Do Men Really have no Shame?

Abigail Barr*§
University of Oxford

Bill Kinsey
Vrije Universiteit Amsterdam

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Abstract

Microfinance is one of the most commonly applied development interventions of our time. It is also one of the most gender-biased. In part, this is due to targeting. However, it might also relate to the emphasis placed by microfinance providers on group-loans. If women have a comparative advantage when it comes to functioning in groups, they might self-select into microfinance provided as group loans, while men seek alternative sources of credit. This paper explores the possibility that such a comparative advantage exists and that it relates to women's greater propensity to feel shame and/or induce feelings of shame in others. It uses data derived from an economic experiment conducted in 12 Zimbabwean villages to test a series of hypotheses. The findings suggest that men regard others less than women when deciding how to behave; that, even after controlling for this, they are more likely to attract criticism; and that they are no less responsive than women to such shame-inducing, social sanctioning. Finally, while men are no more inclined to sanction others they are less effective than women at effecting a resultant improvement in behaviour.

* Corresponding author: Abigail Barr, centre for the Study of African Economies, Department of Economics, University of Oxford, Manor Road, Oxford, OX1 3UQ, Abigail.barr@economics.ox.ac.uk, +44 (0)1865 281443

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1. Introduction

Microfinance has become one of the most commonly applied development interventions of our time. In that application, it is also one of the most gender-biased. In part, this is due to deliberate targeting by service providers (Goetz and Gupta (1996)). However, it might also reflect the emphasis placed by microfinance providers on their most celebrated innovation, the group-lending contract. By linking the fates of self-selected group members, the group-lending contract effectively harnesses local information and social assets (networks of trust, shared behavioural norms, local reputations) and applies them to the problem of enforcement. It provides a means whereby the traditional mechanisms of social control applied in informal financial arrangements such as rotating savings and credit associations (ROSCAs) can be combined with externally supplied financial capital to provide loans for poor households who lack collateral (Besley, Coate, and Loury (1993), Besley and Coate (1995)). If women have a comparative advantage in this *modus operandi*, they might self-select into the client groups of microfinance providers, while men seek alternative sources of credit. That ROSCA membership, which is less prone to targeting, tends to be dominated by women supports this hypothesis (Morduch (1999), Johnson (2001)).

But what form does this comparative advantage take? Johnson (2001) proposes that it relates to women's greater responsiveness to social sanctions. During a series of post-survey meetings, she presented her Kenyan research subjects with data showing that, when faced with constrained access to formal financial services, women are more inclined to join ROSCAs while men are more inclined to borrow from friends and relatives. When asked why this might be, both men and women stated that women are more likely to feel ashamed if they fail to meet their obligations towards groups. Men, on the other hand, are more individualistic. Finding independent

empirical evidence to support these claims is difficult. Wydick (1999) shows that in Guatamala a sense of moral obligation to repay, a willingness to apply pressure to encourage repayment on the part of others, and a willingness to sanction those who fail to repay all improve microfinance groups' repayment performance. However, while he controls for the gender homogeneity of the loan groups, he neither controls for nor explores the effect of variations in male-female shares in group membership on either repayment performance or these three enforcement-related variables.

Here, we treat the explanation provided by Johnson's research subjects, that women have a comparative advantage in group-based activities because they are more highly motivated by shame, as a hypothesis to be tested. We then conduct the test not with survey data but with data from an economic experiment. This enables us to avoid several of the econometric problems that are commonly encountered in this area of research, most notably selectivity bias, while sharpening the focus on men's and women's functionalities in groups.

To facilitate testing, we break the hypothesis into two:-

1. that compared to women, men have less regard for others when deciding how to behave; and

2. that men are less responsive than women to social or shame sanctions imposed by others.

Hypothesis 1 is about the relative selfishness and cooperativeness of men and women. Experimental economists have been exploring such gender differences for some time (see for example Dawes, McTavish, and Shaklee (1977), Mason, Phillips, and Redington (1991), Brown-Kruse and Hummels (1992), Eckel and Grossman (1998)). While experimental economists have also explored the impact of social sanctioning on

cooperative behaviour (see for example Gächter and Fehr (1999)), gender differences in this regard have yet to be investigated. This paper provides tests of both hypotheses using data derived from an economic experiment conducted, not in a university laboratory, but in 13 Zimbabwean villages. Thus, the subjects that took part in the experiment were diverse compared to the more commonplace samples of students as experimental subjects, while having many characteristics in common with users of micro-finance throughout the developing world. These similarities include a dependence on small-scale agriculture, low incomes, and a vulnerability to severe income and consumption shocks. Further, the subjects in each village-specific experimental session would have been familiar with one another's prior behaviour in situations involving social dilemmas. As this would also be true in the context of group-based micro-finance, it adds to the verisimilitude of the experiments.

The economic experiment, which is described in detail in section 2, involved a repeated public goods game played anonymously and then both before and after an opportunity for the players to comment on each other's contributions. Within the context of the game, social sanctions took the form of criticism during the round of comments. Data was collected on players' contributions and on who was criticised by whom. We use this data to test hypotheses 1 and 2 and then go on to test three other related hypotheses that are also relevant to the functioning of groups: –

3. that men are less effective than women at sanctioning others;
4. that men are more likely than women to escape sanctioning by others when they behave in an antisocial manner; and
5. that men are less likely than women to sanction others who behave in an anti-social manner.

The paper has six sections. Following this introduction, section 2 describes the design of the experiment in greater detail. Section 3 outlines the empirical strategy used to test the hypotheses stated above. In section 4, we describe both the experimental and the survey data and the results of some preliminary tests. The more detailed empirical analysis is presented in section 5 and section 6 concludes.

2. Experimental Design

A total of 308 individuals distributed across twelve villages took part in the experiment in the year 2000. Eight of these villages are the result of a resettlement exercise, which took place in the early 1980s. The remaining four are situated on, so called, communal land and are more traditional in terms of social structure. One experimental session was held in each village. In the eight resettled villages every household was invited to send one nominee over the age of fourteen to the experimental session in their own village.[1] In the four non-resettled villages, which are somewhat larger, random samples of 25 households were drawn and only sampled households were invited to send nominees. Any nominee who was unable to identify and rank three numbers was asked to return home and find another nominee to take their place. Between thirteen and 39 subjects took part in each session.

The experiments were conducted outside with the nominees seated approximately two metres apart. They were asked not to talk or attempt to communicate in any way with one another and were constantly watched. They were taught the game by a Shona-speaking research assistant and were then asked a series of questions before playing the games. The description of the games, the questions,

[1] Eight nominees aged 12 or 13 turned up to represent their households. After consulting with all the villagers present in the related sessions, these nominees were allowed to play.

and the nominees' instructions were all scripted and the script was adhered to in all twelve sessions. Nominees' questions were answered by repeating the relevant part of the script. The research team (one of the authors and four Zimbabwean assistants) was the same for every session and efforts were made to standardise actions and demeanours.

