitates particularized trust between the community members through 1) the reduction of uncertainty regarding the trusting belief and 2) the formation of trusting preference (Banfield 1958; Shapiro et al. 1992; Sheppard and Sherman 1998). In particular, Shapiro et al. (1992) claim that particularized

trust is formed in three stages, and that the incentive of cooperation is a necessary condition for the first stage. In the first stage, the strong incentive to share risks between individuals enforces their cooperation, which could, in turn, cause them to collude.[4] Therefore, one believes that the probability for his/her opponent to betray him/her is low, given the incentive to share risks. In other words, the calculative trust grows in this stage. In addition, the incentive of risk sharing can facilitate cooperation in other communal activities, since villagers can punish free riders by excluding them from the risk sharing arrangement (Aoki 2001).[5]

In the second stage, the frequent cooperation grounded in the incentive enhances regular communication among individuals, and this helps them accumulate knowledge about trustworthiness and other preferences, and personality of each other. This knowledge, therefore, increases the predictability of trustee's behavior, improving the accuracy of the trusting belief. For those who exhibit betrayal aversion, the reduction of information asymmetries in this process has a positive effect on the trusting behavior.

Finally, individuals do not only form trusting belief by accumulating knowledge about each other and reducing the information asymmetries, but they also form trusting preference toward their partners. Therefore, these studies suggest that even cooperation as a result of a self-interested motive could facilitate social preference toward the opponent.

Given this argument, this study tests the following hypothesis:

Hypothesis:

If the incentive of risk sharing facilitates trust, individual i should exhibit higher trust in j when:

[4] This is consistent with the argument of Murgai et al. (2002) and Genicott and Ray (2003).
[5] For example, although the irrigation maintenance *per se* does not have a punishment scheme against free riders, such a problem can be controlled if the community members can exclude them from the future arrangement of risk sharing.

(a) their incomes are negatively correlated, and

(b) variation in j's income is higher, and this causality becomes larger as j exhibits higher risk aversion.

However, this hypothesis is not theoretically unambiguous. Gambetta (1998), Sitkin and Roth (1993), and Yamagishi and Yamagishi (1994) claim that people do not need to trust others, if their cooperation is guaranteed by the extrinsic incentive. If this be the case, we should rather observe the opposite result.

3. Data Description and Experimental Design

This study uses a unique dataset derived from a household survey and an economic experiment conducted in Satkhira district, located in southwest Bangladesh. This area is suitable for examining the incentive of risk sharing and trust formation: it was severely affected by cyclone Aila in May 2009, and so the residents had opportunities to share the risk of income loss.

3.1. Sampling and Household Survey

The household survey was conducted in December 2010, 19 months after the cyclone. I employed a multistage stratified random sampling methodology. In the first stage, I selected the three sub-districts (*Upazila*) of Samnagar, Kaliganj, and Ashashoni, based on their economic status and the intensity of the cyclone damage. In the second stage, I randomly sampled two *Unions* from each sub-district.[6] In the next stage, four villages from each *Union* and one cluster (*Para*) from each of the villages were randomly selected. Finally, I selected

[6] The *Union* is an administrative unit in Bangladesh; each *Union* contains multiple villages.

18 households from each cluster.[7] Since five households were unavailable for the survey, I obtained a total of 427 of 432 sample households from 24 clusters.

The questionnaire covered the magnitude of cyclone damage, evacuation behavior, geographical characteristics, crime incidence, self-reported social capital, demographic characteristics, asset holdings, savings, relief received from the government and non-government organizations, membership of microfinance institutions, food and non-food consumption, labor and non-labor income, experience of unanticipated shocks (floods, pest, asset loss, etc.), and bilateral relationships among the survey households.

The main independent variables are income correlation between trustor and trustee, and income variation of the trustee. In order to elicit these, retrospective information on household income and experience of shocks was collected for eight periods over the January 2007–December 2010 period—namely, the dry and rainy seasons of each year. Income shock variables are self-reported binary variables that take unity if the household experienced the shocks—such as drought or inundation—and zero otherwise. From this retrospective information, I compiled a pseudo-panel dataset. Therefore, eight-period panel data were available to compute variations in and correlations of household income. Since these data are retrospective and self-reported, they are likely to suffer from measurement error; this point is taken up in Section 4.2.

In the bilateral relationship module, the interviewers asked about current relationships with each of the other 17 survey households in the same *Para*. The collected information included the distances between their residences, and whether they attend the same mosque, temple, or church. In cases where the respondents did not know the opponents, they could not answer these questions, and so the dataset includes some missing values.

[7] In the survey area, the average *Para* size is 72.5 households.

3.2. Experiment

Eight months after the household survey, the heads of the survey households in Kaliganj and Ashashoni were invited to partake in an economic experiment that used real money.[8] In cases where the household head was not available, the next senior person representing the household (usually the spouse) was recruited, to maintain the sample size. Ultimately, 279 of the 285 households participated in the experiment. The experiment was implemented at the local government office, and each day I conducted the experiment with 36 participants invited from two villages. All 36 participants were first gathered in a room, and they were then randomly allocated to two rooms. Each participant played the take-away game, dictator game, trust game with hidden action, risk preference game, and trust game; however, this study uses the results only from the dictator, risk preference, and trust games. The experimenters were hired in Bangladesh, and since the average schooling years of the participants were less than six years (Table 1), the experimenters explained the experimental design slowly and carefully. More details about the experimental procedure and instruction are described in the Online Appendix.

After finishing all the games, each participant rolled a colored die. Each color corresponds to a decision made during the games, and he/she received his/her payoff from only one randomly selected decision.[9] Therefore, the participants did not know from which decision they received the payoff, and were aware that each participant had earned money from a different decision. This payment process was explained to the participants prior to starting the first game. This process is important for two reasons. First, it alleviates the correlation of choices within participants across games, due to the wealth effect. Second, if participants were to earn money from all games and discuss the payoffs after the experiment,

[8] The experiment in Samnagar was canceled due to flooding.

[9] Besides the payoff from the games, I also provided BDT100 as a participation fee. This is the same amount as the median daily wage, as per the survey data.

they might have been able to infer the choices of the other participants. This would have violated participant anonymity and potentially affected their behavior.

