

**Is there Reciprocity in a Reciprocal-Exchange Economy?
Evidence of Gendered Norms from a Slum in Nairobi, Kenya**

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Norms of reciprocity help enforce cooperative agreements in bilateral sequential exchange. We examine the norms that apply in a reciprocal-exchange economy. In our one-shot investment game in a Nairobi slum, people adhered to the norm of “balanced reciprocity,” which obligates quid-pro-quo returns for any level of trust. The norm is gendered, with people more likely to comply when confronted with women rather than men, and differs from “conditional reciprocity,” prevalent in developed countries, according to which greater trust is rewarded with proportionally larger returns. Which norm prevails has implications for trust, trustworthiness, and gains from trade realized in bilateral exchange.

Key Words: Reciprocity, trust, gender, developing countries. (JEL C72, C91)

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I. Introduction

Norms of reciprocity induce people to voluntarily cooperate with each other. Reciprocity helps explain why people respond to above-market clearing wages with above-standard effort (e.g., Akerlof, 1982; Fehr et al., 1998), contribute to public goods (e.g., Ledyard, 1995; Croson, 2000) and reward trust with trustworthiness even in one-shot interactions (e.g., Berg et al., 1995; Ashraf et al., forthcoming). The norm of reciprocity helps parties achieve efficient outcomes even if contracts are incomplete and legal enforcement is absent (Fehr et al., 1997; Ostrom, 1998).

Reciprocity is an internalized norm, inducing people to respond to kindness with kindness and to unkindness with unkindness, even if it is not in a person's material self-interest to do so.¹ It differs fundamentally from cooperation in repeated games where reputational concerns can enforce "cooperation" (e.g., Kreps et al., 1982; Fudenberg and Maskin, 1986). Many believe that reciprocity is a universal social norm. For example, Gouldner, one of the first to point out the importance of this norm, wrote: "A norm of reciprocity is, I suspect, no less universal and important an element of culture than the incest taboo..." but its "concrete formulations may vary with time and place" (Gouldner, 1960, pp.171).

We examine the reciprocity norms in a context different from the typical environment studied so far, a slum in Nairobi, Kenya,² and what efficiency implications such norms might have. Our context is characterized by informal enforcement due to repeated interactions typical of "reciprocal-exchange economies." In a reciprocal-exchange economy, people exchange goods, services or money in repeated interactions in order to insure against income and cost shocks and

¹ A number of recent theoretical models in economics suggest proximate mechanisms driving such behavior (e.g., Rabin 1993, Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Charness and Rabin 2002, Dufwenberg and Kirchsteiger 2004, Falk and Fischbacher 2006). Evolutionary models of reciprocity include, for example, Gintis (2000) and Bowles and Gintis (2000).

² Carpenter, Daniere and Taskahashi (2004) conducted public goods games in urban slums in Thailand and Vietnam.

smooth consumption over time (e.g., Rosenzweig, 1988; Rosenzweig and Stark, 1989; Kranton, 1996). If the environment shapes norms of reciprocity, we might expect Nairobi slum dwellers to adhere to different norms than the person typically studied in the developed world. Evolutionary theories of cultural transmission suggest that such processes are self-enforcing as people adopt the norms and preferences most frequently held in a given environment (e.g., Boyd and Richerson, 1985; Bowles and Gintis, 1998).³

To measure reciprocity and distinguish it from behavior motivated by repeated game incentives, we focus on one-shot interactions between strangers. We employ a one-shot investment game between anonymous parties to represent a bilateral sequential exchange situation (Berg et al., 1995). If people have internalized a norm of reciprocity, it should apply even without the shadow of the future.

We exclude most important contextual features that may affect behavior in naturally occurring settings in order to measure the internalized norm of reciprocity as precisely as possible but focus on one: gender. Field research in reciprocal-exchange economies suggests greater norm compliance, the needier one's counterpart is. More specifically, repayment of loans is more likely, the needier is the lender (Udry 1994). Thus, one might expect that the norm prevalent in these environments is gendered: typically, including in our sample, women are substantially needier than men (e.g., Central Bureau of Statistics, Kenya 2000). Clearly, gender is not only a proxy for need – other gender-based preferences such as chivalry or solidarity might affect norms or norm compliance as well. Our approach allows us to examine whether the norms of reciprocity prevalent in a reciprocal-exchange economy are gendered but not why.

³ Bohnet et al. (2001) present a theoretical model of how environmental characteristics may affect behavior by influencing norms of reciprocity.

In the investment game, first and second movers are each endowed with an amount of money, S . The first mover can send any amount $X \leq S$ to the second mover. X is multiplied by $k > 1$ by the experimenter to capture the efficiency increasing potential of this transaction. Second movers thus receive kX and then decide how much of it, $Y \leq S + kX$, to return to their first mover. The final payoffs are $S - X + Y$ for the first mover and $S + kX - Y$ for the second mover. X is commonly referred to as “trust”, Y/X measures “trustworthiness” (trustworthiness is precluded when first movers send zero), and the relationship between trust and trustworthiness indicates “reciprocity”. A second mover is said to behave according to a norm of *conditional reciprocity* if trustworthiness increases with trust – i.e., if the return ratio Y/X is increasing in X (e.g., Camerer and Fehr, 2004). A second mover behaves according to a norm of *balanced reciprocity* if trustworthiness does not vary with trust, i.e., if the return ratio $Y/X = 1$ for all values of X .

Investment game experiments conducted in the developed world typically find support for conditional reciprocity: the more trust second movers are offered, the higher the return ratio. Thus, often the money-maximizing strategy is to send everything (e.g., Pillutla et al., 2003 for American subjects). Based on our understanding of informal contract enforcement in reciprocal-exchange economies, we expect not to observe a norm of conditional reciprocity in the Nairobi slums. Rather, in reciprocal-exchange economies, contracts are informally enforced by norms of balanced reciprocity, which obligate future quid-pro-quo repayment of (often interest-free) loans (e.g., Platteau, 1997; Thomas and Worrall, 2002). If this norm were internalized, trust and trustworthiness should not be related in the investment game. Second movers should return exactly what was sent, making the first mover whole independent of how much was sent, and first movers should anticipate this. If Nairobi slum dwellers adhere to (expectations of) the norm of balanced reciprocity in our one-shot “investment game”, the game we use is clearly a misnomer in this context because the expected return on trust is zero. The norm of balanced

reciprocity, and expectations thereof, leaves amounts sent completely up to first movers' intrinsic willingness to comply with the norm and/or their social (and risk) preferences.⁴

Which norms prevail has implications for the gains from trade realized in bilateral exchange. If social concerns do not compensate for the lack of expected material returns under the norm of balanced reciprocity, and if under the norm of conditional reciprocity the return ratio Y/X is monotonically increasing in X and greater than one for some value of X , then the norm of balanced reciprocity induces less trust than the norm of conditional reciprocity. The paper is organized as follows. In Section II, we describe the experimental context and the design. Section III introduces a conceptual framework. Section IV presents our experimental results. Section V compares our results with similar studies around the world and discusses the implications of these results for development. Section VI concludes.