In the public goods (PG) game each player is placed in a group containing n members (themselves and n-1 others) and given an initial endowment, y. Each then has to decide how much of this endowment to contribute to a public good, g_i ($0 \leq g_i \leq y$). Decisions about g_i are made simultaneously. The sum of the group's contributions is multiplied by a factor a ($1 < a < n$), and the resulting amount is shared equally among the n nominees. Thus, the final payoff to each player is $\pi_i = y - g_i + \frac{a}{n}\sum_{j=1}^{n} g_j$. For an anonymous, selfish money-maximiser the dominant strategy in this game is to free-ride by setting g_i equal to zero. This is because $\partial \pi_i / \partial g_i = -1 + a/n < 0.$ However, it follows from $\frac{\partial}{\partial g_i}\sum_{i=1}^{n} \pi_i = -1 + a > 0$ that the group's payoff, $\sum_{i=1}^{n} \pi_i$, is maximized if each member contributes all of their endowment, i.e., sets g_i equal to y. In Zimbabwe the nominees' initial endowments, y, were set equal to Zim$100.[2] The number of nominees per group, n, was set at five and the factor, a, was set at two. Thus, the marginal payoff to the public good was 0.4. The games were played with pens and specially designed forms. The forms presented the nominees with a set of six contribution levels (Zim$0, Zim$20, Zim$40, Zim$60, Zim$80, and Zim$100). They had to select one of these by drawing a circle around it. Assistance was provided to those who had difficulty reading the form or drawing their circles, but they had to make their own decision about the level of contribution. After the selections had been

[2] Zim$100 was approximately equivalent to US$2 at the time of the experiments.

made, the forms were collected and the calculations executed. Both the nominees' shares from their group's public good, $\frac{a}{n}\sum_{j-1}^{n} g_j$, and their final payoffs, π_i, were written on the forms before returning them to the nominees.

In each session, the nominees played four such PG games. At the outset they were told that they would be playing several games, but were told neither the exact number nor whether the games would be identical or different.[3] They were also told that at the end of the session one of the games would be picked at random (by drawing a number from a hat) to determine their earnings. The same groups of five nominees were maintained throughout the sessions and the nominees were reminded of this at the start of each game.[4] Each player knew that the other four nominees in their group were both from their village and present in the session. However, they did not know their exact identity. Thus, their initial expectations about other nominees' behaviour would have been formed on the basis of knowledge gleaned during everyday life. In ten of the sessions the total number of nominees was not a multiple of five. In each of these, one of the groups contained two 'virtual' players. These virtual players always contributed the village mode in the current game. The virtual players' contributions are not included in the analysis but those of the nominees who played with them are included.

[3] To an experimental economist, this will appear odd. Normally one would state the number of games to be played so as to elicit end game effects. However, in addition, experimentalists would go to great lengths to ensure that their subjects did not know one another or, at least, did not know that they knew one another. That our nominees knew one another is a critical feature of our study. Thus, to assume that the last game that they played in our experimental sessions was an end game could be misleading. By choosing to be ambiguous we guarded against such an assumption ever being made.

[4] By preference, experimental economists would conduct experiments based on PG games twice, once with stable groups across games, as we have done, and once remixing of groups between games. The former is referred to as the 'partner treatment' and the latter as the 'stranger treatment'. We chose to do only the partner treatment to guard against the word 'stranger' being associated with the data and to maximize the chance of the Zimbabwean nominees learning and behaving strategically.

The first two games were played anonymously. The third game was played publicly, i.e., the players had to announce their contributions to everyone present in the session. This game was then followed by a 'discussion round'. Up to this point the game resembles one of the treatments executed by Gächter and Fehr (1999) with students in Zurich and replicated by Henrich and Smith (2000) with the Machugenga in the Amazon basin. In Zimbabwe, however, the discussion round was organized in a way that facilitated the required data-capture. The nominees were invited to make public, verbal statements about each other's decisions. Special care was taken not to lead the nominees. The aim was to provide them with an opportunity to comment, while leaving them free to complement, criticise, or remain silent as they saw fit. One research assistant would stand beside each player in turn and say 'Player number …, Mr/Mrs …, contributed $... Does anyone have anything to say about that?' Two other research assistants recorded which nominees were criticised and by whom. A fourth research assistant recorded as much of the substance of the criticism as time allowed. These three independent records were reconciled directly after the experimental session and the analysis presented below is based on the reconciled data.[5] Once the discussion round was complete, a fourth PG game was played. Like the third, this game was played publicly.

3. Empirical strategy

Each of the hypotheses stated in the introduction can be treated as an alternative to a null hypothesis stating that there is no difference between men and women. Then, by

[5] Even though it was designed to mimic a process that had naturally occurred in the villages after prior games, the discussion round could have caused offence. For this reason we held group discussions after each session and, wherever possible, followed-up with trusted key informants. Neither exercise yielded any indication that the villagers were unhappy with the games.

applying econometric methods to the experimental data, each pair of hypotheses can be tested. To test hypotheses 1, 2, and 3 and their corresponding nulls, we conduct an analysis of contributions during the four PG games. To test hypotheses 4 and 5, we conduct analyses of how many other players sanctioned each player for making either too low or too high a contribution and how many low and high contributors each player sanctioned.

The test of hypothesis 1, requires a comparison of male and female players' contributions across all four games. To make this comparison we, first, graph the contributions made by male and female players and conduct a series of t-tests. Then, to ensure than differences in behaviour between the sexes are neither suppressed nor inflated by variations in other social, cultural, or economic factors, we regress contributions, g_i, on *female*, a dummy variable that takes the value one only for female players and a vector of social, cultural, and economic control variables. This vector of control variables is made up of six sub-vectors. The first sub-vector, x_i, contains four other individual player characteristics: *age*, their age in years; *schooling*, their years in formal school; *married*, a dummy variable that takes the value one if the player is currently married; and *head*, a dummy variable that takes the value one if the player is the head of a household. The second sub-vector, h_i, contains three characteristics of the player's household: *hhsize*, the number of people in the household; *livestock*, the value (in thousands of Zimbabwean dollars) of the household's livestock holdings in 1999; and *income*, the income of the household (in thousands of Zimbabwean dollars) in 1999. The third sub-vector, l_i, contains four variables that capture the extent to which the player's household is socially linked to other households in the village: *blood*, is the number of other households in the village to which the player's household is related by blood; *marriage*, is the number of other

households in the village to which the player's household is related by marriage; *sametribe,* is the number of other household heads in the village that belong to the same tribe or lineage group as the player's household head; and *memberships,* is the number of non-religious group memberships maintained by members of the player's household. The fourth sub-vector, r_i, is a set of five dummy variables that capture the religion of the player's household head. The fifth, e_i, is a set of six dummy variables capturing the tribe or lineage group of the player's household head. And the sixth, v_i, is a set of eleven village dummy variables that capture all village-level effects, cultural, economic, and social. Thus, we estimate:

$$g_{it} = \alpha_0 + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \varepsilon_{1it} \qquad 1.$$

where t identifies the game from which the data was derived, the error term, ε_{1it}, is assumed to be i.i.d. normal, and α_0 to α_7 are the vectors of coefficients to be estimated.