3.2.1. Trust Game

This study used the trust game of Berg et al. (1995) to elicit particularized trust. This game is played by a randomly matched pair of participants. These participants are randomly assigned to two roles—namely, a first mover (trustor) and a second mover (trustee). When the game starts, the experimenter provides the first mover with an endowment of 300 Bangladeshi taka (BDT) and the second mover with nothing. This amount is equivalent to about three days' worth of income in the study area. In the first stage of this game, the first mover decides how much of the BDT300 to send to the second mover and how much to keep. He or she can send BDT300, 250, 200, 150, 100, 50, or none. The amount sent is tripled by the experimenter before it reaches the second mover. In the second stage, the second mover can return some of the received amount to the first mover. Thus, the material payoff for the first and second movers is $300 - t + r$ and $3t - r$, respectively, where t and r denote the amount to be sent to the second mover and the amount to be returned to the first mover, respectively. The maximum amount of payoff from this game is BDT900 (to the second mover, when $t = 300$ and $r = 0$). In the study area, this is equivalent to nine days' worth of income.

A distinction of my experimental design from that of Berg et al. (1995) is that it is conducted under both anonymous and non-anonymous settings, in order to elicit generalized and particularized trust, respectively.[10] The first mover first decides how much to send, without knowing to whom he or she is sending the money. After this, the participants make decisions under a non-anonymous setting: I randomly divided the 18 participants from the

[10] Although the strategy method has some potential concerns, Brandts and Charness (2011) shows that, based on the results of a large number of previous studies, the results of the strategy and direct-response methods are comparable.

same *Para* into two groups (nine in each group), and the experimenter shows each participant the name list of the other eight participants in the same group to ask how much to send, if this game were played with each of them. Thus, eight dyadic observations were collected from each participant.

After all participants make decisions as the first mover, they make decisions as the second mover. Again, they are asked how much to return under both anonymous and non-anonymous settings; the experimenter initially informs each second mover how much he or she actually received from the paired first mover, but does not inform from whom he or she received it. After deciding how much to return under the anonymous setting, they are again shown the name list of the eight participants, and the participants decide the amount to return to each of them.[11]

In this game, the second mover has no extrinsic incentive to return money at the second stage. Expecting this, it is rational for the first mover to keep all the money. In other words, calculative trust does not exist for the first movers. However, those who still expect trustworthy behavior from the second mover and/or those who are willing to trust him or her will send money. Therefore, the fraction the first mover sends to the second mover, $t/3$, captures trust, and the fraction that the second mover returns to the first mover, $100r/3t$, indicates trustworthiness.

The amount of transfer from the first to second mover under the non-anonymous setting could also be affected by motives other than particularized trust, such as generalized trust, pure altruism, warm glow, and risk preference. The empirical analysis in the following section carefully addresses these possibilities.

[11] The pair was determined prior to the game, and therefore, the endowment was transferred between the real pair. However, the participants were not informed about the name of the real pair, but only the names of eight potential opponents.

3.2.2. Risk Preference Game

Risk preference is elicited based on the methodology of Schechter (2007b). This game is similar to that involving the first mover of the trust game, but it is played alone. When the game starts, the experimenter provides an endowment of BDT300 and a die. Participants decide how much to bet on the die. They can bet BDT300, 250, 200, 150, 100, 50, or none. After the participant decides how much to bet, he or she rolls the die. The payoff in this game depends on how much he or she bets on the die and the result of the bet, as follows: $300 + z(Odds - 1)$. Here, z denotes the amount participant i bets on the die, and $Odds$ takes 0 if the die lands on 1, 0.5 if the die lands on 2, 1 if the die lands on 3, 1.5 if the die lands on 4, 2 if the die lands on 5, and 2.5 if the die lands on 6. The level of risk aversion is measured by the proportion of endowment to be bet on the die, given that more risk-averse individuals are expected to bet lower amounts.

3.2.3. Dictator Game

This study uses the dictator game to elicit the pure altruism of participants. The experimental design follows that of Forsythe et al. (1994). This game is played anonymously by a randomly matched pair of participants, referred to as the dictator and recipient. When the game starts, the experimenters provide an endowment of BDT400 to the dictator and nothing to the recipient. The dictator can then allocate BDT400, 350, 300, 250, 200, 150, 100, 50, or none to the recipient. The extent of pure altruism is measured by the proportion of endowment to allocate to his or her recipient.[12] This study elicits this preference parameter from all participants by using the strategy method across the roles in the game.

3.3. Summary Statistics

[12] Since this game was conducted after a take-away game, the rule was explained in this context. See online appendix for details.

Panel A of Table 1 reports the major characteristics of the households that participated in both the household survey and experiment. The main industries in the area are agricultural crops and shrimp farming, but only one-half of the households own their land. With respect to cyclone damage, 32% of the sample households experienced inundation of their residence during cyclone Aila, and its average duration was 0.34 months; they were, however, able to ask 11.9 households in the village for help during that time, if they wished.[13] In fact, 19% of the survey households borrowed from neighbors, friends, or relatives after the cyclone, implying that risk sharing among villagers plays the role of insurance.

Panel B summarizes the retrospective information on household income and binary income shocks over the eight periods. The household income includes income from self-employed (farm and non-farm), employed (farm and non-farm), and rent income. The monthly average was around BDT4,200. In each period, negative income shocks such as inundation and drought occur with a probability of around 10–20%. The correlation coefficient of incomes among villagers is 0.28, on average.

Finally, Panel C presents the dyadic relationships among households in the same village. 91% of dyads are connected by friendship, and the average household knows the other villagers for more than 20 years; additionally, 65% engage in the same occupation category (shrimp, agricultural crops, transportation, shopkeepers, and others).

Figure 1 presents the results of the experiment. Figures 1(a)–(d) depict the results of the trust game in the anonymous and non-anonymous settings. 64 of 279 first movers report the same sent amount to all the second movers. It appears that the particularized trust is lower than generalized trust on average, and that the difference is statistically significant ($p < 0.01$). The results for trustworthiness also show a similar tendency.[14] Figure 1(e) shows the results

[13] The size of the risk-sharing network is quantified by responses to the following question: *How many households in the village could you ask for help, if you were in need?*

[14] The data on trustworthiness include missing values, since 28 participants received nothing

of the risk preference game. The participants bet about 50% of their endowment on average; this is slightly higher than that observed in Schechter (2007b), who originally conducted this game in rural Paraguay.[15] Finally, Figure 1(f) shows the results of the dictator game. The average amount of transfer is 46%, which is comparable to the results in the other experiments conducted in developing countries (Cardenas and Carpenter 2008).