II. Experimental Context and Design

We conducted our study in the Kwa Reuben area of the Embakasi slum in Nairobi, Kenya, in July of 2004. In 2000 the population of Kwa Reuben was estimated to be approximately 25,000 but is said to have doubled since then largely as a result of rural-urban migration. Sixty-eight percent of participants in this research spent most of their life outside of Nairobi. Slum residents have limited access to basic health and education facilities and report employment and water to be their two most important needs (APHRC, 2000). Those who have a job earn very low incomes with most earning between \$30 and \$90 per month (Mitullah, 2003). The slum is known to be an unsafe, hostile environment with rampant theft and gang activity and little law enforcement.

⁴ See, e.g., Sugden (1984) for compliance with norms of reciprocity and Fehr and Schmidt (2002) for a survey of the literature on social preferences.

The Kwa Reuben slum can be characterized as a “reciprocal-exchange economy”. Informal transfers and loans are an important source of support for slum residents. In the pre-experimental household survey 71 percent of our sample reported having received transfers from family, friends or neighbors in the previous month, and about 44 percent of the sample reported having borrowed or received money from an individual the last time they were in need of money. Formal lending is not widely practiced: 87 percent of the sample reported that they have never borrowed money from a bank, micro-credit institution or local commercial moneylender (shylock).

In our sample, women earn \$35 (Ksh 2721) per month and men \$55 (Ksh 4351) per month from employment, on average. Women are on average supporting 1.68 children compared to only 1.22 children supported by men.⁵ Thus, as in Kenya generally, not only are women’s incomes lower, but the demands on that income are higher (e.g., Anderson and Baland, 2002; Hoddinott and Haddad, 1996).

270 subjects participated in our study. Subjects were randomly recruited from one household every fifth structure within all of the neighborhoods of Kwa Reuben. Subjects first completed a pre-study questionnaire on demographic characteristics, then participated in our experiments and, finally, completed a post-experimental questionnaire on social norms.⁶ We conducted 10 sessions, two with all-female pairs, two with all male-pairs, three with female first and male second movers and three with male first and female second movers.⁷ Each experimental session lasted approximately two hours.

⁵ This difference is significant even when controlling for marital status ($p < .05$). Unless otherwise specified, we use non-parametric Mann-Whitney U tests to examine differences in means.

⁶ Upon invitation to participate in the research, each respondent was asked to provide oral consent for both the surveys as well as the experimental session in which they would participate. Upon completion of the pre-experimental survey, each respondent was invited to a “workshop” a couple of days later at the Kwa Reuben Community Center. Ninety-three percent of people surveyed participated in one of our workshops.

⁷ Our initial goal was to run 16 sessions, but due to security issues our research had to be stopped prematurely.

Both first and second movers were endowed with S=50 Kenyan Shilling (Ksh), which they received in ten Ksh 5 coins. This corresponded to about one-quarter to one-third of a day's income, \$0.65, or approximately \$1.70 in purchasing power parity.⁸ Our intention was to adhere to the experimental economics research norm of compensating people for the opportunity cost of their time. However, we acknowledge that especially for those who have no income, Ksh 50 may not be a trivial endowment.⁹ Any amount X sent by the first mover was doubled by the experimenter. Final investment game earnings thus were $Ksh\ 50 - X + Y$ for the first mover and $Ksh\ 50 + 2X - Y$ for the second mover.¹⁰

The experiment was run as follows: at the beginning of the experiment, participants were randomly assigned to the role of first or second mover. All participants received an “endowment envelope” containing the endowment of ten Ksh 5 coins and their code number slip, and first (second) movers received a “transfer envelope” (“return envelope”) containing just their code number slip.¹¹ They were seated in two rows facing each other with first movers in one row and second movers in the other row. Thus in mixed gender sessions, participants would find themselves seated in a row of members of their own sex, facing a row of members of the opposite sex. They were not allowed to communicate with one another.

The experiments were conducted in Swahili and run single-blind, that is, subjects were randomly paired with someone sitting in the other row but did not know with whom.¹² Upon

⁸ Based on a real exchange rate of Ksh 79 per 1 USD and purchasing power adjusted exchange rate of Ksh 30 per 1 International Dollar (World Bank, 2003).

⁹ Johansson-Stenman et al (2004) vary endowments to first movers between 3 and 80 USD in purchasing power parity among household heads in Bangladesh and find that amounts sent decrease monotonically as the endowment increases, but the fraction returned declines only for very high stakes. Sutter and Kocher (2004) vary endowments to first movers between 2 and 8 Euros among university students in Austria and find no effect of scale on amounts sent or fractions returned.

¹⁰ We also conducted a public goods game (not reported here). We varied the order in which the games were played and controlled for order in our regressions. First movers were only informed of the results and received their combined earnings after both games had been completed.

¹¹ Note that in the experiment, the envelopes were not labeled. We only use labels here for ease of understanding.

¹² The instructions are available from the authors upon request.

completing tests of understanding, participants made their decisions one at a time by entering a private office in which the experimenter was located. In the office, each first mover placed the amount $X \leq 50$ she wanted to send to her second mover in the transfer envelope and handed it to the experimenter. She was instructed to put the remaining money in her endowment envelope, $50 - X$, in her pocket to prevent other participants from discerning how much money she had sent to her counterpart. The experimenter recorded the amount sent in the transfer envelope and doubled it.

When all first movers had made their decisions, second movers entered the office one at a time to receive their respective transfer envelope with the doubled amount $2X$ sent by their first mover. The first mover's code number slip was removed from the transfer envelope before being handed to the second mover, in order to maintain the anonymity of the second mover's partner. Second movers then placed $Y \leq 50 + 2X$ in their return envelope and handed it to the experimenter to be returned to the first mover. They were instructed to consolidate the remaining money $50 + 2X - Y$ from their endowment and transfer envelopes and hide it in their pockets.

After second movers made their decision, but before the amount Y was returned to the first movers, all participants filled out the post-experimental questionnaire, which we used to collect additional information on what subjects perceived to be the social norm and how norm compliance was related to individual and session characteristics. We employed a "hypothetical strategy method" in which first movers were asked to indicate their expected returns for each amount sent, and second movers were asked to report their intended amounts returned for each possible amount sent.¹³ The questionnaire also asked people how many participants in a given

¹³ This method differs from the "strategy method" in that none of the participants' responses are realized (Brandts and Charness, 2000). Since first movers had not yet received Y from their counterpart, their expectations were not informed by second mover actual behavior. Second movers, having already made their decision, knew their actual behavior for one value of X , but were not required to calibrate their answers to be consistent with their actual behavior for the amount X they received.

session they knew by name. While an imperfect measure of social distance, given that we wanted to preserve subjects' anonymity, this variable may help us understand the extent to which familiarity with others affected norm compliance.

After completing the post-experimental questionnaire, subjects collected their earnings in the experimenter's office by presenting their code number slip. On average, first movers earned Ksh 47 (94% of the endowment) and second movers earned Ksh 68 (136% of the endowment) in the investment game. Thus on average trust did not pay.