We estimate this equation for contributions in each of the first three games, i.e., with t set equal to 1, 2 and 3. However, when analysing the data from the fourth game we introduce another vector, s_{i4}, of variables controlling for differing social sanctioning experiences during the preceding discussion round. This vector includes: *shamers low*$_i$, the number of people who shamed i for making too low a contribution in the third game; *shamers high*$_i$, the number of people who shamed i for making too high a contribution in the third game; *shamers low vil. av.*$_i$, the average number of people shaming other players in the same village for making the same level of contribution as i in the third game; and *shamers high vil. av.*$_i$, the average number of people shaming other players in the same village for making the same level of

contribution as *i* in the third game. Thus, the model for contributions in the fourth round is:

$$g_{i4} = \alpha_0 + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \alpha_8 s_{i4} + \varepsilon_{2i4} \quad 2.$$

where ε_{2i4} is assumed to be i.i.d. normal. Then, we add a vector of three game dummies, gm_{it}, set s_{it} equal to zero for all $t \neq 4$ and re-estimate using the sample pooled over all four games:

$$g_{it} = \alpha_0 + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \alpha_8 s_{it} + \alpha_9 gm_i + \varepsilon_{3it} \quad 3.$$

where ε_{3i} is assumed to be i.i.d. normal.

While there is no reason to expect models 2 and 3 to yield biased estimates of the coefficients on *female,* they could yield biased estimates of the coefficients on s_{it} if, as one would expect, both individual social sanctioning experiences and contributions in the fourth game are correlated with contributions in the third game. To combat this problem, we remove the individual and household characteristics from equation 3 and re-estimate α_8 and α_9, while taking account of player fixed effects, and then, regress the player fixed effects on the vector of individual and household characteristics:

$$g_{ti} = \alpha_{01} + \alpha_8 s_{it} + \alpha_9 gm_{it} + \mu_{4i} + \varepsilon_{41it} \quad 4.$$

$$\mu_{4i} = \alpha_{02} + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \varepsilon_{42i}$$

where μ_{4i} is the individual player effect and ε_{41it} and ε_{42it} are assumed to be i.i.d. normal. In all of these models, it is the sign and significance of α_1, the coefficient on *female* that pertains to hypothesis 1.

The test of hypothesis 2 requires a comparison of how male and female players change their contributing behaviour as a result of being socially sanctioned between the third and fourth games. For this, we need a dynamic model within which we also control for the effects of strategic, dynamic interplay between the players in each PG group. So, building on equation 4, we introduce a vector, $g_{ij,t-1}$, containing four variables: *contrib. (lagged)*, a lagged dependent variable; *others' contrib.*, the mean contribution made in the preceding game by the other four individuals in the player's PG group; *others' contrib. sq.*, the square of that mean; and *others' contrib. cu.*, the cube of that mean. Because we still need the player fixed effects in order to ensure that we get unbiased estimates of α_8, we estimate the resulting model using Arellano and Bond's (1991) differenced generalized method of moments (GMM).[6] The model takes the following form:

$$g_{ti} = \alpha_{01} + \alpha_8 s_{it} + \alpha_9 gm_{it} + \alpha_{10} g_{ij,t-1} + \mu_{5i} + \varepsilon_{51it} \qquad 5.$$

$$\mu_{5i} = \alpha_{02} + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \varepsilon_{52i}$$

where μ_{5i} is the individual player effect and ε_{51it} and ε_{52it} are assumed to be i.i.d. normal. In this model, the coefficient α_1 captures the differential impact of moving towards increasingly socially interactive contexts on men's and women's contributions.

Having correctly specified this dynamic model, we can test hypothesis 2 by introducing a vector of interaction terms, $female_i * s_{it}$, into the first stage of model 5:

[6] Dummy variables for the second and third games fall out of this model as the estimation uses the data from the second games for the lagged variables and the data from the first when constructing instrumental variables.

$$g_{ti} = \alpha_{01} + \alpha_8 s_{it} + \alpha_9 gm_{it} + \alpha_{10} g_{ij,t-1} + \alpha_{11} female_i * s_{it} + \mu_{6i} + \varepsilon_{61it} \quad 6.$$

$$\mu_{6i} = \alpha_{02} + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \varepsilon_{62i}$$

where μ_{6i} is the individual player effect and ε_{61it} and ε_{62it} are assumed to be i.i.d. normal. The test of hypothesis 2 relates to the significance of the coefficients in α_{11} although α_1 also remains of interest

Either model 5 or 6, which depending on the significance of the interaction terms, $female_i * s_{it}$, can provide the basis for testing hypothesis 3 about the relative effectiveness of men and women when sanctioning others. Here, we introduce a vector, fsh_i, containing two variables: *fem. in shamers low*$_i$, the proportion of women among all those who shamed *i* for making too low a contribution; and *fem. in shamers high*$_i$, the proportion of women among all those who shamed *i* for making too high a contribution. If model 5 is the basis, this yields the following:

$$g_{ti} = \alpha_{01} + \alpha_8 s_{it} + \alpha_9 gm_{it} + \alpha_{10} g_{ij,t-1} + \alpha_{12} fsh_{it} + \mu_{7i} + \varepsilon_{71it} \quad 7.$$

$$\mu_{7i} = \alpha_{02} + \alpha_1 female_i + \alpha_2 x_i + \alpha_3 h_i + \alpha_4 l_i + \alpha_5 r_i + \alpha_6 e_i + \alpha_7 v_i + \varepsilon_{72i}$$

where μ_{7i} is the individual player effect and ε_{71it} and ε_{72it} are assumed to be i.i.d. normal. The test of hypothesis 3 relates to the significance of the coefficients in α_{12}.

The test of hypothesis 4, requires an analysis of how many other players sanction player *i* for making either a high or a low contribution. We define three dependent variables: *shamers*$_i$, the number of other players who criticized player *i*; *shamers low*$_i$, the number of other players who criticized player *i* for making too low a contribution; and *shamers high*$_i$, the number of other players who criticized player *i* for making too high a contribution. Each of these is then regressed on *female*$_i$, player

i's contribution in the third game, g_{3i}, the square of that contribution, g_{3i}^2, a number indicating how late in the discussion round player *i*'s contribution came up for discussion *play order*$_i$ (takes the value one for the first player whose contribution is discussed, two for the second, and so on), and then x_i, h_i, l_i, r_i, e_i, and v_i. So, the model to be estimated takes the form:-

$$shamers_i = \beta_0 + \beta_1 female_i + \beta_2 g_{3i} + \beta_3 g_{3i}^2 + \beta_4 playorder_i +$$

$$\beta_5 x_i + \beta_6 h_i + \beta_7 l_i + \beta_8 r_i + \beta_9 e_i + \beta_{10} v_i + \varepsilon_{8i} \qquad 8.$$

Because *shamers*$_i$ takes zero as its modal value and cannot take values less than zero, we conduct a censored regression or tobit analysis. Similar models are estimated with *shamers low*$_i$ and *shamers high*$_i$ as alternative dependent variables. In each case it is the sign and significance of β_1 that pertains to hypothesis 4.

