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. Balanced reciprocity produces less trust and trustworthiness and smaller gains from trade than conditional reciprocity. (*JEL* C72, C91)

I. INTRODUCTION

Reciprocity is an internalized norm, inducing people to respond to kindness with kindness and to unkindness with unkindness even if it is not in their material interest to do so. It helps explain why people respond to above-market clearing wages with above-standard effort, voluntarily contribute to public goods, and reward trust with trustworthiness even in one-shot interactions.[1]

We examine reciprocity norms and the efficiency implications of such norms in a context different from the typically studied environment, a slum in Nairobi, Kenya. Our context can be characterized as a "reciprocal-exchange economy," where contracts are informally enforced by norms of "balanced reciprocity" obligating future quid-pro-quo repayment of loans (Kranton 1996; Thomas and Worrall 2002). If such norms were internalized, we might expect slum dwellers to adhere to different norms than the person typically studied in the developed world.

To measure reciprocity, we employ a one-shot investment game between anonymous parties (Berg, Dickhaut, and McCabe 1995). In this game, first and second movers are each endowed with S. The first mover sends any amount $X \leq S$ to the second mover. X is multiplied by $k > 1$ by the experimenter to capture the efficiency gains of this transaction. Second movers receive kX and decide how much of it, $Y \leq S + kX$, to return to the first mover. 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, $\partial(Y/X)/\partial X$, represents "reciprocity."

A second mover is said to behave according to a norm of *conditional reciprocity* if trustworthiness increases with trust—that is, $\partial(Y/X)/\partial X > 0$ (e.g., Camerer and Fehr 2004). A second mover behaves according to a norm of *balanced reciprocity* if trustworthiness does not vary with trust, that is, if $\partial(Y/X)/\partial X = 0$ and if $Y/X = 1$. Investment game experiments conducted in the developed world typically find support for conditional reciprocity, and often, the money-maximizing strategy is to send everything (for a survey, see Camerer 2003).

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1. A number of recent theoretical models suggest proximate mechanisms driving such behavior (for a survey and a discussion of the empirical evidence, see Camerer 2003).

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We make two predictions. First, we expect not to observe a norm of conditional reciprocity (or expectations, E, thereof) in the Nairobi slums. If the norm of balanced reciprocity were internalized, trust and trustworthiness should not be related in the investment game, that is, $\partial(Y/X)/\partial X = 0$. Second movers should return exactly what was sent ($Y/X = 1$), and first movers should anticipate this ($E[Y/X] = 1$). 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. Which norms prevail has implications for the gains from trade realized in bilateral exchange. If under conditional reciprocity, $Y/X > 1$ for some value of $X \leq S$, then the norm of balanced reciprocity induces less trust than conditional reciprocity.[2]

Our second prediction is that compliance with the norm will be gendered. 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—gender-based beliefs about trustworthiness (statistical discrimination) or preferences (taste-based discrimination) might affect norms or norm compliance as well. We are able to exclude the statistical discrimination hypothesis by examining first movers' expectations. However, we cannot distinguish taste-based discrimination from perceptions of one's counterpart's need.

Our paper is organized as follows: in Section II, we describe the experimental design, Section III presents the results, and Section IV concludes.

II. EXPERIMENTAL CONTEXT AND DESIGN

We conducted our study in the Kwa Reuben area of the Embakasi slum in Nairobi, Kenya, in July 2004. 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 preexperimental household survey, 71% of our sample reported having received transfers from family, friends, or neighbors in the previous month and 44% 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% of the sample reported that they have never borrowed money from a bank, microcredit institution, or local moneylender.

In our sample, women earn $35 (Ksh 2,721) per month and men $55 (Ksh 4,351) per month from employment, on average. Women are on average supporting 1.68 children compared to only 1.22 children supported by men.[3] Thus, as Anderson and Baland (2002) also found in a Nairobi slum, not only are women's incomes lower but the demands on that income are higher.

A total of 270 subjects were randomly recruited from one household every fifth structure within all the neighborhoods of Kwa Reuben. We conducted ten 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. Both first and second movers were endowed with S = Ksh 50Ksh, 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.[4] Any amount X sent by the first mover was doubled by the experimenter. Final investment game earnings were thus Ksh $50 - X + Y$ for the first mover and Ksh $50 + 2X - Y$ for the second mover.