III. Conceptual framework

Trust is defined as the amount sent, X , and trustworthiness as the amount returned divided by the amount sent for positive amounts sent, Y/X . The relationship between X and Y/X , denoted by $\partial(Y/X)/\partial X$, gives us reciprocity. According to the Nash prediction, assuming selfish money-maximizing preferences and common knowledge of rationality, we should observe zero returns, $Y^*=0$, and no trust, $X^*=0$, which precludes any trustworthiness and reciprocity. However, results from the investment game the world over reject this hypothesis, with the majority of subjects sending and returning positive amounts (Camerer, 2003). In the developed world, returns in the investment game typically conform to a norm of conditional reciprocity, i.e., $\partial(Y/X)/\partial X > 0$ (e.g., Camerer and Fehr, 2004). We make two predictions: we expect the norm of balanced reciprocity, $\partial(Y/X)/\partial X = 0$, rather than conditional reciprocity to prevail in a reciprocal-exchange economy, and compliance with the norm to be gendered. In accordance with the literature, we examine a reduced-form regression model¹⁴:

¹⁴ In order to address the potential problem of correlated errors with X being on both sides of the equation, we also estimate the following equations as a robustness check: for second movers, $Y = \delta_4 * X + \beta_4 * X^2 + \gamma_4 * \text{Female 1}^{\text{st}} \text{ Mover} + \zeta_4 * \text{Female 2}^{\text{nd}} \text{ Mover} + \eta_4 * \text{Female} * \text{X} * \text{Female} + \theta_4 * \text{controls}$; and for first movers: $E(Y) = \delta_3 * X + \beta_3 * X^2 + \gamma_3 * \text{Female 1}^{\text{st}} \text{ Mover} + \zeta_3 * \text{Female 2}^{\text{nd}} \text{ Mover} + \eta_3 * \text{Female} * \text{X} * \text{Female} + \theta_3 * \text{controls}$. These regressions are run without a constant because the returns are zero in the absence of any amount sent.

For second movers:

$$Y/X = \alpha_2 + \beta_2 * X + \gamma_2 * \text{Female 1}^{\text{st}} \text{ mover} + \delta_2 * \text{Female 2}^{\text{nd}} \text{ Mover} + \varepsilon_2 * \text{controls.}$$

For first movers:

$$E(Y/X) = \alpha_1 + \beta_1 * X + \gamma_1 * \text{Female 1}^{\text{st}} \text{ Mover} + \delta_1 * \text{Female 2}^{\text{nd}} \text{ Mover} + \varepsilon_1 * \text{controls.}$$

In the empirical analysis, we also control for gender interactions.

Hypothesis 1: Balanced reciprocity

For balanced reciprocity and expectations thereof to apply, we should observe no relationship between amounts sent and (expected) return ratio, i.e., $\beta=0$. Second movers do not condition fractions returned on amounts sent (and first movers do not expect a relationship between expected fractions returned and amount sent). Second movers just return the amount sent, and first movers anticipate this. The balanced reciprocity norm leaves amounts sent up to first movers' social and/or norm compliance preferences. Balanced reciprocity is in contrast to conditional reciprocity where second movers reward trust by returning larger fractions of the amount sent, Y/X , the more the first movers send, i.e., $\beta>0$, and where first movers expect a positive relationship between amounts sent and expected return ratios.

Theoretically, a norm of conditional reciprocity where Y/X monotonically increases in X , induces higher levels of trust and efficiency than the norm of balanced reciprocity, if we assume that $Y/X>1$ for some value of $X \leq \text{Ksh}50$, and the norms are common knowledge. We assume that we have selfish and socially/intrinsically motivated subjects in the population of first movers and that these types are equally distributed in conditional-reciprocity and balanced-reciprocity environments. In this case, rational, risk-neutral money-maximizing first movers should send everything to maximize their earnings in a conditional-reciprocity environment. With a norm of balanced reciprocity where $Y/X=1$ and $E(Y/X)=1$ for positive amounts sent, risk-neutral money-maximizers should be indifferent between sending something or nothing. Socially and/or

intrinsically motivated first movers send a positive amount in both environments, depending on the specific preferences they have. Thus, it is the selfish money-maximizers who are responsible for our prediction: they should send everything when conditional-reciprocity norms apply but nothing in balanced-reciprocity environments, leading to higher levels of trust and efficiency in the former than the latter environment.

Hypothesis 2: Gendered compliance with the norm of reciprocity

If compliance with the norm of reciprocity is gendered, we should observe $\gamma > 0$: second movers should exhibit greater compliance to the norm when confronted with a female rather than male first mover. Accordingly, female first movers should expect to be rewarded with more trustworthiness than male first movers. In the context of the Nairobi slum, gender may be a proxy for need, albeit imperfect - the correlation between being female and monthly income is significant but small, $r = -0.27$. Field evidence from developing countries suggests that needy lenders are more likely to be repaid (Udry 1994). Also in previous experiments in developed countries, people tended to behave more pro-socially towards needier counterparts (e.g., Eckel and Grossmann, 1998).

Additional channels of influence include statistical discrimination, based on expected gender differences in trustworthiness (Buchan et al. 2003), and tastes for discrimination unrelated to need (e.g., chivalry for male-female pairs or solidarity for same-gender pairs as found by Eckel and Grossman, 2001). We are able to exclude the statistical discrimination hypothesis by examining first movers' expectations. However we cannot distinguish tasted-based discrimination from perceptions of one's counterpart's need. We include a gender interaction term in order to fully explore all gender effects. Udry (1994) also found that debtors are less

likely to repay, the needier they are. Thus, while women may benefit from more norm compliance towards them, they themselves could be less likely to comply with the norm.

We include three control variables, the fraction of participants a person knew by name in a given experimental session to measure social distance, income, and whether a person has lived most of his or her life in a slum. Clearly, our social distance measure is imperfect but probably the best one available, since we did not want to reveal our subjects' identities. The more people one knows, the more one might care about their well-being. Experimental results suggest that a decrease in social distance increases other-regarding behavior (e.g., Bohnet and Frey, 1999). We can rule out the possibility that first movers become more optimistic about second movers' likely returns, the more people they know, by examining expectations. (Expected) trustworthiness should be higher, the larger the fraction of people a person knows.

We include second movers' income to get some sense for how their own need affects their behavior. However, as they have no information on their counterpart's need (apart from gender), this does not allow us to control for perceptions of relative need that are independent of gender. Previous evidence on the role of own income is not conclusive (see, e.g., Ashraf et al., forthcoming). Finally, whether a person has spent most of his/her life in a slum may give us an indicator for their past experiences with trust and trustworthiness. Given that the slum is known to be an unsafe, hostile environment with rampant theft and gang activity, we expect trustworthiness to be lower among those who have spent most of their lives in the slum.

IV. Experimental Results

We first present an overview of our results, compare them with other findings in the literature, and then proceed to testing our hypotheses.