4. Empirical Strategy for Determinants of Particularized Trust

4.1. Estimation Model

This section estimates the following dyadic regression model to test the hypothesis proposed in Section 2.3:

$$Trust_{ij} = \beta_0 + \beta_1 Corr_{ij} + \beta_2 SD_j + \beta_3 SD_j \times Bet_j + Proximity_{ij}\beta_4 + X_j\beta_5 + D_i + \varepsilon_{ij}, \quad (1)$$

where $Trust_{ij}$ represents the proportion of endowment sent from the participant of household i (trustor) to that of household j (trustee) in the trust game under the non-anonymous setting; $Corr_{ij}$ denotes the correlation coefficient of incomes between households i and j; SD_j denotes the standard deviation of household j's income[16]; and Bet_j represents j's willingness to take risks, as quantified by the proportion of endowment bet in the risk preference game. My hypothesis predicts that $\beta_1 < 0$, $\beta_2 > 0$, and $\beta_3 < 0$. $Proximity_{ij}$ includes social proximity variables such as geographic distance between their

from the first mover.

[15] In Schechter's experiment, the average proportion that was bet was 43%.

[16] One may suggest the use of coefficient of variation rather than the standard deviation, given that the latter is positively correlated with the income level. However, it is inappropriate to use it, since the household income can take a negative value, particularly during disasters. Therefore, this study isolates the effect of income level by controlling for the holdings of productive assets.

houses; two dummy variables representing the relationship between i and j, such as relative and stranger (the reference group is friend/acquaintance); and three dummy variables indicating whether the gender of the participants, the place of worship and occupations of the households are the same, respectively.[17] X_j is j's characteristics, such as the proportion of endowment allocated in the dictator game (pure altruism), proportion returned in the trust game under the anonymous setting (generalized trustworthiness), and asset holdings and demographics.[18] Finally, D_i denotes the trustor (household i) fixed effects, capturing the trustor's income dynamics, risk preference, and socio-economic characteristics.

The standard errors are computed to adjust the correlation of residuals at the cluster (*Para*) level throughout the study.

4.2. Identification Strategy

4.2.1. Motives Other Than Particularized Trust

There are two potential issues with estimation in Equation (1). The first is that $Trust_{ij}$ might capture motives other than particularized trust, such as the trustor's generalized trust, willingness to take risk, generalized pure/impure altruism, and fairness (Ashraf et al. 2006; Cox 2004; Ligon and Schechter 2012; Schechter 2007b). In addition, given that the participants made decisions in front of the experimenter, concerns about their social image in the eyes of the experimenters could have potentially affected their behavior. However, presuming that the impact of these factors do not vary across the eight trustees, the trustor fixed effects, D_i, can control for these effects.

[17] As explained in Section 3, the dyadic data—such as the distance between residences and whether they go to the same mosque/temple/church—are unobserved when the respondents do not know the opponents. In these cases, the missing data are replaced with 0, and a dummy variable indicating that i considers j a stranger is added to the independent variables (Greene 2011).

[18] In line with Schechter (2007a), participant j's generalized trustworthiness is assumed to be exogenous for i.

In addition, $Trust_{ij}$ could also be affected by trustee-specific altruism and fairness. However, if this is the case, the trustors should transfer more endowment to the poor and cyclone-affected individuals, who can yield a larger utility gain from the transfer. Therefore, we should observe the negative coefficients of the trustee's asset holdings and education, and the positive coefficient of cyclone damage. As shown in Section 5, such results are not observed.

4.2.2. Endogeneity of Income Dynamics

The second issue is endogeneity of $Corr_{ij}$ and SD_j. Social capital plays a significant role in the income-earning behavior in developing countries (Fafchamps 2004), and therefore, trust might also affect the income dynamics. In order to address this issue, I employ the method of Albarran and Attanasio (2003), which isolates the unanticipated component from the total income by estimating the following equation:

$$Income_{jt} = \sum_{k=1}^{5} \gamma_k Shock_{jtk} + D_j + \epsilon_{jt} \quad t = 1,2, \dots 8, \tag{2}$$

where $Income_{jt}$ denotes household j's seasonal income per month at period t; $Shock_{jtk}$ takes unity if household j experiences exogenous income shock k at period t, and 0 otherwise; and D_j represents household fixed effects that control for the anticipated component of income. The shock variables include inundation due to cyclones and floods; soil salinization caused by tidal waves; drought; pests, weeds, and animals; and the loss of productive assets. These shocks affect agricultural and non-agricultural labor income significantly, and are also uncontrollable and unpredictable for households. Therefore, I define the income explained by these shock variables, $\sum_{k=1}^{5} \hat{\gamma}_k Shock_{jtk}$, as unanticipated income. Finally, I use the unanticipated income to compute the exogenous standard deviation and correlation

coefficient. The estimation result is reported in Table 2. As expected, the inundation of fields significantly affected household income.

This approach, however, has four potential issues that need to be addressed. First, given that the shock variables are self-reported, some households may over-report their hardships more than others, even though their actual damages are comparable. This violates the exclusion restriction of the instrument. However, if one's tendency to over-report is time-invariant, the household fixed effects in Equation (2) should be able to mitigate this problem. This assumption is likely to hold, since the data on the shock variables were surveyed only once, in December 2010. Therefore, the criteria for reporting the shocks could be the same across the eight periods.

Second, the instrument may affect the particularized trust through other channels, such as the social proximity between individuals and the vulnerability to poverty; a positive correlation in the experience of shocks between two households may indicate that they engage in the same occupation and reside closer. This has a direct positive effect on particularized trust (Etang et al. 2011). In addition, those who experience negative shocks more frequently may spend more time on income-earning activities, and have fewer opportunities to communicate with the neighbors, suggesting the negative effect of trustee's income variation on particularized trust (Shoji et al. 2012). Although this study controls for the social proximity between the dyads and trustee's socioeconomic characteristics, the potential of unobserved characteristics leads to the violation of exclusion restriction. However, as long as the estimated impact of income correlation on particularized trust is negative and that of trustee's income variation is positive, this issue should not affect the interpretation of results.

Third, Table 2 shows that the instruments are weak: F-value for the joint significance of the instruments is 4.45. This is presumably because the instruments suffer from recall bias,

since they are retrospective data. This causes the attenuation bias in the first-stage result. Therefore, the coefficients of $Corr_{ij}$ and SD_j in the second stage should be biased to the direction of OLS estimates even after being instrumented, and the standard errors become larger. This issue is discussed in the next section by comparing the results of OLS and IV.

Finally, this approach makes the correlation coefficient unidentified for 39% of the dyads; 64 households reported no shocks during the survey periods, causing the variation in unanticipated income to be zero. Therefore, in line with Greene (2011), I replace the correlation coefficient with zero for such dyads and run the regressions with an additional independent variable that takes unity if the correlation is unidentifiable and 0 otherwise. For robustness, I also conduct the OLS estimation, which uses the total income to compute the standard deviation and correlation of income.