Finally, the test of hypothesis 5 requires an analysis of how many low and high contributors player *i* sanctioned. We define three dependent variables: *targets*$_i$, the number of other players criticized by player *i*; *targets low*$_i$, the number of low contributors criticized by player *i*; and *targets high*$_i$, the number of high contributors criticized by player *i*. Each of these is then regressed on *female*$_i$, player *i*'s contribution in the third game, g_{4i}, and then x_i, h_i, l_i, r_i, e_i, and v_i. So, we estimate

$$targets_i = \gamma_0 + \gamma_1 female_i + \gamma_2 g_{4i} + \gamma_3 x_i + \gamma_4 h_i + \gamma_5 l_i + \gamma_6 r_i + \gamma_7 e_i + \gamma_8 v_i + \varepsilon_{9i} \qquad 9.$$

Once again, we apply a censored regression or tobit analysis and estimate similar models with *targets low*$_i$ and *targets high*$_i$ as alternative dependent variables. In each case it is the sign and significance of γ_1 that pertains to hypothesis 5.

4. Data

4.1 Experimental data

The data on PG contributions made during the experiment is presented in Figures 1, 2, and 3, and in the upper half of Table 1. Mean contributions increased game-by-game from Zim$44.61 in the first to Zim$53.57 in the third and then declined to 50.26 in the fourth. In every game, women contributed more than men, although the difference is statistically significant according to a t-test (equal variance not assumed) only in the fourth. The men's contributions varied across games to a greater degree than the women's. In particular, the men revised their contributions downwards between the third and fourth game, i.e., following the discussion, while women did not.

The data on criticisms made during the discussion round is presented in Figure 4, and in the lower half of Table 1. Note that while there was considerably more criticism of players for contributing too little, some players were criticised for contributing too much. Despite their higher average contributions, more women than men were criticised for contributing too little. They also meted out more criticism to others who, in their opinion, had contributed too little. In contrast, fewer women than men were criticised for contributing too much. Similarly, they did less criticising of others who, in their opinion, had contributed too much. Only the third of these results is statistically significant.

4.2 Demographic, economic, and social data

Individual and household-level data are available for 261 out of the 308 nominees who showed up and played the game. The remaining 47 either belonged to households that were not included in the survey or could not be matched to the survey and other

data due to coding errors in the field. T-tests indicate that the behaviour of these 47 players during the experimental sessions was statistically indistinguishable (10% significance level) from that of the 261 to whom we can match individual and household-level data. The descriptive statistics presented in this section relate to the 261 nominees that could be matched. The sources from which each of the demographic, economic, and social variables are drawn along with their method of generation are presented in Table 2. The individual characteristics and economic household characteristics are all taken from the Zimbabwe Rural Household Dynamics Project (ZRHDP) survey. The data on blood and marriage ties between households within villages resulted from a series of participatory social mapping exercises designed and facilitated by Dekker (2003). And the data on associational memberships, religious affiliations and tribal descent was generated through a series of village-level and smaller focus group interviews using both semi-structured and structured questionnaires (Barr (2003)).

Table 3 contains the means and proportions relating to each of the variables to be used in the analysis for male and female players, and the sample as a whole. It also contains the standard deviations of the nine continuous variables. Of the 261 players 112, 43 percent, were female. These were significantly younger (37.8 years as compared to 45) and significantly less educated (5.8 as compared to 6.8 years of formal schooling) than the men. They were also significantly less likely to be married (62 percent chance compared to a 75 percent chance) and significantly less likely to be heads of households (24 percent chance compared to a 68 percent chance).

The players are members of rural households involved in small-scale cash crop farming and livestock-raising. In 1999, the year prior to the experiment, the average household had 9 members, its holding of livestock was worth Zim$13,360 and its

nominal household income was Zim$24,150. Female players tended to come from households of similar size and with similar livestock holdings, but with significantly lower incomes (Zim$18,900 compared with Zim$28,100) than male players.

On average, the players' households have blood ties to 2.25 and marriage ties to 1.02 other households within the same village. The first of these figures is low by African standards and reflects the fact that eight out of the twelve villages included in the study are resettled. The resettlement programme in the early 1980s involved the selection of applicant households at random for inclusion in each newly created village. This also explains why the average household in this sample shares its tribal descent with only 22.5 percent of the households in the same village. The resettled households have compensated for the lack of kinship and ethnic ties by forming civil associations: the average household in this sample maintains 3.5 memberships in civil associations within their village (Barr (2003)). There is no significant difference between male and female players with respect to social connectedness.

Focusing on each player's household head, 6.5 percent can be classified as Protestant, 3.5 percent as Catholic, 50.2 percent as belonging to new, indigenous, charismatic or apostolic churches, 2.3 percent as belonging to other world Christian religions, 25.7 percent as practicing traditional religions, and 11.9 percent as having no religion. The dominance of household heads whose tribal descent can be traced to the area northeast of Harare in the sample is a reflection of the location of the villages in the study. Ten out of the twelve are in or close to that area. The remaining two are situated between Harare and Mutanda. Heads of households from the other areas migrated to their current locations during either the resettlement exercise in the early 1980s or the preceding colonial era. The distributions of male and female players with

respect to their heads of households' religions and tribal descents and their distribution across villages are statistically indistinguishable.

4. Empirical analysis

4.1. Are men less regarding of others when deciding how to behave?

The estimated coefficients relating to models 1, 2, 3 and 4 are presented in Table 4. Before turning to our hypotheses, consider some of the results relating to the control variables. There is some evidence that older players and players coming from larger households contribute more in the PG games. However, perhaps surprisingly those coming from households with larger holdings of livestock contribute less. Those coming from households with more blood ties to other households in their village contribute significantly more. Religious affiliation, tribal descent, and village of residence also have significant effects on contributing behaviour.

In every game, women contributed more than men even after controlling for variations in the other economic, social and cultural factors mentioned above. In the game-by-game analyses (models 1 and 2), this difference only reaches significance in the fourth game. However, it is large and significant in the pooled regression (model 3) and fixed effects analysis (model 4).

4.2. Are men less responsive than women to the social or shame sanctions imposed by others?

In models 2 and 3 only one of the four sanctioning variables, *shamers low*, has a significant coefficient and this is perversely signed due to omitted variable bias. In model 4, the bias is removed and the coefficient is insignificant, although it remains

negative. Here also, the coefficient on *shamers low vil. av.* is positive, large and highly significant, suggesting that players are motivated to increase their level of cooperation not by the criticism that is directed at them personally, but by the criticism that is direct at all the individuals that behaved in the same way as them. This result is confirmed by the dynamic model 5, which is presented in Table 5. In this model the negative coefficients on *shamers high* and *shamers high vil. av.* are also significant suggesting that players who are criticised for making too high a contribution and/or observe others who made similar contributions being thus criticised, significantly reduce their contributions in the subsequent game. Also, note the negative and significant coefficient on the dummy variable *game4*, which indicates that if no use were made of the opportunity to impose social sanctions the players would contribute less in the subsequent game.

The lower half of the first column in Table 5 presents the results of the regressions that take the player fixed effects from the first stage of model 5 as there dependent variable. Here, we see that the coefficient on *female* is once again positive and significant, suggesting that women become increasingly more cooperative than men as we move to increasingly socially interactive contexts.

Model 6, which includes the interaction terms between *female* and the social sanctioning variables, is not an improvement on model 5: the interaction terms are neither jointly nor individually significant. So, model 5 remains the preferred model.