Overview

Table 1 in the Appendix presents the summary statistics of the experimental data and the demographic characteristics. On average, first movers sent Ksh 15 or 30 percent of their endowment of Ksh 50 to their second movers (N=134). Second movers returned Ksh 12.32 on average, which corresponds to 82% of the amount sent (N=134). Thirteen percent of the first movers sent nothing. The modal amount sent, chosen by 25 percent of the first movers, was Ksh 5, closely followed by Ksh 10, chosen by 19 percent. Among the second movers who received positive amounts, 12 percent returned nothing; the remaining 88 percent returned on average 98 percent of the money sent to them on average (N=116). The modal response was to return 100 percent of the amount sent.

Even though our data generally do not support the traditional Nash prediction of no trust ($X=0$) and no returns ($Y=0$), the mean amounts sent are substantially lower than the standard results in investment games run with student subjects in developed countries. Indeed, sending nothing was the modal response for male first movers paired with male second movers (36 percent). Camerer (2003) reports in his survey of experimental results that typically first movers send about 50 percent of their endowment. Cardenas and Carpenter (2005) survey the evidence for developing countries. Trust levels so far reported in African countries are generally between 40 and 45 percent: members of the Orma tribe in Kenya sent 44 percent of their endowment (Ensminger, 2000), villagers in Zimbabwe sent 43 percent of their endowment (Barr, 2003), Ghanaian manufacturing employees sent 45 percent of their endowment (Barr, 2004), and South-African university students sent 43 percent of their endowment (Ashraf et al., forthcoming). In a recent study with younger subjects, high school pupils in South Africa sent similarly low amounts as the Nairobi slum dwellers, namely 32 percent of their endowment (Burns, 2004).¹⁵

¹⁵ Note that trust tends to increase with age (e.g., Sutter and Kocher, 2004).

Comparing our results with studies in which amount sent was doubled ($k=2$), members of micro-lending groups in Peru sent 46 percent (Karlan, 2005), university students in Brazil sent 56 percent (Lazzarini et al. 2005), a representative sample of Dutch citizens sent 44 percent (Bellemare and Kröger, forthcoming), and American university students sent 83 percent (Glaeser et al. 2000). The level of trust in Nairobi slums is among the lowest ever reported.

Average trustworthiness levels in Nairobi slums differ less from other findings. There is no clear trend in trustworthiness between developed and developing countries, but our findings fall within the normal range. On average, second movers typically return about the amount sent (Camerer, 2003). However, looking at the distribution of choices, in addition to returning what was sent, a return fraction equalizing the payoffs is a commonly observed response in most samples (e.g., Buchan et al., 2003). If our second movers had wanted to split the pie equally, they would have had to return $Y/X=1.5$, a strategy chosen only by three percent of second movers. In experiments in Africa, villagers in Zimbabwe have been found to be among the most trustworthy subjects examined so far: they returned 128 percent of the amount sent (Barr, 2003). South African students returned basically the same fraction of the amount sent as our sample here, 82 percent (Ashraf et al., forthcoming). Members of the Orma Tribe in Kenya returned only 54 percent, and South African pupils returned 70 percent (Cardenas and Carpenter, 2005).

Overall, efficiency increases by 15 percentage points compared to the equilibrium prediction of no trade. In equilibrium, both, first and second movers leave the experiment with their endowment of Ksh 50 each. First movers earned Ksh 47 and second movers Ksh 68, on average, increasing the size of the pie from Ksh 100 to Ksh 115. Comparing to other investment game experiments, where the amount of money sent, X , was doubled and both players were endowed, this efficiency gain is smaller than what has been realized elsewhere. With representative samples of Germans and Dutch, for example, Fehr et al. (2002) and Bellemare and

Kröger (forthcoming) found respectively an efficiency increase of 22 percentage points. In Peru, Karlan (2005) reported an increase of 23 percentage points with a sample of members of micro finance groups. The most striking efficiency gain of 83 percentage points was found in the US with Harvard undergraduates (Glaeser et al., 2000), although the experimental conditions were quite different from ours (e.g., people knew who their counterpart was).

Result 1: Balanced reciprocity towards female first movers; negative reciprocity towards male first movers.

The modal response for second movers was to adhere to the norm of balanced reciprocity by returning 100 percent of the amount sent. However, norm adherence is mainly due to second movers who are paired with a female first mover. Second movers return exactly 100 percent of the amount sent 24 percent of the time when paired with male first movers compared to 45 percent of the time when paired with female first movers. Female first movers were rewarded with more trustworthiness than male first movers by both male and female second movers ($p < 0.05$). Figure 1 presents the distribution of choices graphically by the gender of the first mover.

< Figure 1 about here >

In order to examine our hypotheses more precisely, we perform ordinary least squares regressions of the (expected) return ratios on the amounts sent and include the gender pairings as independent variables, controlling for social distance, the log of previous month's income, and whether one has spent most of his or her life living in a slum ("slum"). We focus on the 116 first mover-second mover pairings in which the second mover received a positive amount and thus had a decision to make.

Table 2 reports the results for trustworthiness (Appendix). Standard errors have been adjusted for clustering at the session level. Column 1 of Table 2 shows that when including our complete sample, the fraction returned is significantly declining in the amount sent. For every additional Shilling sent, second movers returned about 1.8 percentage points less. The negative relationship remains robust when including additional control variables in Columns 2 through 6. Controlling for amount sent, we see that generally female first movers were rewarded with more trustworthiness than male first movers and female second movers returned smaller fractions than male second movers.

In Column 4, we add social distance, the log of previous month's income, and slum.¹⁶ Column 5 controls for order effects and Column 6 adds session dummies. Social distance and log of previous month's income did not affect return ratios or the coefficients on the gender dummies, indicating that gender differences in the return ratio are not mediated by own need. Whether a person has spent most of her life in the slum (rather than in non-slum parts of Nairobi or outside of Nairobi) is our most relevant control variable. People who have spent most of their lives in a slum returned approximately 40 percentage points less than people who have recently moved to the slum. This suggests that the experience of living in a slum may either condition people to be less trustworthy. Alternatively, it may be due to a selection effect, with the less trustworthy ending up in slums and staying there longer than others. We believe that the selection effect is less relevant, however. The average age of those who spent most of their lives in the slum is 24 and the average number of years spent in the slum is 12, indicating that those who have spent most of their lives in the slum arrived to the slum as children accompanying an adult rather than on their own accord.

¹⁶ In other specifications without clustering at the session level, we included age, education, and ethnicity, but none of these controls are significant, and our main results do not change.

In Column 7, we regress absolute amounts returned, Y , on X and X^2 , otherwise replicating the regression in Column 4. The results are not affected – the coefficient on X is not significantly different from 1, the coefficient on X^2 is significantly negative. Our gender controls have the same sign as before but are no longer significant while slum is still significantly negatively associated with returns.¹⁷

To further examine the negative relationship between trust and trustworthiness, we split our sample by first mover gender. Figure 2 shows that the downwards-sloping reciprocity curve is mainly due to second movers paired with male first movers: they return smaller fractions, the larger is the amount sent. Second movers paired with female first movers return about the amount sent to them, independent of the amount sent.