5. Results

5.1. The Impact on Particularized Trust

The upper part of Figure 2 depicts the correlation between particularized trust and income correlation. It shows that, without controlling for trustor and trustee characteristics, particularized trust is negatively and significantly correlated with income correlation between the trustor and trustee, although the magnitude of correlation is small. The figure pertaining to the standard deviation of income (the bottom part of the figure) is counter to the expectation: it is negatively correlated with trust.

Table 3 presents the estimation results of Equation (1). The odd-numbered columns control for the endogeneity of income dynamics by using unanticipated income, while the even-numbered columns use total income, including both anticipated and unanticipated income. The table shows the positive effect of the incentive of the risk-sharing arrangement; particularized trust is high if incomes are negatively correlated between the trustor and trustee.

An increase in income correlation by 0.1 decreases the fraction of endowment transferred to the trustee by 21.1–23.8%; this is equivalent to approximately two-thirds of the average daily income in the study area. A high standard deviation in the trustee's income is also positively associated with trust, and the impact is larger among risk-averse trustees. The signs of these coefficients are the same in the OLS and IV estimations, and the absolute values of IV coefficients are larger. In addition, the standard errors in the IV estimates are larger, but the coefficients are still statistically significant. Therefore, the findings here are robust to the issue of weak instrument.

Regarding the other variables, first, the positive coefficient of years of knowing each other could also be consistent with the argument of Shapiro et al. (1992) that particularized trust is formed by accumulating knowledge about the trustee. On the contrary, the other social proximity variables—such as kinship, gender, occupation, and religion—are insignificant. Second, the insignificant effects of the trustee's schooling years, asset holdings, and cyclone damage reject the possibility that the trust measure is affected by particularized pure/impure altruism and fairness toward the trustees. Third, it is also found that the trustor does not necessarily trust a trustworthy and/or altruistic trustee; this finding is consistent with those of Fershtman and Gneezy (2001) and Binzel and Fehr (2013), while it is inconsistent with that of Falk and Zehnder (2013). The result does not change qualitatively when controlling for particularized rather than generalized trustworthiness.[19] This may be because either the trustors do not maximize their material payoffs in the experiment, and/or they maximize their payoffs based on incorrect beliefs.

5.2. The Impact on Particularized Trustworthiness

This section estimates the following equation to uncover the effect of the incentive on

[19] The estimation results while controlling for particularized trustworthiness are not reported in this paper, but are available from the author upon request.

particularized trustworthiness:

$$Trustworthiness_{ji} = \beta_0 + \beta_1 Corr_{ij} + \beta_2 SD_j + \beta_3 SD_j \times Bet_j + Proximity_{ji}\beta_4 + X_j\beta_5 + Receive_j\beta_6 + D_i + \varepsilon_{ji}. \quad (3)$$

The dependent variable is *j*'s trustworthiness to *i*, elicited by the fraction of the received amount returned to *i*. This estimation model additionally controls for the amount of endowment received from the paired trustor, $Receive_j$.

Table 4 presents the results. The OLS estimations in Columns 2 and 6 show that the coefficients of income correlation are negative and statistically significant. The coefficients of trustee's income variation and its cross-term with the risk preference are positive and negative, respectively (Columns 4 and 6). These findings are consistent with the hypothesis. However, they are not robust to the use of unanticipated income dynamics (Columns 1, 3, and 5). Particularly, counter to the expectation, the coefficient of standard deviation of income is negative, although it is statistically insignificant. This may be either because trustworthiness is formed through a different mechanism, or the measure of trustworthiness is affected by other behavioral motives.

Pertaining to the other independent variables, again, the impact of social proximity is statistically insignificant except for the positive effect of gender. Particularized trustworthiness is positively correlated with the trustee's altruism, and this is consistent with the findings of Ashraf et al. (2006). Finally, educated participants are trustworthy on average.

5.3. Wild Bootstrap Clustered Standard Errors

The estimation results presented in Tables 3 and 4 use the clustered standard errors at *Para*

level. However, this might not fully adjust the correlation of residuals, given that this dataset contains only 16 *Para*.[20] Therefore, for robustness, I also employ the wild bootstrap clustered standard errors proposed by Cameron et al. (2008). The results are reported in Appendix Table A1. The results do not change qualitatively.

5.4. Evidence of Extrinsic Incentive and Risk-Sharing Behavior

Thus far, this study assumes that the incentive of risk sharing enhances the risk-sharing arrangement among villagers, and therefore increases the amount of transfer to those who experience negative income shocks. This section tests whether this assumption holds. It is straightforward to investigate the impact of incentive to share risks between a dyad on their transactions to smooth consumption, such as borrowing. However, given the unavailability of data on dyadic transactions, I estimate the following two models separately:

$$Network_i = \overline{Corr_\iota}\alpha_1 + \overline{SD_\iota}\alpha_2 + \overline{Proximity_\iota}\alpha_3 + X_i\alpha_4 + V_i + \varepsilon_i \quad (4)$$

$$Borrow_i = \Delta Income_i(\beta_1 + \overline{Corr_\iota}\beta_2 + \overline{SD_\iota}\beta_3) + \overline{Proximity_\iota}\beta_4 + X_i\beta_5 + V_i + \varepsilon_i \quad (5)$$

where $Network_i$ is the size of household i's risk-sharing network in the cluster. $Borrow_i$ is the amount of loans household i borrowed from his or her relatives, neighbors, and friends within 12 months after the cyclone in 2009. $\overline{Corr_\iota}$, $\overline{SD_\iota}$, and $\overline{Proximity_\iota}$ are the mean of $Corr_{ij}$, SD_j, and $Proximity_{ij}$ over the households in the cluster except i, respectively. $\Delta Income_i$ is the first difference of monthly income between the season before the cyclone and the season after. This variable is instrumented by the specification employed in Equation (2). While X_i in Equations (1) and (3) includes the age and education level of

[20] The asymptotic approximation relevant for clustered data relies on a large number of clusters.

the experiment participant, I drop them from Equation (2), given that this estimation model does not use the experiment data. Furthermore, in order to control for the demand for credit based on the household's lifecycle, I include the household size, age of household head, its squared term, and the schooling years of the household head.[21] Finally V_i is the cluster fixed effect.

In this specification, it is expected that $\alpha_1 < 0,\ \alpha_2 > 0,\ \beta_1 < 0,\ \beta_2 > 0,$ and $\beta_3 < 0$; a household should be able to ask more neighbors for help—in other words, the size of the risk-sharing network should be larger—in a village where the villagers' incomes are negatively correlated ($\alpha_1 < 0$) and are volatile ($\alpha_2 > 0$). Similarly, the amount of borrowing from the network members should increase with a decline in the household income ($\beta_1 < 0$), especially in those villages with a stronger incentive of risk sharing ($\beta_2 > 0,\ \beta_3 < 0$).