Participants were randomly assigned to the role of first or second mover and randomly

2. Assuming that selfish and socially motivated subjects are equally distributed in conditional reciprocity and balanced reciprocity environments, rational, risk-neutral money-maximizing first movers should send everything in a conditional reciprocity environment but be indifferent between sending something and sending nothing in a balanced reciprocity environment. Socially motivated first movers send a positive amount in both environments. Thus, it is the money maximizers who are responsible for higher levels of trust and efficiency in conditional reciprocity rather than balanced reciprocity environments.

3. This difference is significant even when controlling for marital status ($p < 0.05$). Unless otherwise specified, we use nonparametric Mann-Whitney U tests to examine differences in responses.

4. 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). Our intention was to adhere to the experimental economics research norm of compensating people for the opportunity cost of their time.

paired. The experiments were conducted in Swahili and run single blind. Each first mover decided how much $X \leq 50$ to send to her second mover and, afterward, was asked how much she expected to get back for each possible amount sent. Then, second movers decided how much $Y \leq 50 + 2X$ to return to their first mover. To collect information on demographics and other possible control variables, we asked people to complete a postexperimental questionnaire. We were particularly interested in social distance (e.g., Bohnet and Frey 1999), measured by how many participants in a given session a person knew, income as a measure of need, and whether a person had lived most of his or her life in a slum. We also conducted a public goods experiment in the same sessions and thus control for order.[5] After completing the questionnaire, subjects collected their earnings. 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. EXPERIMENTAL RESULTS

Appendix Table A1 presents summary statistics. On average, first movers sent 30% of their endowment to their second movers ($N = 134$). Second movers returned 82% of the amount sent on average ($N = 134$). Thirteen percent of the first movers sent nothing. Among the second movers who received positive amounts, 12% returned nothing; the remaining 88% returned on average 98% of the money sent to them ($N = 116$).

The mean amounts sent are substantially lower than the standard results in investment games run in developed countries. Typically, first movers send about 50% of their endowment (Camerer 2003; Cardenas and Carpenter 2005). Trust levels so far reported in African countries are somewhat lower but still between 40% and 45% (e.g., Ashraf, Bohnet, and Piankov 2006; Barr 2003; Ensminger 2000). Trust levels in studies in which the amount sent was doubled ($k = 2$) range from 44% (Dutch citizens, Bellemare and Kröger 2007) to 83% (U.S. university students, 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. Second movers return about the amount sent (Camerer 2003; Cardenas and Carpenter 2005). Efficiency increases by 15 percentage points compared to the equilibrium prediction of no trade. This efficiency gain is smaller than the 22–83 percentage point gains realized in other experiments where the amount sent was doubled (Bellemare and Kröger 2007; Glaeser et al. 2000).

The modal response for second movers was to adhere to the norm of balanced reciprocity by returning 100% of the amount sent. However, norm adherence is mainly due to second movers who are paired with female first movers. Figure 1 presents the distribution of choices graphically for the entire sample and also by the gender of the first mover. Figure 2 shows the distribution of expected return ratios. A majority of first movers expected second movers to adhere to the norm of balanced reciprocity.

In order to examine our hypotheses more precisely, we perform ordinary least squares regressions. Appendix Table A2 reports the results.[6] Column 1 of Appendix Table A2 shows that when including our complete sample, the fraction returned is significantly declining in the amount sent. The negative relationship remains robust when including additional control variables in Column 2. Female first movers were rewarded with more trustworthiness than male first movers, and female second movers returned smaller fractions than male second movers (for a review of gender differences in trust games, see Croson and Gneezy 2004). People who have spent most of their lives in a slum returned approximately 40 percentage points less than others.[7]

To further examine the negative relationship between trust and trustworthiness, we split our sample by first mover gender in Columns 3 and 4 of Appendix Table A2.

5. Participants were only informed of the results and received their combined earnings after both games had been completed. The instructions are available from the authors upon request.

6. Standard errors have been adjusted for clustering at the session level.

7. In other specifications without clustering at the session level, we included other controls such as age, education, and ethnicity, but none of these controls are significant, and our main results do not change. Using a Tobit model with left censoring, we also find similar results. To address the potential problem of correlated errors with X being on both sides of the equation, we also estimate Y as a function of X and X^2 without a constant, which also produces similar results.

