

Does stake size matter in trust games?

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Abstract

In a trust game conducted in rural Bangladesh, the proportion of money sent decreased significantly with the stake size. Still, even with very large stakes few followed the conventional economic prediction and sent nothing.

Key words: Trust; trust game; stake size; social capital; field experiment

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1. Introduction

The importance of trust and social capital is emphasised in recent literature on economic and social development; see e.g. Knack and Keefer (1997) and Zak and Knack (2001). However, the question of how to measure trust in an accurate and reliable way is still open to dispute. In this paper we test if the stake size matters in a standard trust game (Berg et al. 1995), which has become the most frequently used measure of individual trust, besides using survey questions.

There is considerable evidence from ultimatum games showing that stake size does not, in general, significantly affect the proportion of the endowment offered (Hoffman et al., 1996, Slonim and Roth, 1998, Cameron, 1999, Munier and Zaharia, 2002). Perhaps more surprisingly, Forsythe et al. (1994) and Carpenter et al. (2003) find no significant effect of the size of stake on allocations in dictator games either. One might then guess that the same would hold for trust games as well. However, in what as far as we know is the first study to test the effect of stake sizes in trust games, we found that the amount sent decreased significantly when the stake size was increased.

2. The trust game

Participants in the game are unknown to each other and divided into two groups and asked to act as a 'sender' or as a 'receiver'. The sender is given a certain amount of money and decides how much of it to send to the receiver, and how much to keep for herself. Any positive amount sent is tripled before it reaches the receiver, who then decides how much of the tripled amount of money received to be returned to the sender. With perfect information, the conventional (albeit Pareto-inefficient) sub-game perfect prediction of this game is that rational senders should send nothing,

since they would realise that a purely self-interested receiver has no incentive to send anything back. The fractions sent and returned are typically regarded as measures of trust and trustworthiness, respectively. Empirically, virtually all studies so far (including this one) have strongly rejected the conventional theoretical prediction.

This trust game was conducted among rural household heads in the districts Manikganj, Mymensingh and Netrokona of the Dhaka division in Bangladesh, at the end of a household survey. We applied ex-ante matching of first and second mover from different villages, and a random sample strategy based on every fourth household in the villages. The sample was divided into three groups, with 65 pairs in each group, using 40, 200 and 1000 Bangladesh Taka, respectively, as initial endowments for the senders. The highest amount is substantial and equals 4.8% of the GNI per capita; the same fraction in the US would correspond to 1683 USD. Each respondent also gets a participation fee of Taka 100 to complete the whole survey including the trust game.

The enumerators made sure a private interview environment, free from any possible interruptions, and read the instructions to the sender and also presented the outcomes of different examples of decisions, both related to the amount sent by the sender and the amount returned to them by the receiver, and took great care to make sure that the respondents understood the mechanisms involved.

The senders were given two thick envelopes, one containing their original endowment and one empty. The enumerator ensured confidentiality by turning his back to the sender while the sender put the chosen amount of money into the initially empty envelope. The sender was then asked to close the envelope and seal it with the provided stamp before returning it to the enumerator. The sender was instructed to do so even if he/she had decided to send nothing, and they were informed that they

would be paid within three days. At the end of the day, the enumerator handed the envelopes to the principal investigator, who opened them and put the tripled amount of money into new envelopes with a pre-matched household code.

The following day the enumerators were given these new envelopes ready to be delivered to the assigned receiver, and the enumerators followed similar procedures as in the senders' households. The receiver put the chosen amount to be returned in the previously empty envelope, while the enumerator turned his back to the receiver. The enumerator then returned the envelopes from the receiver to the principal investigator, who checked and wrote down the amount to be transferred back by another enumerator the following day.²

3 Results

Table 1 reveals that the average proportion sent clearly decreases with the stake size. There is no equally clear pattern for receivers, although high-stake receivers on average sent back less.

>>> TABLE 1

To test whether the obtained differences are statistically significant or not we conduct pair-wise comparisons by stake size, using the non-parametric Wilcoxon-Mann-Whitney test. That the amount sent in the high and the low stake treatments come from the same underlying distribution is strongly rejected ($P < 0.01$). The corresponding hypotheses are somewhat less strongly rejected for the amount sent in the low and the medium stake treatments ($P < 0.06$), and the medium and the high stake treatments ($P < 0.04$). Similarly, based on the non-parametric Kruskal-Wallis test, we can strongly reject ($P < 0.01$) the hypothesis that the proportion sent for all stakes

² The complete questionnaire is available from the authors upon request.

comes from populations with the same distribution. However, we cannot reject at 5% significance level that the proportions sent back in the different sub-samples come from populations with the same distribution, using either repeated pair-wise Wilcoxon-Mann-Whitney tests or the joint Kruskal-Wallis test. The average proportions sent and returned are quite similar to many other trust games, such as Berg et al. (1995). Since the average return ratio is higher than one third, it is on average profitable for senders to send money to the receivers.