The estimation results in Tables 5 and 6 confirm the validity of my assumption. Table 5 presents the results of Equation (4). The negative coefficient of $\overline{Corr_i}$ indicates that the size of one's risk-sharing network grows when the income of the household is negatively correlated with that of the other villagers. In addition, the coefficient of $\overline{SD_i}$ is positive and statistically significant, implying that the risk-sharing network is larger when the other villagers' income is volatile.

The estimation results of Equation (5) are reported in Table 6. Given that the dependent variable is censored at 0, I use a Tobit model. The coefficients of income difference ($\Delta Income_i$) are negative for all specifications and statistically significant for most of them. Furthermore, the interaction between the income difference and the mean of income correlation with the other villagers ($\overline{Corr_i}$) is positively associated with the amount of borrowing, although the point estimates of the interaction with the standard deviation of income ($\overline{SD_i}$) are insignificant.

[21] The exclusion of these variables does not qualitatively affect the estimation results.

6. Conclusions

This study shows that the incentive to share risk facilitates both the risk sharing behavior and particularized trust formation among villagers in rural Bangladesh. These findings imply that experience of cooperative behavior driven by the self-interested motives could form social capital. Combining this argument with those of previous studies suggests the potential of a poverty trap. It has been shown in the literature that an increase in trust helps individuals achieve more efficient risk sharing (Carter and Castillo 2005; Carter and Maluccio 2003; Ligon and Schechter 2012). On the other hand, the findings of this study indicate that a stronger incentive of risk sharing also causes higher trust. Thus, community members with low initial trust might experience a slower growth of trust than those with high initial trust, suggesting the potential of a poverty trap.

Some possible policy implications may be derived. Improvements to formal institutions so as to help villagers smooth consumption can diminish trust among villagers, since it makes them less dependent on informal risk sharing. This in turn offsets returns to programs by lowering the efficiency of risk sharing. Such trust-reducing policies include the introduction of health insurance, an increase in the wages of unskilled labor, disaster relief, and reductions in the transaction costs of livestock sales. On the other hand, participation in microfinance might enhance trust, as it strengthens potential punishments against deviation. In line with this, there is empirical evidence showing the positive effect of microfinance participation on social capital (Feigenberg et al. 2010). Furthermore, job training programs that introduce a new industry in the community may also increase particularized trust, since they cause the income dynamics of villagers to become less correlated, and increase the net gains derived from risk sharing.

Finally, although this study finds an insignificant effect of social proximity on

particularized trust, it does not necessarily reject its importance in a general setting. The participants of this experiment are villagers in rural Bangladesh, and they are closely connected with each other and communicate frequently. Assuming the decreasing marginal effect of proximity on trust formation, the proximity measures used in this study may not fully capture variations in social proximity in such communities.

Additional Supporting information may be found in the online version of this article:

Appendix. Experimental Procedure and Instructions.

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Figure legends

Figure 1: Result of Experiments

Figure 2: Correlation between Particularized Trust and Income Dynamics

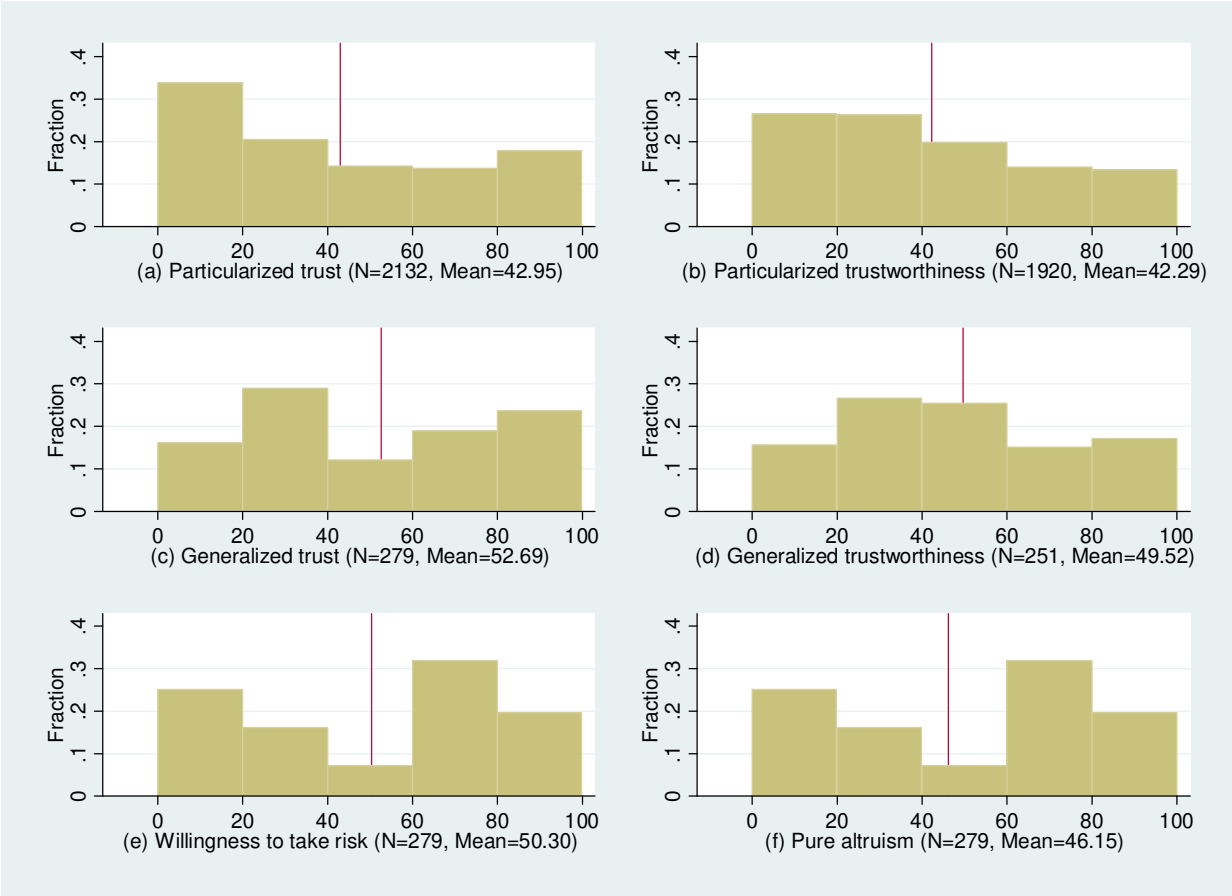
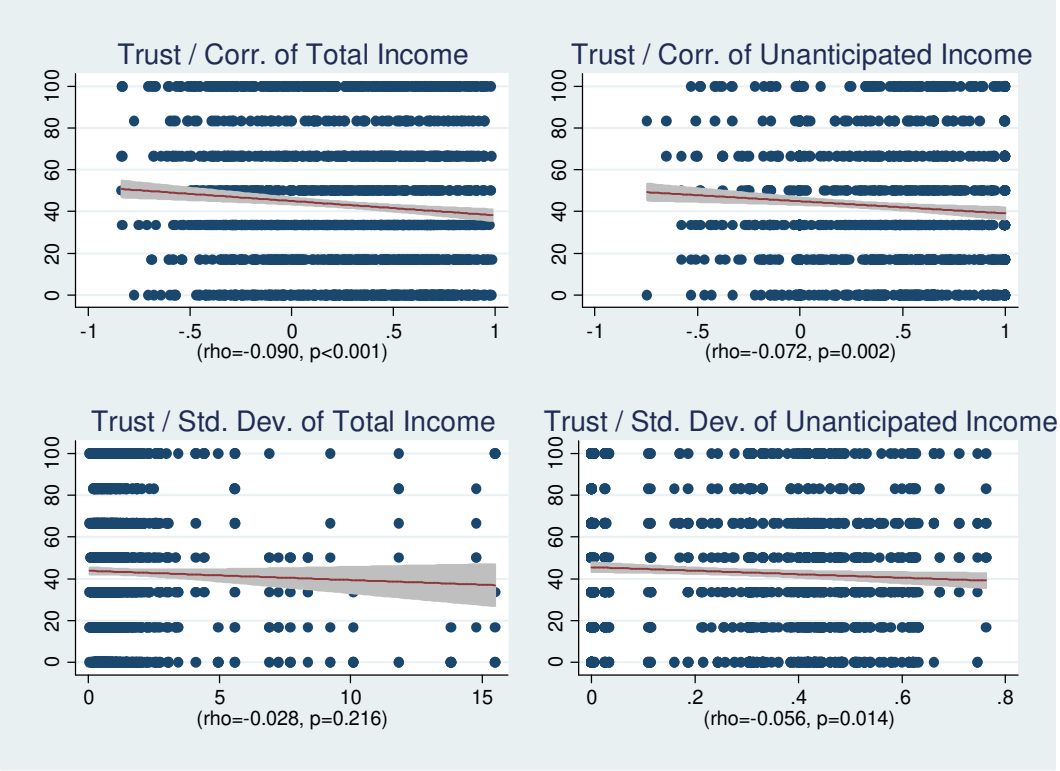