< Figure 2 about here >

Table 4 (Appendix) presents the regressions by first mover gender. Due to our small sample size we restrict our controls to gender and experience in a slum. Our results are robust to the inclusion of these controls. The negative relationship is significant for male but not for female first movers, although the difference in the slopes of the reciprocity curves by the gender of the first mover is not significant. Our results support Hypothesis 1 for second movers paired with female but not with male first movers. Norm compliance is gendered, supporting Hypothesis 2. Our gender findings differ from the typical results in developed countries where there are either no gender differences in trust and trustworthiness (e.g., Croson and Buchan, 1999 for the US, Fehr et al., 2002 for Germany) or where women are more trustworthy but less trusting than men (e.g., Buchan et al., 2003 for the US). Buchan et al. (2003) also examined the

¹⁷ In other specifications using a Tobit model with left censoring, we find similar results. Trustworthiness is negatively associated with trust, and this result is robust to all of our controls. People return more to women than to men, and having spent most of one's life in a slum is negatively associated with trustworthiness.

effect of gender interactions but, in contrast to our results, found that in the United States trust and trustworthiness were not related to one's counterpart's gender.

Note that our regressions exclude second movers who did not receive any money. Comparing second movers who were sent nothing (N=18) with second movers who were sent positive amounts (N=116), we find no significant differences between the two sub-samples for most of our control variables. The most notable exception is gender. Men were more likely than women to receive nothing—especially men paired with male first movers. Female second movers paired with men were the least likely to receive nothing. Because the gender distribution in our full sample slightly over-samples men, the exclusion of second movers who received zero serves to balance the gender distribution.

Result 2: Expectations of balanced reciprocity for all

Figure 3 shows the distribution of expected return ratios for the entire sample and also by the gender of the first mover. A majority expected second movers to adhere to the norm of balanced reciprocity: they expected to be made whole. While this in fact was the second movers' modal response, first movers were too optimistic about amounts returned, particularly for large amounts sent. Still, of the first movers sending a positive amount, only 20 percent expected to get back more than they sent, 60 percent expected to break even, and another 20 percent expected less than they sent. This is a remarkable result. Of those who sent a positive amount, only one-fifth expected to make money in this game. All others, 80 percent, were willing to transfer money at no or some cost to themselves, suggesting that they did not perceive this to be an investment decision.

< Figure 3 here >

Table 4 reports the regression results for expectations of return (Appendix). In support of Hypothesis 1, balanced reciprocity, expected trustworthiness is generally not related to amount sent. We find a weak positive relationship, significant at the 10%-level, in Columns 4 and 5. Women expected to get back more than men (particularly from men). Social distance is negatively associated with expectations but only marginally significant ($p < .10$).¹⁸

When we use expected absolute amounts returned, $E(Y)$, as dependent variable in Column 7, the coefficient on X is not significantly different from 1 and the coefficient on X^2 is zero. In other words, first movers expected that a one Shilling increase in amounts sent would yield a return of about one additional shilling, which would make them whole irrespective of how much they sent. Female first movers expected higher returns from male second movers than male first movers.

Our results generally support Hypothesis 1 for expectations of reciprocity: on average first movers expect to break even. Our expectations data also provide some support for Hypothesis 2: although there is no main first mover gender effect, there is a significant gender interaction effect with female first movers paired with male second movers expecting significantly higher returns than male first movers paired with male second movers.

Result 3: Reported balanced reciprocity

Figure 4 compares strategy responses to observed behavior and first movers' expectations. Strategy responses are similar to first movers' expectations for the amounts they sent in the experiment but differ from second movers' return ratios for large amounts sent. Thus, first movers' expectations and strategy responses almost perfectly conform to the norm of

¹⁸ Estimating the same equations using a Tobit model with left censoring produces similar results. Expected trustworthiness is not related to trust. Women expect higher fractions returned than men ($p < .10$).

balanced reciprocity. Second movers revealed, through their strategy responses, an *intention* to adhere to the balanced reciprocity norm, but, especially when paired with male first movers, their actual return ratios exceeded the norm when it was cheap to do so and fell below the norm when it was costly to comply with it. The changing adherence to the norm according to the cost of adherence is reflected in the slope of the actual return ratio line.

< Figure 4 here >

Returning to Table 1, in support of Hypothesis 2, we see that there are significant differences in second movers' stated hypothetical responses according to the gender composition of the pair. In accordance with experimental behavior, men and women indicated that they would return higher fractions to women than to men ($p < 0.05$). As in the experiment, according to hypothetical strategy expectations, male first movers correctly anticipated the gender difference in men's return ratios, i.e. that men would comply with the norm of balanced reciprocity significantly more when paired with female first movers than male first movers.

V. Conclusions

Our paper makes three main contributions. First it provides experimental evidence for the importance of the social norm of balanced reciprocity in bilateral sequential exchange among slum dwellers in Nairobi, Kenya. All interactions are one-shot and take place between individuals who were paired with an anonymous counterpart, suggesting that people have internalized the norm. One might have expected that Nairobi slums constitute an environment where it is too costly to be reciprocally minded. Given the severe poverty, high crime rates and the lack of law enforcement in the slums, residents could have converged on the no reciprocity-no trust equilibrium. Indeed among our sample male-male pairs came very close to this equilibrium, and having spent most of one's life in the slum is associated with returning lower

proportions of the amount sent. However, a norm of balanced reciprocity, little known in high-enforcement environments, helps cope with the mere prospects of this bad equilibrium (North, 1990).

Second, we find that the balanced reciprocity norm is gendered. People were more likely to adhere to this norm when they were dealing with women than with men. Women experienced more trustworthiness but offered less trust than men. While the gender pattern may partly be due to a taste for discrimination, gender differences in income suggest that it may also be related to differences in perceived need. Women are poorer than men in our sample and in Kenya more generally and, perhaps as a result, are treated more generously (particularly by male counterparts) while they themselves behave less pro-socially (particularly towards men).

Third, balanced reciprocity produces less trust and smaller efficiency gains than the norm of conditional reciprocity. A preliminary review of the experimental literature on reciprocity – i.e. the studies which report the relationship between trust and trustworthiness – in developing and in developed countries provides suggestive evidence that we may have discovered differences in norms of reciprocity that apply more generally. Table 5 in the Appendix summarizes the evidence. Despite substantial differences in experimental procedures (strategy method versus real exchange, endowments, price of giving, etc.), there appears to be a pattern in norms of reciprocity across countries: conditional reciprocity, i.e., a positive relationship between trust (amounts sent) and trustworthiness (fractions returned), is the typical finding in developed countries, and balanced reciprocity (a flat relationship) or mildly inverse reciprocity (a negative relationship) are typical for developing countries.