4.3. Are men less effective than women at sanctioning others?

In model 7, Table 5, we see that the greater the proportion of women among those who shame a player for contributing too little, the larger the upward adjustment in that

players contribution in subsequent games. Further, including this variable causes the negative coefficient on *shamers low* to become significant once more. This indicates that, *ceteris paribus,* when players are criticised for making too low a contribution only or primarily by men, on average, they actually make an even lower contribution in the subsequent game. However, if a sufficient proportion of their critics are women, on average, they make a larger contribution in the subsequent game.

4.4. Are men more likely than women to escape sanctioning by others when they behave in an antisocial manner?

The upper half of Table 6 contains the estimated coefficients relating to three versions of model 8. In the first column *shamers*, the number of people who criticized player *i*, is the dependent variable. In the second column *shamers low*, the number of people who criticized player *i* for making too low a contribution, is the dependent variable. And in the third column *shamers high*, the number of people who criticized player *i* for making too high a contribution, is the dependent variable. Here, the signs and magnitudes of the significant coefficients on *contrib. (lagged)* and *contrib. (lagged) sq.* in the first column indicate that players are more likely to be criticised if they make a very high or a very low contribution. Then, in the second and third columns we see that those making lower contributions are more likely to be criticised for making too low a contribution and those making higher contributions are more likely to be criticised for making too high a contribution. Players whose behaviour was offered up for discussion later were more likely to be criticised, probably because potential critics became less inhibited as the discussion progressed. *Ceteris paribus*, young players and more educated players are more likely to be criticised for making too low a contribution. Married players and household heads are more likely to be

criticised for making too high a contribution, possibly because they are risking their families' return from the game rather than just their own. *Ceteris paribus,* players from households with higher incomes were less likely to be criticised, especially for making too high a contribution. Those from households with more marriage ties to other households in the same village received more criticism, especially for low contributions, and those from households maintaining more associational memberships were less likely to be criticised for making too low a contribution. Both tribal descent and village of residence affected the likelihood of a player being criticised, especially for making too low a contribution. And finally, while women are generally less likely to receive criticism, the coefficients in the models for the two specific forms of criticism are poorly defined.

4.5. Are men less likely than women to sanction others who behave in an anti-social manner?

The lower half of Table 6 contains the estimated coefficients relating to three versions of model 9. In the first column *targets*, the number of people criticized by player *i*, is the dependent variable. In the second column *targets low*, the number of people criticized by player *i* for making too low a contribution, is the dependent variable. In the first column *targets high*, the number of people criticized by player *i* for making too high a contribution, is the dependent variable. Player *i*'s own contribution behaviour has no effect on how many other players he or she criticizes for making too low or too high a contribution. Education increases the number of targets, particularly the number criticized for making too high a contribution. Players from households with higher incomes criticise more people for making too low a contribution. Those from households with fewer marriage ties criticise fewer people and those from

households who maintain more associational memberships criticise more high and low contributors. Once again, village of residence has a significant effect on how many other players, both low and high contributors, a player criticizes. However, the gender of the player has no significant effect at all.

5. Conclusions

The evidence relating to hypothesis 1, while mixed, tends to support the conclusion that, compared to women, men are less regarding of others when deciding how to behave at least within the context of the public goods game. They contributed less in each of the games they played and significantly less in the fourth. Some experimentalists might argue that this result is of little value compared to those derived from laboratory experiments incorporating double blind procedures and other experimental controls that are impractical in the field. This may be true to a degree, but we also need to ask how relevant observations made within the highly abstract setting of an experimental laboratory are to our understanding of human behaviour in everyday life. We propose that our field experiments should be seen as a complement to and viewed alongside the laboratory work undertaken in this area.

Turning to hypothesis 2, there is no evidence to suggest that men are less responsive than women to social or shame sanctions imposed by others. This is the case with respect to both their first-hand experience of being sanctioned by others and their experience of witnessing the sanctioning of others who have behaved in a similar way to themselves. This notwithstanding, it is interesting to note the greater magnitude and significance of the gender difference as the level of social interaction associated with the game increases with the discussion round. These results suggest

that it would be inappropriate to characterise the men in our sample as shameless, even though they show signs of being less pro-social than their female co-villagers.

With respect to hypothesis 3, the data suggest that men are less effective than women at sanctioning others. In fact, when men sanction non-cooperators they tend to have a perverse effect on their behaviour, causing them to become even less rather than more cooperative. With respect to hypothesis 4, it seems that men are less likely than women to escape sanctioning by others, although if we focus only on the sanctioning of uncooperative behaviour, this result is weak. And finally, with respect to hypothesis 5, men are neither more nor less likely than women to sanction others who have behaved in an uncooperative manner.

One complicating factor emerged during the analysis that was not anticipated at the time when the experiment was designed – in several of the villages not only low but also high contributors were socially sanctioned. That married players and household heads attracted more criticism of this kind suggests that the sanctioning villagers may have been taking account of their co-villagers' competing obligations when deciding who to sanction. Note also that the more educated, i.e., those who might have had a greater understanding of the maths of the game, tended do more criticising of high contributors, possibly with the hope of enlightening them about the potential implications of their actions. For high contributors without family responsibilities and the less educated sanctioners, an alternative explanation might relate to a taste for conformity (Jones (1984)). Regardless of which if any of these explanations is correct, the question of whether we should adopt a definition of antisocial behaviour that includes high contributions remains to be answered. Further, if the competing obligations explanation is correct, its implications within the context of microfinance needs to be explore. In future research this finding might usefully be

linked to the informal insurance function fulfilled by groups in microfiance arrangements.

To sum up, while the results suggest that women may indeed have a comparative advantage when it comes to functioning in groups, it does not, at least in Zimbabwe, appear to be related to their responsiveness to shame sanctions. Rather it relates to the behavioural rules they appear to have internalised, the way in which these rules interacts with the general level of social interaction, and their effectiveness at sanctioning others who behave antisocially. Whether these results are applicable beyond the bounds of the Zimbabwean villages within which the experiments were conducted remains to be seen. It is also not entirely clear at this stage whether and how behaviour within the experiments reflects behaviour in real situations including those involving group-lending contracts, although some of our results relating to the social connectedness and social status of the players are promising. Forging a link between experimental data and a wide array of data is, arguably, the most important contributions of the paper. The other is to demonstrate the potential value of the experimental methodology as a tool for addressing questions about informal contractual performance.