Figure 1: Result of Experiments



Note: Linear prediction plot and confidence interval at 95 % are depicted.

Figure 2: Correlation between Particularized Trust and Income Dynamics

Table 1: Summary Statistics

Symbol	Variables	Obs.	Mean	Std. Dev.
Panel A: Household/ individual characteristics				
X	1 if the household engages in farming of crops or shrimp	279	0.76	
X	1 if the household engages in processing of crops or shrimp	279	0.13	
X	Value of land assets (10^6 Tk)	279	0.16	0.39
	1 if land assets > 0	279	0.47	
X	Value of liquid assets (10^6 Tk) [#]	279	0.03	0.06
X	Inundation of residence due to cyclone Aila (months)	279	0.34	0.66
	1 if months of duration > 0	279	0.32	
Network	The number of households available to ask for helps in the village	279	11.9	11.4
Borrow	The amount of loan from neighbor, friend or relative within 12 months after the cyclone (10^3 Tk)	279	0.002	0.006
	1 if the amount of loans >0	279	0.19	
X	Age of experiment participant	279	35.81	13.71
X	Schooling years of experiment participant	279	5.84	4.07
Panel B: Retrospective characteristics				
Income	Seasonal income (Tk 1000/month)	2136	4.22	4.20
Shock	1 if experience saline soil	2136	0.14	0.35
Shock	1 if experience inundation	2136	0.13	0.33
Shock	1 if experience drought	2136	0.11	0.31
Shock	1 if experience pest, weed, animals	2136	0.19	0.39
Shock	1 if experience any asset loss	2136	0.10	0.30
SD	Standard deviation of seasonal income (1000 Tk/month)	279	1.45	2.96
Corr	Correlation of labor income between i and j	2132	0.28	0.42
Panel C: Dyadic characteristics				
Proximity	Distance between i and j's houses (km)	2062	0.15	0.15
Proximity	1 if household i considers j as a stranger	2132	0.03	
	1 if household i considers j as a friend/acquaintance (reference)	2132	0.91	
Proximity	1 if i and j are relatives	2132	0.06	
Proximity	Years since i gets to know j	2132	22.68	9.91
Proximity	1 if i and j go to the same mosque/temple/church	2062	0.85	
Proximity	1 if gender of experiment participants are the same	2132	0.62	
Proximity	1 if i and j engage in the same occupation category [##]	2132	0.65	

[#] Liquid assets include livestock, cell phone, grain storage, deposit at the bank account, jewelry, and cash.

[##] It takes unity if both households are included in the same occupation categories, such as shrimp (farming and processing), crops (farming and processing), transportation, and shopkeepers.

Table 2: First Stage Regression
Dependent Variable: Seasonal Income (BDT 1000/month)

	(1)
1 if experience saline soil	-320.545
	(315.641)
1 if experience inundation	-865.569***
	(238.073)
1 if experience drought	11.069
	(335.815)
1 if experience pest, weed, animals	658.050
	(407.153)
1 if experience any asset loss	-73.969
	(329.327)
Observations	3,416
Number of Households	427
H_0: coefficients of shock variables are jointly zero (F-value)	4.45***
Household FE	Yes

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: The Impact of Extrinsic Incentive on Particularized Trust
Dependent Variable: Fraction of Endowment Transferred from the Trustor to the Trustee