This finding helps us understand the empirical evidence of positive correlations between trust (measured using World Values Survey questions) and investment, economic growth, and per capita income (e.g., Knack and Keefer, 1997; Zak and Knack, 2001; Narayan and Pritchett,

1997; Haddad and Maluccio, 2003). The norm of balanced reciprocity may have been a response to the need to insure against income and cost shocks. When people's basic needs are not met, assistance is provided according to consumption needs rather than for investment purposes, and a norm of balanced rather than conditional reciprocity ensues. Balanced reciprocity, in turn, produces lower levels of trust and efficiency than conditional reciprocity.

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Figures

Figure 1: Distribution of second movers' return ratios, by first mover gender

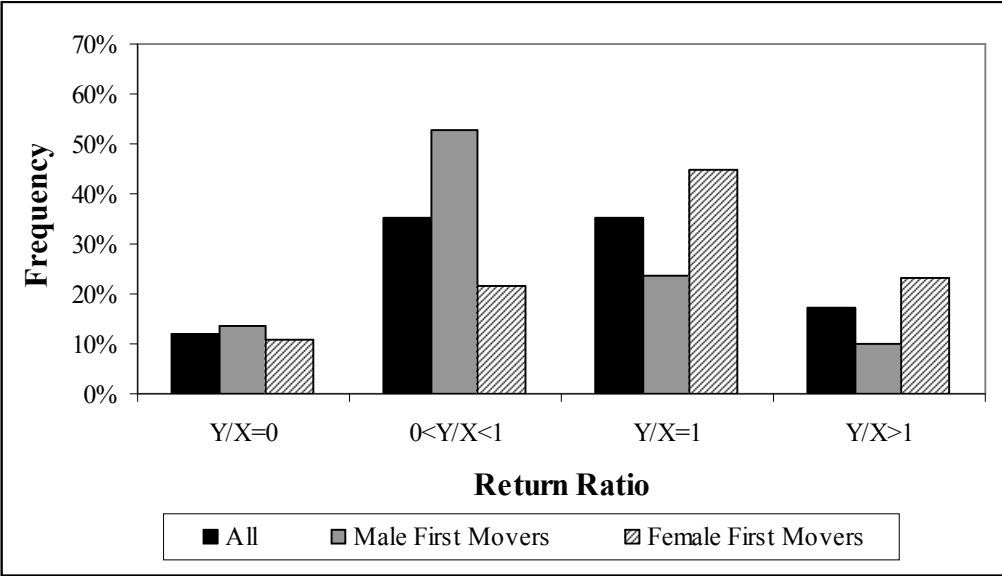


Figure 2: Returns (Y/X and Y) for each possible amount sent (X), by first mover gender

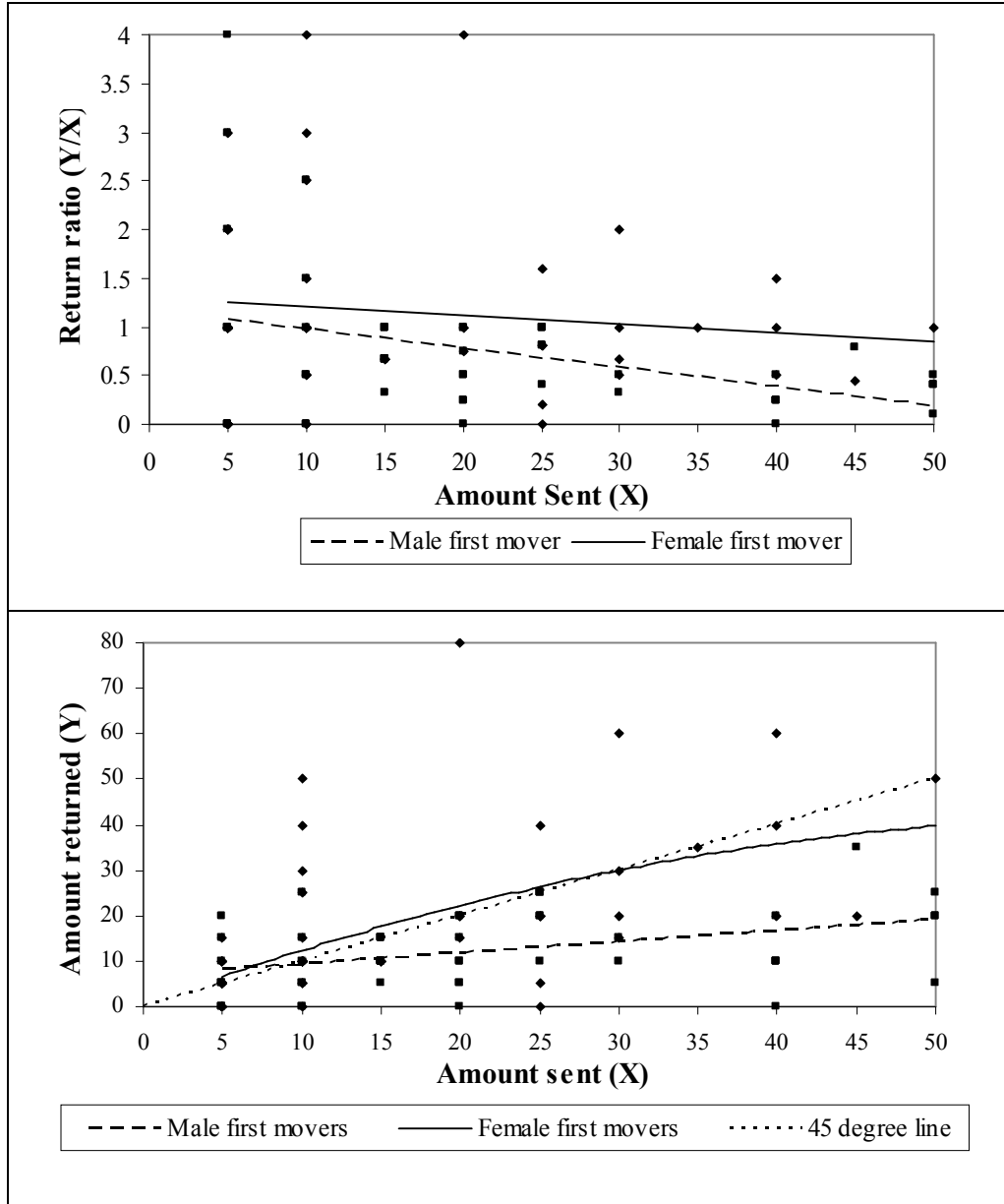


Figure 3: Distribution of first movers' expected return ratios, by first mover gender