The regression results in Table 2 show again a significant effect of the size of the stake on the proportion sent, i.e. also after correcting for other variables.

>>> TABLE 2

The amount sent increases with equivalence-scaled household income per capita.³ 26% of the sample had experienced at least one recent misfortune in terms of robbery/theft, mugging, personal assault, home attacked, land fraud, false accusation to criminal offence, or political harassment during the previous year. Such an experience decreases the amount sent.

Stated trust was measured on a six-level scale as the level of agreement with the statement “most people can be trusted,” where “strongly disagree” is quantified as 0 and “strongly agree” is quantified as 5. The average score equals 2.3, indicating a low level of average stated trust. As in Glaeser et al. (2000), there is no significant effect of stated trust on the amount sent. Confidence in public institutions was measured as a summation index for the following institutions: banks, NGOs, the military, the police, the judiciary, the government (executive branch), the local government, educational institutions, political parties, and rural power elites. “Hardly any confidence at all” is quantified as 0, “only some confidence” is quantified as 1,

³ Calculated as household income/[adults+ 0.5*children]^{0.75}. Sample mean = 20903 Taka/year.

and “great deal of confidence” is quantified as 2. The sample mean equals 14.3 (out of 20). Such confidence does not increase, but weakly reduces, the amount sent. Neither illiteracy (35% of the sample) nor an education above high school (13% of the sample) affected the amount sent.

For the proportion sent back, none of the parameters associated with the explanatory variables, including the stake-size dummy variables, are statistically significant at conventional levels. The latter is consistent with the results of Forsythe et al. (1994) and Carpenter et al. (2003) mentioned earlier, since this part of the trust game can be seen as a conditional dictator game. The result of the interaction effect in the last reported model implies that when lower levels are sent, relatively more is returned in the low and medium stake cases, and vice versa. Thus, senders seem to be rewarded for sending a large proportion in the high-stake case.

4. Conclusion

A possible explanation to our finding that the amount sent significantly decreases with the stake size is linked to the suggestion by Karlan (2004), namely that the first part of the trust game largely measures risk preferences, rather than trust. That higher stakes induce lower amounts to be sent in trust games is then consistent with Binswanger (1980) and Holt and Laury (2002), who found that people tend to become more risk averse at higher stakes. Moreover, we found that the amount sent increases significantly with the respondent’s income, and it is also reasonable that people’s willingness to take a risky gamble increases with their income.

Finally, using very large financial incentives offers no rescue for the conventional economic predictions that the senders would send nothing, and that the

receivers, if they received anything, would send back nothing. Very few acted in this way, and a majority of both senders and receivers sent substantial amounts.

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Table 1. Average proportion sent and average proportion returned.

	Low stake	Medium stake	High stake	Total
Proportion sent	0.56	0.46	0.37	0.46
Proportion returned	0.45	0.46	0.37	0.43
Proportion of zero sent	0.06	0.06	0.03	0.05
Proportion of zero returned	0.07	0.03	0.08	0.06

Table 2. Trust and trustworthiness: OLS estimates. Standard errors in parenthesis.

Dependent variable	Proportion sent	Proportion returned	Proportion Returned
Medium stake endowment (200 taka)	-0.091* (0.054)	-0.006 (0.062)	-0.087 (0.134)
High stake endowment (1000 taka)	-0.186*** (0.055)	-0.096 (0.066)	-0.333** (0.128)
Most people can be trusted	-0.005 (0.015)	0.010 (0.020)	0.010 (0.019)
Confidence in public institution index	-0.011* (0.006)	0.007 (0.008)	0.007 (0.008)
Has experienced a recent misfortune	-0.101** (0.050)	-0.076 (0.060)	-0.085 (0.060)
Age in years	0.001 (0.001)	0.003 (0.002)	0.002 (0.002)
Illiterate	0.030 (0.049)	-0.015 (0.061)	-0.010 (0.060)
Educated above high school level	-0.046 (0.074)	-0.015 (0.074)	-0.016 (0.073)
Equivalence scaled income per capita	0.292*** (0.113)	0.168 (0.109)	0.118 (0.110)
Proportion sent by the senders		-0.028 (0.089)	-0.249 (0.163)
Proportion sent × medium stake			0.127 (0.222)
Proportion sent × high stake			0.507** (0.223)
Constant	0.610*** (0.134)	0.183 (0.160)	0.336* (0.176)
R squared	0.125	0.066	0.098
Number of observations	188	175	175

Note. Superscripts *, **, *** denote statistical significance at 10%, 5%, and 1% levels, respectively.