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Aid Distribution and Co-operation in Unequal Communities

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Abstract

We study the influence of economic inequality on co-operation and aid distribution in community-based development schemes. For this, we organized a field experiment in which community members contributed to a collective effort to attract aid. We find that devolving aid distribution to community representatives increases the aid attracted, but that this benefits community representatives only. At the same time, however, community representatives do take fairness considerations into account. They give higher aid shares to poorer community members and lower shares to low contributors. Moreover, representatives with lower relative wealth or who contribute relatively more keep higher aid shares.

Keywords: collective action, aid distribution, experiment, Nicaragua
JEL classification: C93, D31, D70

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1 Introduction

Over the last two decades governmental and non-governmental aid resources have been increasingly distributed through participatory or community-based development (CBD) schemes (Mansuri and Rao 2004). In some occasions, the benefits are equally distributed irrespective of people's contribution. This is the case for the construction of local *public goods*, such as a school or a common water well, or the maintenance of local roads or irrigation systems. In other cases, private goods are distributed, such as seeds or tools, which are not necessarily distributed equally.

The mandate to distribute these aid resources among the community members is often devolved to local community representatives. This has several advantages. In comparison with the officers of aid programmes, local representatives tend to have better access to local information which might increase the efficiency and sustainability of the programme. At the same time, however, participatory programmes are vulnerable to aid capture by community representatives (Galasso and Ravallion 2001; Conning and Kevane 2002; Platteau and Abraham 2002; Platteau and Gaspart 2003; Ravallion 2003; D'Exelle 2009; Takasaki 2011). Such capture is commonly modelled as the autonomous decision of community representatives, who act as brokers between their community and the outside aid community. The underlying models, however, ignore the following two important elements.

First, a community-based development approach requires community members to get mobilized and organized, on which aid provision is made conditional. Setting up new community-based development projects therefore requires sufficient contributions from community members, in terms of time and labour. If aid resources are equally distributed irrespective of people's contribution, such 'community mobilization' can be modelled as a public good and free riding behaviour is to be expected. Giving local community representatives a mandate to distribute aid resources among the community members internalizes the externalities inherent in community mobilization. The distributive implications of doing so are not clear though. On the one hand, the devolution of aid distribution may reduce free riding behaviour and hence lead to higher amounts of aid attracted. On the other hand, community representatives may capture a substantial proportion of the attracted aid resources.

Second, little attention has been paid to the importance of fairness. There is growing evidence in behavioural economics that fairness concerns matter when scarce resources are distributed. Economic inequality may exert an important influence on the dynamics of community mobilization and aid distribution for communities that value fairness. Moreover, as community representatives are most active in community mobilization, it may well be fair that they get a larger part of the provided aid resources. Consequently, an unequal distribution of aid resources is not necessarily 'unfair' if there is economic inequality or if contributions to community mobilization have been unequal as well.

In this study, we look at the impact of devolving aid distribution to endogenously selected community representatives on community mobilization and aid distribution as well as the importance of economic inequality on these effects. For this, we design an experiment that simulates the distribution of development aid channelled through a participatory development

approach. Such an approach implies that sufficient community mobilization is required. In particular, the final beneficiaries are expected to contribute sufficient amounts of resources, including time and labour. The amount of aid attracted depends on the level of community mobilization, simulated by the collective contribution (the details of our experimental design are provided in Section 2). The community members with the highest contribution to community mobilization are selected as community representatives.

Two treatments are organized that differ in the way the attracted aid is distributed among the community members. In the first treatment, the aid resources are distributed equally irrespective of individual contributions. In the second treatment, the community member with the highest contribution distributes the aid resources. Comparing both treatments allows us to study the influence of devolving the distribution of aid resources to the community level. To study the effects of inequality, we ran two between-subject treatments. In one treatment, all group members receive equal endowments, while in the second half of the group members receive a high endowment and the other half a low endowment.

An important reason for organizing experiments in a field laboratory is to analyse how community mobilization and aid distribution is influenced by devolving aid distribution to self selected community representatives, and that we can do it in a controlled way. A controlled environment is also very helpful to investigate the effect of economic inequality. In real-life, it is virtually impossible to observe how people behave under different institutional and economic conditions in otherwise identical situations.