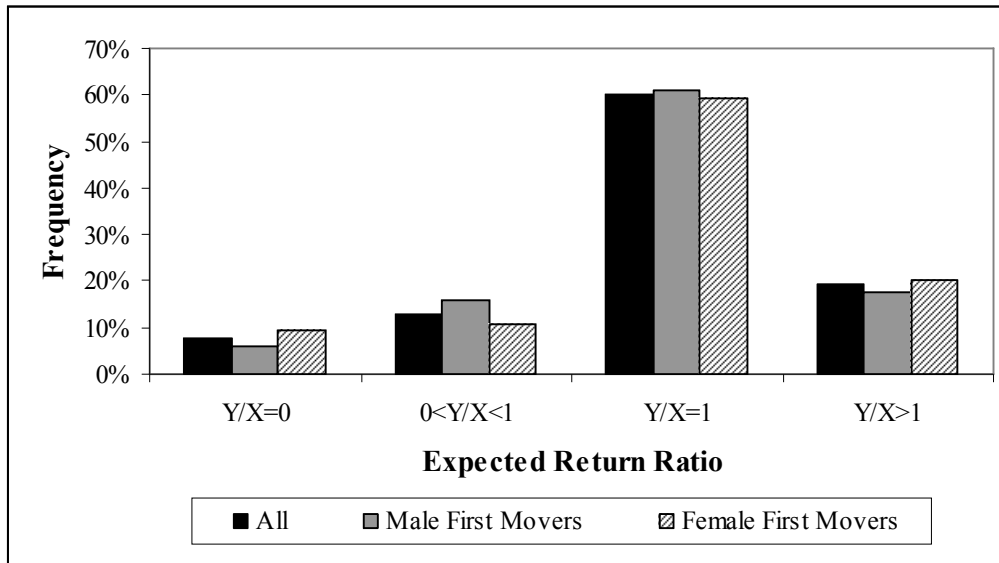
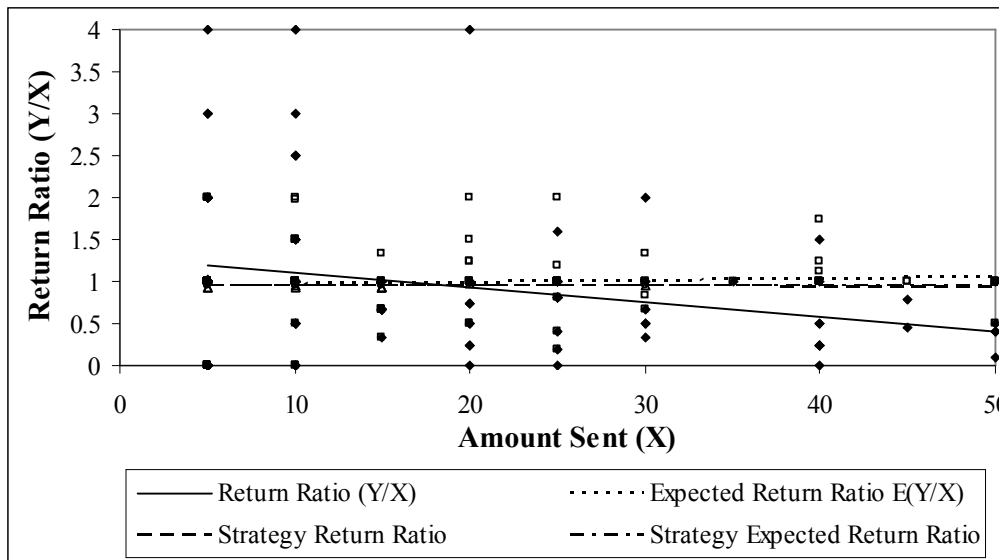


Figure 4: Average strategy return ratio (\hat{Y}/X) versus actual return ratio (Y/X) and strategy expected return ratio $E(\hat{Y}/X)$ versus actual expected return ratios $E(Y/X)$ for each possible amount sent



Appendix

Table 1: Summary statistics – mean, (standard deviation), and [N] reported

	ALL	MALE	FEMALE	Female 1 st mover Female 2 nd mover	Female 1 st mover Male 2 nd mover	Male 1 st mover Female 2 nd mover	Male 1 st mover Male 2 nd mover
Amount Sent (X)	15.00 (13.48) [134]	16.90 (14.88) [63]	13.31 (11.95) [71]	13.39 (10.46) [28]	13.26 (12.95) [43]	20.29 (14.60) [35]	12.68 (14.37) [28]
Expected Amount Returned E(Y)	15.04 (14.97) [133]	16.75 (16.44) [63]	13.50 (13.44) [70]	12.86 (11.58) [28]	13.93 (14.67) [42]	20.86 (16.82) [35]	11.61 (14.66) [28]
Expected Return Ratio E(Y/X)	98.31% (0.45) [115]	95.08% (0.38) [51]	100.89% (0.49) [64]	95.13% (0.53) [26]	104.82% (0.47) [38]	101.14% (0.35) [33]	83.98% (0.41) [18]
Amount Returned (Y)	12.32 (13.41) [134]	13.61 (16.14) [71]	10.87 (9.36) [63]	10.89 (10.37) [28]	16.63 (19.05) [43]	10.86 (8.62) [35]	8.96 (8.61) [28]
Return Ratio (Y/X)	98.05% (0.90) [116]	118.73% (1.09) [57]	78.07% (0.59) [59]	88.40% (0.41) [26]	134.81% (1.16) [39]	69.93% (0.70) [33]	83.89% (0.85) [18]
Strategy Amount Expected Returned E(Y)	24.04 (9.81) [133]	23.35 (7.75) [63]	24.65 (11.38) [70]	24.43 (10.36) [28]	24.79 (12.13) [42]	24.48 (7.58) [35]	21.95 (7.87) [28]
Strategy Expected Return Ratio E(Y/X)	96.35% (0.39) [133]	93.42% (0.31) [63]	98.60% (0.46) [70]	97.73% (0.41) [28]	99.18% (0.49) [42]	97.92% (0.30) [35]	87.79% (0.31) [28]
Strategy Amount Returned (Y)	23.67 (8.91) [134]	24.09 (7.97) [71]	23.20 (9.91) [63]	26.20 (9.15) [28]	25.19 (8.13) [43]	20.81 (9.97) [35]	22.39 (7.53) [28]
Strategy Return Ratio (Y/X)	94.78% (0.36) [134]	97.40% (0.33) [71]	91.84% (0.40) [63]	104.10% (0.35) [28]	102.22% (0.33) [43]	82.03% (0.41) [35]	90.00% (0.32) [28]
Income (Ksh)	3536.16 -2954.87 [268]	4351.05 -3096.87 [134]	2721.27 -2568.95 [134]				
Lived most of life in the slum	27.00% -0.44 [268]	25.00% -0.44 [134]	28.00% -0.45 [134]				
Session participants recognized by name	6.00% -0.06 [268]	5.00% -0.05 [134]	7.00% -0.07 [134]				