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Figure 1: Mean contributions by men and women in games 1 to 4

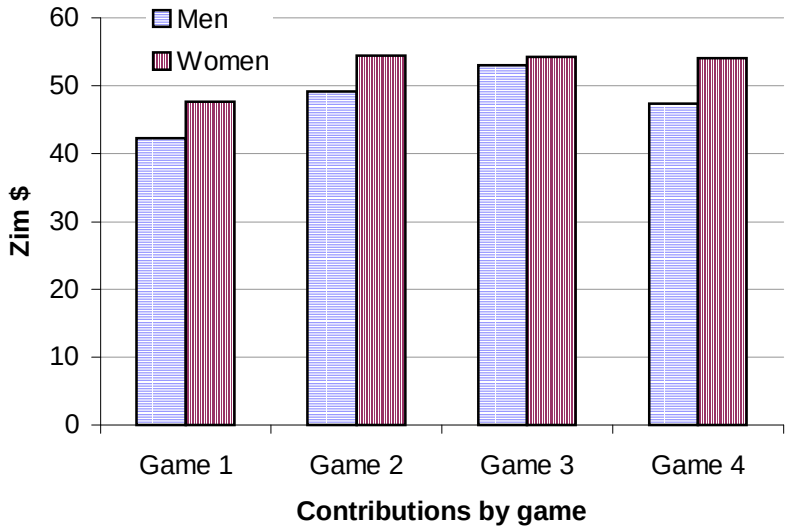

Figure 2: Cumulative distribution functions for contributions by men and women in games 1 to 4

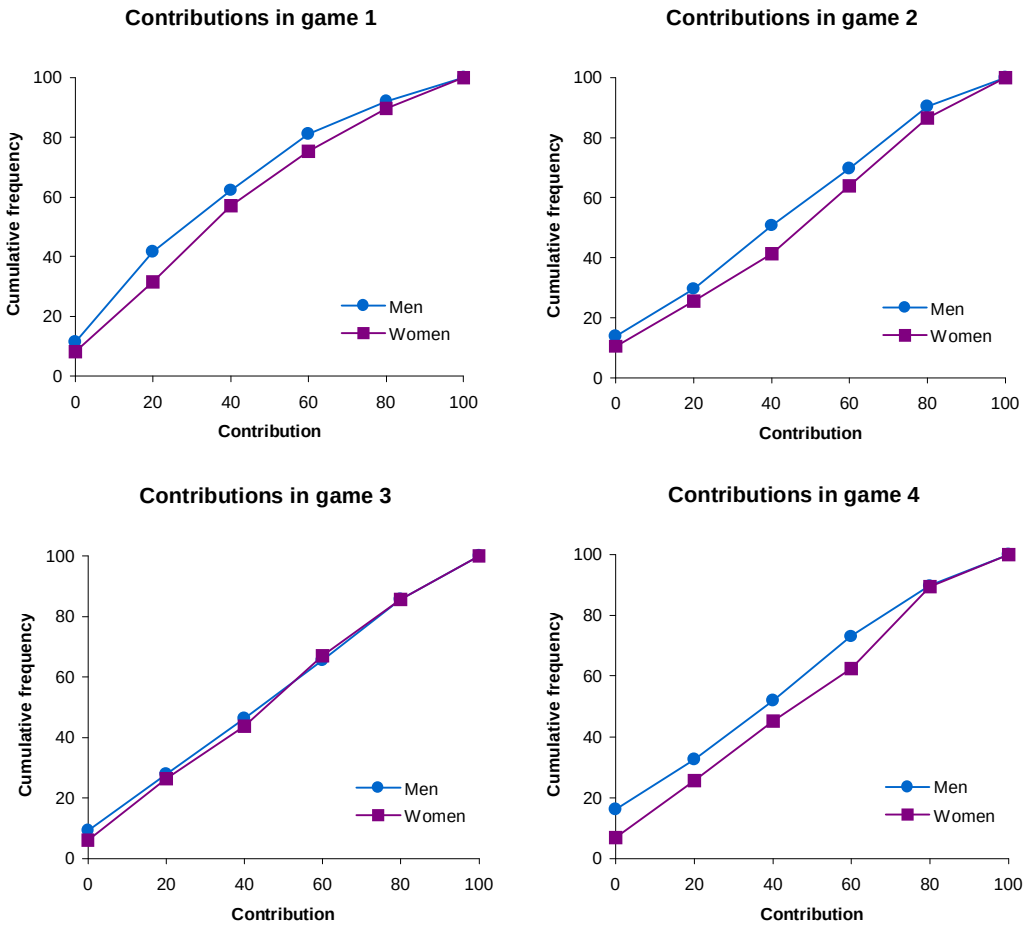

Figure 3: Cumulative distribution functions for men and women's contributions by game