Income variables are instrumented?	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Dyadic Characteristics						
Income correlation [#]	-2.328*	-2.110**			-2.318*	-2.383**
	(1.210)	(0.931)			(1.276)	(0.948)
1 if correlation is unidentified	0.829				2.035	
	(1.586)				(2.123)	
Years since knowing	0.335***	0.332***	0.331***	0.334***	0.338***	0.337***
	(0.073)	(0.074)	(0.072)	(0.074)	(0.072)	(0.076)
1 if relative	0.083	-0.118	-0.154	-0.112	0.045	-0.180
	(2.779)	(2.800)	(2.787)	(2.797)	(2.818)	(2.807)
1 if stranger	5.404*	5.299*	5.685*	5.120*	5.646*	4.955*
	(2.618)	(2.605)	(2.736)	(2.563)	(2.693)	(2.520)
1 if the participants' gender are the same	0.927	0.803	0.995	1.022	1.037	0.889
	(1.285)	(1.300)	(1.296)	(1.289)	(1.302)	(1.303)
1 if the same occupation category	-0.001	0.246	0.023	0.016	0.113	0.307
	(1.547)	(1.521)	(1.580)	(1.569)	(1.517)	(1.526)
1 if going to the same mosque	-1.194	-1.287	-1.134	-1.445	-1.148	-1.580
	(2.783)	(2.700)	(2.801)	(2.686)	(2.853)	(2.646)
Distance between houses (km)	1.947	2.246	2.700	2.382	2.138	2.191
	(5.345)	(5.298)	(5.336)	(5.374)	(5.437)	(5.349)
Trustee Characteristics						
S.D. of income [#]			7.573*	0.040	10.160**	-0.005
			(3.891)	(0.057)	(4.612)	(0.055)
S.D. × % bet in the risk preference game [#]			-0.116**	-0.007**	-0.114**	-0.007**
			(0.052)	(0.003)	(0.052)	(0.003)
% bet in the risk preference game	-0.002	-0.001	0.026*	0.011	0.026*	0.010
	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)
Generalized trustworthiness	-0.016	-0.016	-0.014	-0.019	-0.014	-0.020
	(0.013)	(0.013)	(0.012)	(0.014)	(0.012)	(0.014)
% allocated in the dictator game	-0.012	-0.014	-0.013	-0.011	-0.011	-0.010
	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Age of participant	-0.041	-0.049	-0.051	-0.055	-0.051	-0.064
	(0.035)	(0.038)	(0.036)	(0.037)	(0.034)	(0.040)
Schooling years of participant	-0.075	-0.098	-0.105	-0.075	-0.095	-0.090
	(0.093)	(0.106)	(0.100)	(0.091)	(0.096)	(0.100)
Land holdings	0.048	-0.170	0.010	0.116	0.291	0.204
	(1.347)	(1.338)	(1.287)	(1.490)	(1.287)	(1.507)
Liquid assets	-0.181	0.472	-1.954	0.366	-2.548	1.240
	(11.217)	(11.084)	(11.214)	(10.889)	(11.285)	(10.842)
1 if engaging in farming	1.360	1.082	1.261	1.553	1.058	1.264
	(1.593)	(1.622)	(1.651)	(1.645)	(1.611)	(1.646)
1 if engaging in processing	3.417**	2.827*	2.965**	3.261**	3.254**	2.919*
	(1.340)	(1.429)	(1.350)	(1.355)	(1.308)	(1.417)
Inundation of residence (Months)	-0.194	-0.304	-0.504	-0.246	-0.429	-0.239
	(0.795)	(0.840)	(0.799)	(0.821)	(0.780)	(0.835)
Observations	1,920	1,920	1,920	1,920	1,920	1,920
Number of trustors	279	279	279	279	279	279
Trustor FE	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1
[#] denotes endogenous variables.

Table 4: The Impact of Extrinsic Incentive on Particularized Trustworthiness
Dependent Variable: Fraction of Received Money Returned to the Trustor

Income variables are instrumented?	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Dyadic Characteristics						
Income correlation #	-0.126	-3.897*			-0.079	-4.272**
	(4.643)	(1.983)			(4.812)	(1.677)
1 if correlation is unidentified	6.838				0.736	
	(5.603)				(7.151)	
Years since knowing	-0.130	-0.152	-0.135	-0.145	-0.133	-0.139
	(0.108)	(0.104)	(0.113)	(0.095)	(0.115)	(0.094)
1 if relative	0.534	0.131	0.272	0.100	0.307	-0.033
	(3.613)	(3.475)	(3.603)	(3.436)	(3.652)	(3.428)
1 if stranger	-13.115**	-13.863**	-12.804*	-14.838**	-12.783*	-15.156**
	(6.030)	(5.916)	(6.215)	(6.173)	(6.221)	(6.094)
1 if the participants' gender are the same	3.154*	3.107*	2.698	3.638*	2.700	3.402*
	(1.736)	(1.723)	(1.606)	(1.728)	(1.602)	(1.769)
1 if the same occupation category	-3.914	-4.232	-4.083	-4.398	-4.020	-3.877
	(3.445)	(3.235)	(3.103)	(3.229)	(3.353)	(3.267)
1 if going to the same mosque	-1.027	-1.214	-1.141	-2.261	-1.143	-2.542
	(4.986)	(4.822)	(4.984)	(5.262)	(4.995)	(5.230)
Distance between houses (km)	-7.657	-7.566	-6.980	-7.209	-7.042	-7.513
	(6.854)	(6.807)	(7.072)	(7.261)	(7.029)	(7.186)
Trustee Characteristics						
S.D. of income #			-21.854	0.669**	-21.161	0.585**
			(14.764)	(0.258)	(13.635)	(0.263)
S.D. × % bet in the risk preference game #			0.008	-0.033*	0.009	-0.033*
			(0.213)	(0.017)	(0.215)	(0.017)
% bet in the risk preference game	0.055	0.054	0.044	0.107	0.045	0.106
	(0.071)	(0.070)	(0.102)	(0.072)	(0.100)	(0.072)
% allocated in the dictator game	0.280***	0.274***	0.279***	0.281***	0.280***	0.282***
	(0.061)	(0.062)	(0.060)	(0.064)	(0.060)	(0.063)
Age of participant	-0.033	-0.047	-0.025	-0.087	-0.026	-0.105
	(0.102)	(0.107)	(0.106)	(0.094)	(0.106)	(0.098)
Schooling years of participant	0.894*	0.857*	0.907*	0.932*	0.908*	0.905*
	(0.489)	(0.473)	(0.487)	(0.469)	(0.492)	(0.468)
Land holdings	0.124	-0.255	-0.096	0.392	-0.053	0.568
	(4.984)	(5.007)	(5.050)	(5.464)	(4.955)	(5.522)
Liquid assets	-1.071	-3.487	6.152	-2.830	6.172	-1.580
	(34.599)	(37.024)	(31.815)	(35.055)	(31.891)	(34.863)
1 if engaging in farming	4.886	4.326	6.478	5.421	6.430	4.927
	(3.505)	(3.362)	(3.742)	(3.612)	(3.845)	(3.491)
1 if engaging in processing	3.999	2.719	3.652	2.756	3.712	2.136
	(4.455)	(4.205)	(4.249)	(4.679)	(4.290)	(4.548)
Inundation of residence (Months)	3.627	3.110	4.094	3.241	4.119	3.251
	(3.691)	(3.590)	(3.612)	(3.509)	(3.702)	(3.541)
The amount received from trustor (Tk)	-0.036	-0.033	-0.038	-0.032	-0.038	-0.031
	(0.026)	(0.028)	(0.025)	(0.028)	(0.025)	(0.028)
Observations	1,920	1,920	1,920	1,920	1,920	1,920
Number of trustors	279	279	279	279	279	279
Trustor FE	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1
# denotes endogenous variables.