The results of our analyses can be summarized as follows. We find that devolving the responsibility of aid distribution to community representatives increases the level of community mobilization. While this leads to larger amounts of aid attracted, it does not translate into larger absolute aid shares for the community members (except for the community representatives). Community representatives, however, do not capture all resources, but take fairness considerations into account when distributing aid. They give higher aid shares to poorer community members and lower shares to community members who contribute little. Moreover, representatives with lower relative wealth or who contribute relatively more keep higher aid shares. Finally, we find that endowment inequality leads to higher levels of mobilization when aid resources are equally distributed but not when aid distribution is devolved to the community.

2 Experimental design

To simulate the distribution of development aid through a participatory development scheme, we designed an experiment, the structure of which closely simulates the actual experiences of our subjects. We organized the field experiment in November-December 2009, in six rural villages in the Pacific and interior regions of Nicaragua, where in recent years substantial amounts of aid resources have been distributed through participatory development projects.

2.1 A field experiment with community mobilization as public good

Potential aid donors that follow a participatory approach expect the community to identify needs, elaborate plans and budget, get organized, etc. As these are important aid conditions,

aid donors will be more willing to provide aid resources in communities that manage to mobilize successfully. Such mobilization requires that community members pool sufficient amounts of resources, often in the form of time and labour.

In the experimental game we model this in the following way. Groups of $n = 8$ subjects interact for $t = 10$ rounds. In each round, all group members are asked to simultaneously and privately decide on their contribution g_i from their endowment y_i to a public account. The amount of aid attracted is calculated as the total contribution to the public account, multiplied by an efficiency factor b, with $1 < b < n$. After this, a second stage is added where the attracted aid is distributed among the group members, each receiving a share s_{it} so that the payoff of individual i in round t is equal to: $\pi_{it} = y_i - g_{it} + s_{it} \cdot b \sum_{j=1}^{n} g_{jt}$.

We organize two different treatments that vary in the distribution mechanism. In a first treatment, called the 'equal sharing' treatment, $s_{it} = 1/n$, in which everyone receives the same share of the attracted aid. This treatment is played for five consecutive rounds. After this treatment, the same players continue for another five rounds, in which the highest contributor distributes the attracted aid among the group members (called the 'representative sharing' treatment).[1] In particular, he/she decides on the vector $[s_{1t}, s_{2t}, \dots, s_{nt}]$, with $\sum_{i=1}^{n} s_{it} = 1$ and $s_{it} \geq 0$.[2] Comparing both treatments allows us to investigate how devolving aid distribution to local community representatives effects aid distribution and community mobilization.

To study the effect of endowment inequality on community mobilization and aid distribution, and its interaction with the effect of the devolution of aid distribution, we organize an additional between-subject treatment comparison. In one treatment, all group members receive equal endowments y = 10 units, while in the second treatment, half of the group members receive a high endowment of y = 12 and the other half a low endowment of y = 8. Combining all treatments leads to the design depicted in Table 1. The table also shows the number of sessions in each treatment.

In each community we organized a maximum of three sessions in a maximum of two days. Participants were randomly selected from a village census. In total, 128 persons participated in 16 sessions. Seventy-two of them are female (56.25 per cent). None had participated in a similar experiment before. Each session lasted between 90 and 120 minutes. Average earnings were C$117.7 (i.e. equal to US$5.67, being more than two days average income), with the highest earnings being C$200.0 and the lowest C$70.0. After the experiment, participants were asked to answer a series of post-experimental questions which allowed us to capture important socio-economic characteristics (including economic inequality). Some descriptive statistics can be found in Appendix 1 (Table A1), while detailed experimental procedures and the instructions are presented in Appendix 2.

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1 People do not know how many rounds will be played or that a second series with different rules will follow the first treatment.