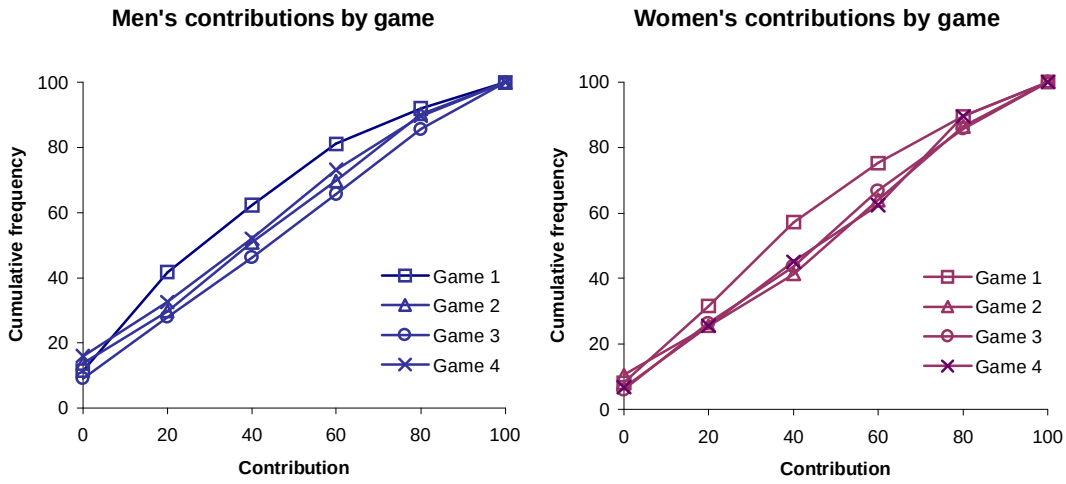

Figure 4: The shamed and the shamers

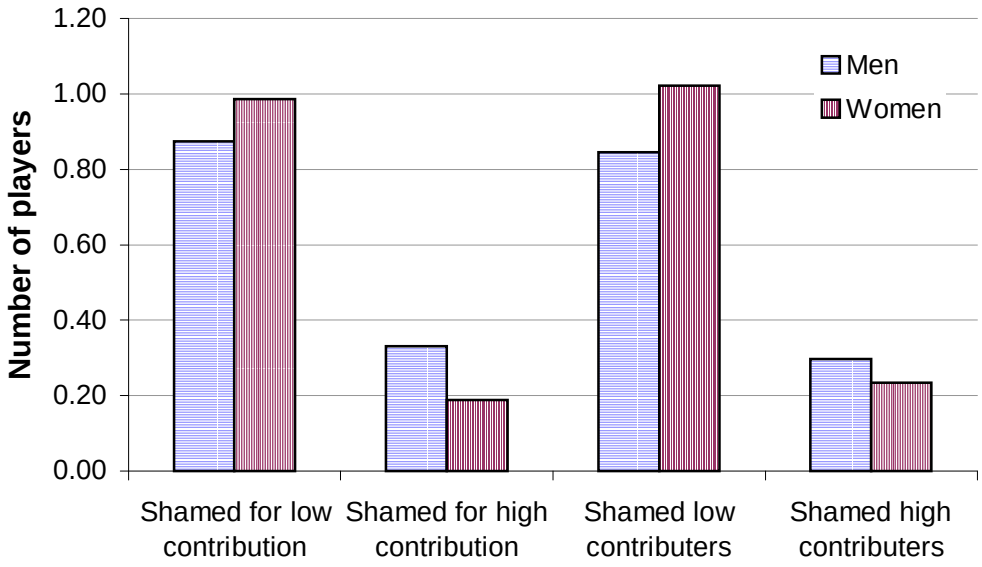

Table 1: Experimental behaviour of male and female players

	Men	Women		All	Sd.
Sample size	**175**	**133**		**308**	
Contributions					
in game 1	42.29	47.67		44.61	29.16
in game 2	49.14	54.44		51.43	31.08
in game 3	53.03	54.29		53.57	30.53
in game 4	47.31	54.14	*	50.26	30.82
The shamers and the shamed					
No. who shamed ego for low contribution	0.87	0.98		0.92	1.87
No. who shamed ego for high contribution	0.33	0.19	*	0.27	0.71
No. of others shamed	1.14	1.26		1.19	2.07
No. of low contributers shamed by ego	0.85	1.02		0.92	1.72
No. of high contributors shamed by ego	0.30	0.23		0.27	0.71

Notes: ** means for males and females significantly different at the 5% level, according to a two tail test assuming non-equal variance, * means for males and females significantly different at the 10% level according to a two tail test assuming non -equal variance.

Table 2: Origin of economic, social and cultural variables

Variable	Source	Data generation method
Individual characteristics female age schooling married (percent) head (percent)	ZRHID survey	Application of structured questionnaire to individual or household head
Economic characteristics of household hhsize (number of members) livestock ('000 Zim $) income ('000 Zim $)	ZRHID survey	Application of structured questionnaire to household head
Social connectedness of household		
blood relations marriage relations	Dekker (2003)	Participatory social mapping exercise
sametribe memberships	Barr (2003)	Semi-structured interviews, application of structured questionnaires to groups and individuals
Religion of household head		
Geographical area of household head's tribal descent		
Village of residence	ZRHID survey	Administrative data

Table 3: Economic, social, and cultural characteristics of players

	Men	Women		All	Sd.
Sample size	149	112		261	
Individual characteristics					
female (percent)				42.91%	
age	45.01	37.79	***	41.92	18.38
schooling	6.82	5.68	***	6.33	3.19
married (percent)	75.17%	61.61%	**	69.35%	
head (percent)	67.79%	24.11%	***	49.04%	
Economic characteristics of household					
hhsize (number of members)	9.36	8.49		8.99	5.97
livestock ('000 Zim $)	13.88	12.65		13.36	11.35
income ('000 Zim $)	28.10	18.90	***	24.15	27.37
Social connectedness of household					
blood	2.50	1.92		2.25	4.09
marriage	0.93	1.14		1.02	1.26
sametribe	22.95	22.04		22.56	13.37
memberships	3.66	3.16		3.45	2.66
Religion of household head (percent)					
Protestant	7.38%	5.36%		6.51%	
Catholic	3.36%	3.57%		3.45%	
Apostolic	51.01%	49.11%		50.19%	
Other Christian	3.36%	0.89%		2.30%	
Traditional	26.85%	24.11%		25.67%	
none	8.05%	16.96%		11.88%	
Geographical area of household head's tribal descent (percent)					
north-east of Shamva	52.35%	46.43%		49.81%	
between Shamva and Harare	5.37%	3.57%		4.60%	
west of Harare	2.68%	5.36%		3.83%	
between Harare and Mutanda	18.79%	18.75%		18.77%	
south-east of Senegezi and Mutanda	7.38%	9.82%		8.43%	
north or east of Mutanda	6.04%	8.04%		6.90%	
from outside Zimbabwe	7.38%	8.04%		7.66%	
Village of residence (percent)					
Chitepo	8.72%	10.71%		9.58%	
Mudzinge	8.72%	14.29%		11.11%	
Muringamombe	9.40%	5.36%		7.66%	
Moturamehepo	4.70%	4.46%		4.60%	
Mupedzanhamo	5.37%	2.68%		4.21%	
Zvataida	6.71%	8.93%		7.66%	
Tongogara	13.42%	6.25%		10.34%	
Gwetera	16.11%	10.71%		13.79%	
Guzemuka	7.38%	8.04%		7.66%	
Madziwana	6.71%	11.61%		8.81%	
Chechera	6.04%	9.82%		7.66%	
Paswavavaviri	6.71%	7.14%		6.90%	

Notes: ** means for males and females significantly different at the 1% level, according to a two tail test assuming non-equal variance, * means for males and females significantly different at the 5% level according to a two tail test assuming non-equal variance.

Table 4: Regression analysis of contributions in the public goods games

	Game 1 (model 1)		Game 2 (model 1)		Game 3 (model 1)		Game 4 (model 2)		Pooled sample (model 3)		Fixed effects (model 4)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
constant							22.606	12.884	14.635	10.823	44.610	1.276 ***
shamers low							-5.494	1.779 **	-3.786	1.462 **	-1.850	1.584
shamers high							-3.576	4.696	-2.945	4.332	-4.114	2.525
shamers low vil.av.							9.829	8.453	6.701	6.906	16.097	5.228 ***
shamers high vil.av.							8.875	12.752	7.223	12.683	-10.930	7.857
game2									7.203	1.638 ***	6.818	1.805 ***
game3									9.655	1.848 ***	8.961	1.805 ***
game4									7.385	3.246 **	5.312	2.210 **
Obs. (FE only)												1232
Groups (FE only)												308
constant	11.134	14.988	16.111	10.787	33.551	16.988					-30.568	12.392 **
female	8.841	5.505	7.862	4.853	6.046	5.071	10.978	5.487 *	8.503	3.721 **	8.806	4.070 *
age	0.242	0.140	0.418	0.189 **	0.270	0.191	0.261	0.129 *	0.298	0.113 **	0.312	0.128 **
schooling	0.145	0.828	-0.320	0.711	-0.227	1.000	0.484	0.933	-0.008	0.663	-0.085	0.785
married	5.323	3.383	-0.114	6.111	3.731	4.727	7.013	3.151 **	3.792	2.630	3.225	3.147
head	2.855	7.289	-2.416	6.649	5.485	6.934	2.924	4.803	2.237	3.892	2.652	4.335
hhsize	0.572	0.380	0.555	0.291 *	0.708	0.274 **	0.251	0.288	0.538	0.185 **	0.646	0.212 **
livestock	-0.284	0.174	-0.224	0.193	-0.200	0.200	-0.401	0.200 *	-0.279	0.123 **	-0.278	0.141 *
income	0.034	0.045	-0.020	0.072	0.017	0.082	0.179	0.053 ***	0.054	0.044	0.058	0.049
blood	-0.174	0.471	1.324	0.344 ***	0.687	0.366 *	0.282	0.380	0.543	0.200 **	0.590	0.260 **
marriage	0.953	2.195	1.200	1.482	3.104	2.145	1.120	1.308	1.583	1.142	1.587	1.325
sametribe	0.005	0.185	-0.189	0.167	0.013	0.231	-0.038	0.157	-0.055	0.106	-0.063	0.120
memberships	-0.087	1.181	0.721	1.478	0.423	1.625	-1.052	1.324	0.039	1.035	0.205	1.169
Joint sig. of 5 religion dummies		0.651		0.193		0.296		0.258		0.031 **		0.059 **
Joint sig. of 6 tribal dummies		0.013 **		0.002 ***		0.276		0.147		0.017 **		0.021 **
Joint sig. of 11 village dummies		0.000 ***		0.000 ***		0.000 ***		0.000 ***		0.000 ***		0.000 ***
R sq.		0.176		0.189		0.189		0.280		0.179		0.277
Obs.		261		261		261		261		1044		261