Table 5: The Impact of Extrinsic Incentive on Risk Sharing Arrangement among Villagers
Dependent Variable: Size of Risk Sharing Network in the Village

Income variables are instrumented?	Yes	Yes	Yes
	(1)	(2)	(3)
$\overline{Corr}^{\#}$	-9.809**		-8.689**
	(3.912)		(3.927)
1 if $\overline{Corr}$ is unidentified	-2.385		-5.938**
	(1.441)		(2.167)
$\overline{SD}^{\#}$		204.346**	236.275*
		(87.937)	(117.240)
Household Characteristics			
Age of household head	23.735	12.466	16.999
	(20.691)	(18.686)	(21.517)
Age squared	-23.404	-13.938	-16.369
	(23.348)	(20.183)	(23.669)
Schooling years of head	0.442**	0.357*	0.434**
	(0.185)	(0.172)	(0.182)
Household size	-0.427	-0.464	-0.341
	(0.607)	(0.512)	(0.528)
Land holdings	-2.113	-1.465	-2.172
	(1.416)	(1.417)	(1.572)
Liquid assets	78.373***	85.024***	79.356***
	(24.455)	(25.241)	(25.585)
1 if engaging in farming	0.727	1.452	1.982
	(2.749)	(2.324)	(2.326)
1 if engaging in processing	-1.308	-2.075	-1.656
	(2.348)	(2.328)	(2.281)
Inundation of residence (Months)	1.549	2.043	1.860
	(1.889)	(1.879)	(1.814)
Average of dyadic characteristics at the cluster level			
Years since knowing	0.224*	0.205	0.246*
	(0.122)	(0.125)	(0.131)
1 if relative	18.991**	19.597**	19.353**
	(6.730)	(7.384)	(7.029)
1 if stranger	1.947	-0.612	2.124
	(9.301)	(8.306)	(8.894)
1 if the same occupation category	-0.608	0.887	-1.568
	(3.894)	(3.867)	(3.953)
1 if going to the same mosque	2.190	2.983	2.497
	(3.143)	(3.391)	(3.362)
Distance between houses (km)	-12.271*	-11.444	-11.586
	(6.689)	(7.664)	(7.330)
Observations	279	279	279
Cluster FE	Yes	Yes	Yes

Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1
[#] denotes endogenous variables.

Table 6: The Impact of Extrinsic Incentive on Risk Sharing Arrangement among Villagers Dependent Variable: Credit from Neighbor, Friend, and Relative within 12 Months after the Cyclone

Income variables are instrumented?	Yes	Yes	Yes	Yes
	(1)	(2)	(3)	(4)
$\Delta Income^{\#}$	-0.010*	-0.024***	-0.013	-0.025**
	(0.005)	(0.007)	(0.009)	(0.010)
$\Delta Income$ x $\overline{Corr}^{\#}$		0.026***		0.026**
		(0.010)		(0.010)
1 if $\overline{Corr}$ is unidentified		0.001		0.001
		(0.006)		(0.007)
$\Delta Income$ x $\overline{SD}^{\#}$			0.012	0.004
			(0.026)	(0.028)
Household Characteristics				
Age of household head	0.083	0.110	0.080	0.109
	(0.081)	(0.085)	(0.082)	(0.087)
Age squared	-0.111	-0.133	-0.108	-0.132
	(0.094)	(0.098)	(0.094)	(0.099)
Schooling years of head	0.001	0.001*	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Household size	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Land holdings	-0.003	-0.004	-0.003	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)
Liquid assets	0.039**	0.028	0.038**	0.028
	(0.018)	(0.019)	(0.017)	(0.019)
1 if engaging in farming	0.000	-0.001	0.000	-0.001
	(0.003)	(0.004)	(0.003)	(0.004)
1 if engaging in processing	-0.004	-0.004	-0.004	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)
Inundation of residence (Months)	-0.004	-0.004	-0.004	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Average of dyadic characteristics at the cluster level				
Years since knowing	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
1 if relative	-0.023**	-0.019*	-0.023**	-0.019*
	(0.011)	(0.010)	(0.011)	(0.010)
1 if stranger	-0.117**	-0.108***	-0.114**	-0.108***
	(0.050)	(0.041)	(0.049)	(0.041)
1 if the same occupation category	-0.002	-0.002	-0.002	-0.002
	(0.005)	(0.005)	(0.004)	(0.005)
1 if going to the same mosque	-0.015**	-0.013**	-0.015**	-0.013**
	(0.007)	(0.006)	(0.007)	(0.006)
Distance between houses (km)	-0.034	-0.036*	-0.035	-0.036*
	(0.022)	(0.021)	(0.022)	(0.021)
Observations	279	279	279	279
Uncensored Observations	52	52	52	52
Cluster FE	Yes	Yes	Yes	Yes

Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

# denotes endogenous variables.

Appendix Table A1: The Impact of Extrinsic Incentive on Particularized Trust and Trustworthiness
(Wild bootstrap clustered standard errors)

Dependent Variable:	Trust		Trustworthiness	
Income variables are instrumented?	Yes	No	Yes	No
	(1)	(2)	(3)	(4)
Income correlation #	-2.318*	-2.383**	-0.079	-4.272**
	(0.096)	(0.032)	(0.944)	(0.012)
1 if correlation is unidentified	2.035		0.736	
	(0.42)		(0.968)	
S.D. of income #	10.160*	-0.005	-21.161	0.585
	(0.096)	(0.944)	(0.164)	(0.248)
S.D. × % bet in the risk preference game #	-0.114**	-0.007*	0.009	-0.033
	(0.044)	(0.096)	(0.984)	(0.136)
Observations	1,920	1,920	1,920	1,920
Number of trustors	279	279	279	279
Trustor FE	Yes	Yes	Yes	Yes

Wild bootstrap p-values proposed by Cameron et al. (2008) are in parentheses (500 bootstrap replications, with imposing the null hypothesis). *** p<0.01, ** p<0.05, * p<0.1
# denotes endogenous variables.