FIGURE 1
Distribution of Second Movers' Return Ratios, by First Mover Gender

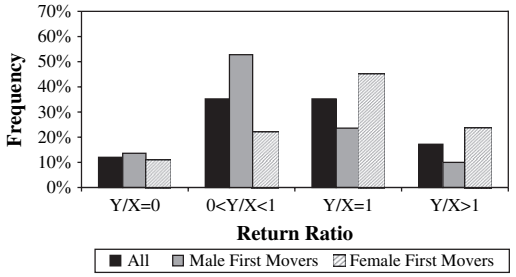
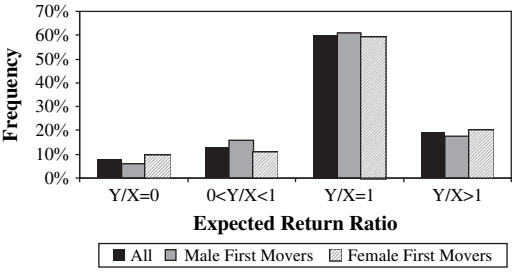


FIGURE 2
Distribution of First Movers' Expected Return Ratios, by First Mover Gender



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. Columns 5 and 6 in Appendix Table A2 report the regression results for expectations of return. Consistent with the norm of balanced reciprocity, expected trustworthiness is generally not related to amount sent. We find a weak positive relationship, significant at the 10% level, in Column 5. Women expected to get back more than men (particularly from men).[8]

Our results generally support our hypotheses. We do not find evidence of conditional reciprocity. Rather, second movers generally return the amount received, particularly when paired with a female first mover, and first movers expect this. Norm compliance and expectations thereof are gendered, with female first movers more likely to be made whole than male first movers. Indeed, female first movers expect significantly higher returns than male first movers when paired with a male second mover.

IV. CONCLUSIONS

Our paper makes three main contributions. First, it provides experimental evidence of the social norm of balanced reciprocity in bilateral sequential exchange among residents of a slum 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. 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, our male-male pairs came very close to this equilibrium, and those who have spent most of their life in the slum return lower proportions of the amount sent. However, the norm of balanced reciprocity, little known in high-enforcement environments, helps prevent this bad equilibrium.

Second, we find that the balanced reciprocity norm is gendered. People were more likely to adhere to this norm when 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 prosocially (particularly toward men).

Third, balanced reciprocity produces less trust and smaller efficiency gains than the norm of conditional reciprocity. A review of the experimental literature on reciprocity, that is, the studies that report the relationship between trust and trustworthiness, suggests that we may have discovered differences in norms of reciprocity that apply more generally (see our working paper, Greig and Bohnet 2006). Despite substantial differences in experimental procedures, there appears to be a pattern in norms of reciprocity across countries: conditional reciprocity is typical in developed countries, and balanced reciprocity or mildly

8. Estimating the same equation using a Tobit model with left censoring or regressing $E(Y)$ on X and X^2 produces similar results.

APPENDIX
TABLE A1
Summary Statistics

	All	Male	Female	Female First Mover Female Second Mover	Female First mover Male Second Mover	Male First Mover Female Second Mover	Male First Mover Male Second 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]				

Note: Data are reported as mean (standard deviation) [N].

TABLE A2
Predicting Trustworthiness ($Y|X$) and Expected Trustworthiness ($E(Y|X)$)

	Dependent Variable: $Y|X$				Dependent Variable: $E(Y|X)$	
	All		**Male First Movers**	**Female First Movers**	**All**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Amount sent	−0.014 (0.004)***	−0.013 (0.004)**	−0.020 (0.004)***	−0.008 (0.007)	0.002 (0.002)	0.004 (0.002)*
Female first mover	0.435 (0.198)*	0.565 (0.208)**			0.219 (0.085)**	0.22 (0.117)*
Female second mover	−0.114 (0.091)	−0.19 (0.079)**	−0.199 (0.093)*	−0.404 (0.235)	0.168 (0.087)*	0.145 (0.095)
Female first × female second	−0.353 (0.236)	−0.356 (0.215)			−0.264 (0.122)*	−0.227 (0.160)
Names known (%)		0.931 (1.773)				−0.808 (0.712)
Log income		0.006 (0.020)				−0.014 (0.014)
Slum		−0.401 (0.076)***	−0.512 (0.114)**	−0.347 (0.126)*		−0.007 (0.078)
Order	No	Yes	No	No	No	Yes
Constant	1.124 (0.111)***	0.991 (0.211)***	1.385 (0.109)***	1.566 (0.311)***	0.797 (0.097)***	0.915 (0.193)***
Observations	116	116	51	65	115	115
R^2	0.13	0.18	0.19	0.10	0.030	0.050

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

inverse reciprocity (a negative relationship between amount sent and fraction returned) is typical for developing countries.

This finding helps us understand the positive correlations between trust (measured using World Values Survey questions) and investment, economic growth, and per capita income (e.g., the literature started by Knack and Keefer 1997). The norm of balanced reciprocity may have been a response to the need to insure against income and cost shocks. When 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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