Table 5: Dynamic models of cooperative behaviour

	Arellano-Bond (model 5)		Arellano-Bond (model 6)		Arellano-Bond (model 7)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
constant	2.872	1.809	2.848	1.815	3.209	1.763
contrib. (lagged)	-0.162	0.060 ***	-0.153	0.061 **	-0.189	0.058 ***
others' contrib.	-0.828	0.960	-0.761	0.960	-0.837	0.919
others' contrib. sq.	0.020	0.020	0.019	0.020	0.021	0.019
others' contrib. cu.	-1.4E-04	1.3E-04	-1.3E-04	1.3E-04	-1.5E-04	1.2E-04
shamers low	-1.255	1.319	-0.984	2.012	-3.166	1.395 **
shamers high	-4.433	2.612 *	-4.864	3.038	-3.896	2.881
shamers low vil.av.	20.771	4.211 ***	19.295	5.161 ***	21.729	3.982 ***
shamers high vil.av.	-28.012	7.372 ***	-21.490	11.008 *	-24.716	7.358 ***
game4	-5.841	2.869 **	-8.062	3.112 **	-7.898	2.742 ***
*fem * shamers low*			-1.236	2.733		
*fem * shamers high*			0.940	6.201		
*fem * shamers low vil.av.*			6.429	9.332		
*fem * shamers high vil.av.*			-13.404	14.207		
*fem * game4*			4.812	4.206		
fem. in shamers low					20.196	6.718 ***
fem. in shamers high					-1.988	8.259
Obs. (FE and AB only)		616		616		616
Groups (FE and AB only)		308		308		308
Autocovariance test (p-value)		0.002		0.002		0.006
Sargan test (p-value)		0.894		0.956		0.644
constant (FE and AB only)	33.680	14.952 **	33.411	14.955 **	33.755	15.609 *
female	9.973	4.979 *	8.564	5.001	10.310	5.132 *
age	0.391	0.169 **	0.393	0.168 **	0.418	0.174 **
schooling	-0.266	0.978	-0.253	0.967	-0.216	0.987
married	2.858	4.685	2.729	4.745	2.867	4.791
head	2.929	5.612	2.813	5.653	2.427	5.800
hhsize	0.845	0.249 ***	0.839	0.247 ***	-0.337	0.178 *
livestock	-0.313	0.177	-0.307	0.178	0.066	0.072
income	0.070	0.070	0.068	0.069	0.955	0.398 **
blood	0.942	0.371 **	0.941	0.367 **	2.035	1.453
marriage	2.087	1.456	2.037	1.437	-0.095	0.169
sametribe	-0.099	0.168	-0.096	0.169	0.869	0.237 ***
memberships	0.412	1.642	0.395	1.630	0.334	1.644
Joint sig. of 5 religion dummies		0.077 *		0.079 *		0.081 *
Joint sig. of 6 tribal dummies		0.025 **		0.025 **		0.025 **
Joint sig. of 11 village dummies		0.000 ***		0.000 ***		0.000 ***
R sq.		0.254		0.252		0.264
Obs.		261		261		261

Table 6: Regression analysis of shaming behaviour

Ego shamed by others	***shamers*** (model 8)		***shamers low*** (model 8)		***shamers high*** (model 8)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Constant	3.261	1.271 **	1.028	1.703	-6.429	2.092 ***
contrib. (lagged)	-0.172	0.019 ***	-0.005	0.030	0.059	0.045
contrib. (lagged) sq.	1.2E-03	1.8E-04 ***	-2.6E-03	5.7E-04 ***	-6.3E-05	3.3E-04
play order	2.019	0.584 ***	1.994	0.692 ***	1.338	0.745 *
female	-0.960	0.409 **	-0.702	0.440	-0.780	0.585
age	0.020	0.015	0.038	0.018 **	0.005	0.018
schooling	0.145	0.066 **	0.346	0.092 ***	0.046	0.076
married	1.102	0.394 ***	0.579	0.439	0.976	0.555 *
head	0.566	0.501	0.029	0.601	1.525	0.656 **
hhsize	-0.051	0.033	-0.073	0.046	0.020	0.036
livestock (Zim$ '000)	0.002	0.017	-2.5E-04	0.023	0.024	0.019
income (Zim$ '000)	-0.017	0.008 **	-0.010	0.009	-0.021	0.011 *
blood	-0.047	0.048	0.014	0.059	0.005	0.061
marriage	0.334	0.137 **	0.407	0.180 **	0.048	0.171
sametribe	-0.005	0.015	-0.011	0.017	-0.018	0.019
memberships	-0.103	0.109	-0.243	0.138 *	0.059	0.129
Joint sig. of 5 religion dummies		0.125		0.572		0.281
Joint sig. of 6 tribal dummies		0.128		0.007 ***		0.599
Joint sig. of 11 village dummies		0.000 ***		0.000 ***		0.109
R sq.		0.261		0.522		0.349
Obs.		261		261		261

Ego shaming others	***targets*** (model 9)		***targets low*** (model 9)		***targets high*** (model 9)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
constant	-3.480	2.028 *	-3.268	1.855 *	-5.192	1.926 ***
contrib. (lagged)	0.005	0.009	0.005	0.008	0.004	0.008
female	0.094	0.650	0.440	0.594	-0.547	0.583
age	0.038	0.023	0.032	0.021	0.009	0.021
schooling	0.187	0.107 *	0.110	0.097	0.246	0.098 **
married	0.211	0.604	0.217	0.559	0.217	0.503
head	-0.395	0.830	-0.110	0.756	-0.005	0.721
hhsize	0.006	0.051	0.017	0.046	-0.029	0.047
livestock (Zim$ '000)	-0.010	0.029	-0.014	0.026	0.003	0.025
income (Zim$ '000)	0.020	0.013	0.020	0.012 *	0.007	0.011
blood	0.042	0.077	0.073	0.069	-0.053	0.069
marriage	-0.451	0.251 *	-0.277	0.225	-0.289	0.221
sametribe	0.017	0.024	0.009	0.022	0.041	0.025 *
memberships	0.389	0.167 **	0.343	0.152 *	0.280	0.145 *
Joint sig. of 5 religion dummies		0.442		0.634		0.689
Joint sig. of 6 tribal dummies		0.615		0.684		0.926
Joint sig. of 11 village dummies		0.001 ***		0.001 ***		0.092 *
R sq.		0.080		0.089		0.162
Obs.		261		261		261