Table 2: Predicting trustworthiness

Dependent Variable: Y/X in Columns 1-6 and Y in Column 7							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Amount Sent	-0.018 (0.005)***	-0.014 (0.004)***	-0.014 (0.004)***	-0.015 (0.004)***	-0.013 (0.004)**	-0.018 (0.007)***	1.194 (0.252)***
Amount Sent ²							-0.014 (0.004)***
Female 1 st		0.246	0.435	0.428	0.565		8.203
Mover		(0.129)*	(0.198)*	(0.218)*	(0.208)**		(4.556)
Female 2 nd		-0.316	-0.114	-0.187	-0.19		-4.004
Mover		(0.141)*	(0.091)	(0.100)*	(0.079)**		(2.237)
Female 1 st X Female 2 nd			-0.353 (0.236)	-0.206 (0.258)	-0.356 (0.215)		-2.129 (4.399)
Names known (%)				0.522 (1.702)	0.931 (1.773)	0.186 (1.428)	-13.514 (18.548)
Log income				0.004 (0.019)	0.006 (0.020)	0.010 (0.025)	0.034 (0.205)
Slum				-0.386 (0.076)***	-0.401 (0.076)***	-0.498 (0.188)***	-5.400 (1.051)***
Order	NO	NO	No	NO	YES	NO	NO
Session	NO	NO	No	NO	NO	YES	NO
Constant	1.284 (0.118)***	1.25 (0.150)***	1.124 (0.111)***	1.182 (0.158)***	0.991 (0.211)***	0.939 (0.344)***	
Observations	116	116	116	116	116	116	116
R-squared	0.06	0.12	0.13	0.17	0.18	0.24	0.70

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Predicting trustworthiness by first mover gender

Dependent Variable: Y/X in Columns 1 and 3 and Y in Columns 2 and 4

	Male first movers		Female first movers	
	(1)	(2)	(3)	(4)
Amount Sent	-0.020 (0.004)***	1.058 (0.166)***	-0.008 (0.007)	1.811 (0.431)**
Amount Sent ²		-0.015 (0.004)**		-0.021 (0.008)*
Female 2 nd mover	-0.199 (0.093)*	-1.253 (2.074)	-0.404 (0.235)	-5.896 (3.627)
Slum	-0.512 (0.114)**	-4.333 (1.078)**	-0.347 (0.126)*	-4.782 (2.371)
Constant	1.385 (0.109)***		1.566 (0.311)***	
Observations	51	51	65	65
R-squared	0.19	0.74	0.10	0.71

Note: Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Predicting expected trustworthiness

Dependent Variable: E(Y/X) in Columns 1-6 and E(Y) in Column 7							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Amount Sent	0.002 (0.001)	0.002 (0.002)	0.002 (0.002)	0.004 (0.002)*	0.004 (0.002)*	0.004 (0.004)	1.143 (0.140)***
Amount Sent ²							-0.002 (0.003)
Female 1 st Mover		0.077 (0.086)	0.219 (0.085)**	0.222 (0.111)*	0.22 (0.117)*		2.307 (1.423)
Female 2 nd Mover		0.017 (0.082)	0.168 (0.087)*	0.145 (0.093)	0.145 (0.095)		1.476 (1.246)
Female 1 st X Female 2 nd			-0.264 (0.122)*	-0.23 (0.147)	-0.227 (0.160)		-2.750 (2.061)
Names known (%)				-0.799 (0.640)	-0.808 (0.712)	-1.344 (0.806)*	-15.200 (6.921)*
Log income				-0.014 (0.014)	-0.014 (0.014)	-0.013 (0.011)	-0.220 (0.140)
Slum				-0.005 (0.073)	-0.007 (0.078)	-0.052 (0.103)	-1.333 (1.321)
Order	NO	NO	NO	NO	YES	NO	NO
Session	NO	NO	NO	NO	NO	YES	NO
Constant	0.953 (0.055)***	0.89 (0.101)***	0.797 (0.097)***	0.912 (0.163)***	0.915 (0.193)***	1.084 (0.183)***	
Observations	115	115	115	115	115	115	115
R-squared	0.000	0.010	0.030	0.050	0.050	0.09	0.92

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Relationship between amount sent and percent returned across countries ranked by GNI per capita¹⁹

Country	Author [Table: column]	GNI per cap (PPP) 2003	Method	Population	Endowment (S)	Price of giving (1/k)	Reciprocity: β sign sig. level	Measure
Tanzania	Danielson & Holm (2005) [Figure 5a]	610	Strategy	University students	Sender and Receiver	0.33	–	Regression Y/X on X
Uganda	Mosley & Verschoor (2003) [4:3]	1,440	Real Exchange	Villagers	Sender	0.33	– **	Regression Y/X on X
Bangladesh	Johansson -Stenman et al (2004) [2:3]	1,870	Real Exchange	Household heads	Sender	0.33	–	Regression Y/X on X/S
Zimbabwe	Barr (2003) [2:4]	2,180	Real Exchange	Villagers	Sender and Receiver	0.33	–	Regression Y/X on X
Peru	Karlan (2005) [4:3]	5,090	Real Exchange	Micro- lending group members	Sender and Receiver	0.5	–	Regression Y/X on X
Brazil	Lazzarini et al (2003) [4:4]	7,480	Strategy	University students	Sender	0.5	+ **	Regression Y/X on X
Bulgaria	Koford (2001) [3]	7,610	Real Exchange	University students	Sender	0.33	–	Rank order test of Y/X vs. X
Russia	Ashraf et al (forth.) [A.5:7]	8,920	Strategy	University students	Sender	0.33	+ ***	Regression Y/X on X
South Africa	Ashraf et al (forth.) [A.5:7]	10,270	Strategy	University students	Sender	0.33	+ ***	Regression Y/X on X
South Africa	Haile, Sadrieh & Verbon (2006) [5:4]	10,270	Strategy	University students	Sender and Receiver	0.33	+ ***	Regression Y/(S+kX) on (kX+S)
Sweden	Danielson & Holm (2005) [Figure 5b]	26,620	Strategy	University students	Sender and Receiver	0.33	+ **	Regression Y/X on X

¹⁹ We cannot report efficiency gains here because they depend on the multiplier k and on whether the second mover was endowed or not.

Country	Author [Table: column]	GNI per cap (PPP) 2003	Method	Population	Endowment (S)	Price of giving (1/k)	Reciprocity: β sign sig. level	Measure
Germany	Willinger, et al (2003) [pg 461]	27,460	Real Exchange	University students	Sender and Receiver	0.33	0	Correlation Y/X and X
France	Willinger, et al (2003) [pg 461]	27,460	Real Exchange	University students	Sender and Receiver	0.33	0	Correlation Y/X and X
Netherlands	Bellemare & Kröger (forth.) [3:3]	28,600	Strategy	Representati ve sample of household	Sender and Receiver	0.5	+ ***	Regression Y/(kX+S) on X
USA	Berg, Dickhaut, McCabe (1995) [pg 132]	37,500	Real Exchange	University students	Sender and Receiver	0.33	+	Correlation Y/X and X
USA	Buchan, Croson and Solnik (2003) [pg 15]	37,500	Real Exchange	University students	Sender and Receiver	0.33	+ ***	Regression Y/X on X.
USA	Ashraf et al (forth.) [A.5:7]	37,500	Strategy	University students	Sender	0.33	+ ***	Regression Y/X on X
USA	Glaeser et al (2000) [7:1]	37,500	Strategy	University students	Sender	0.5	+ **	Regression Y/X on X

* significant at 10%; ** significant at 5%; *** significant at 1%