2 To facilitate the decision–making by community representatives, we asked them to decide first on the amount of aid to keep for themselves, and second on the distribution of the remaining resources among the other group members. For each group member they were asked to decide whether to give nothing, a low share, or a high share; with high shares being double as high as low shares. $S_i = 0,1,2$ with 0 = nothing, 1 = low and 2 = high. $s_i = S_i \cdot \frac{(1-s_r)}{\sum_{i \neq r} S_i}$ and s_r is the share kept by the representative.

2.2 Theoretical considerations

In this section, we elaborate theoretical predictions for individual behaviour in terms of contributions to the public account and aid distribution, and how this may differ across the treatments. We start with the equal sharing treatment and the representative sharing treatment, after which we continue with a reflection on the possible effect of economic inequality, both induced by experimental treatments and by real-life heterogeneity.

Equal sharing treatment

Note that the equal sharing treatment, where all group members receive an equal aid share, is similar to the standard public goods game (Ledyard, 1995). From $b > 1$ follows that it is socially optimal to contribute everything as this maximizes the group payoff. However, as $b/n < 1$ and with people having selfish preferences, each player has a dominant strategy to free ride for any given allocation of the other group members, leading to a Nash equilibrium where everyone contributes nothing at all. As confirmed by several experimental studies, however, the assumption of selfish preferences is commonly rejected. In reality, many people are conditional co-operators, that is, they co-operate if they expect others to do the same. Consequently, contribution levels will commonly be higher than predicted by the Nash equilibrium of zero co-operation. With repeated play, however, co-operation levels tend to deteriorate over time as conditional co-operators reduce their contribution when they realize other group members free ride (on this, see e.g. Fischbacher, Gächter, and Fehr 2001).

Representative sharing treatment

In the representative sharing treatment, there are two mechanisms that stimulate individual contributions which are absent in the equal sharing treatment. First, with standard preferences a player who expects to be the only highest contributor will opt for full contribution and keep all resources. He does so since the attracted aid resources will always be strictly larger than his individual contribution (as $b > 1$ and $s_i = 1$). The other members, knowing that the highest contributor will keep all aid, do not have any incentive to increase their contribution. As a consequence, the strategy combination where one group member contributes everything and others do not contribute anything at all, will be an equilibrium. A strategy combination where all group members contribute the same amount can never be an equilibrium. The individual (expected) pay-off is then equal to: $\pi_i = y - g_i + p_{repr}\, b \sum_{j=1}^{n} g_j$. With the probability to become the representative $p_{repr} = 1/n$, we have the same situation as the standard public goods game, and with $b < n$, it is not an optimal strategy to contribute anything to the public good. The crucial difference with the equal sharing treatment, however, is that p_{repr} is not fixed, but depends on the number of highest contributors. As a consequence, we have multiple equilibria. If the efficiency factor $b > 2$, a strategy combination where two risk-neutral group members contribute everything and all others nothing, may also be an equilibrium. Such competition among highest contributors will certainly stimulate contributions to the public good.

Second, with social preferences, people will be more inclined to contribute—as we predicted in the equal sharing treatment. Moreover, social preferences may stimulate community representatives to punish non co-operative group members by giving them lower aid shares. As shown by experimental studies (for example, Fehr and Gächter 2000), introducing a punishment option leads to higher contribution levels. Therefore, if group members anticipate

that the representative gives less to less generous contributors, they may be willing to contribute more.

In sum, compared to the equal sharing treatment in the representative sharing treatment there are two additional mechanisms (through competition for the representative's role and anticipation of punishment by the representative) that stimulate individual contributions. Hence, we expect co-operation to be higher with representative sharing.

The influence of economic inequality

There is a large literature on the effect of economic inequality in standard public goods games (remember that with equal sharing our game is actually a public goods game), but the evidence is inconclusive (for example, see the literature review in Anderson, Mellor, and Milyo 2008). Relying on models of inequality aversion and altruism, Buckley and Croson (2006) predicted low and high endowment subjects to contribute differently in absolute terms, but this was not confirmed by their experimental results. However, other studies found a negative effect of inequality on contributions to public goods. Cardenas (2003), for example, found that real-life inequality reduces contributions in a public goods game, but only when participants were allowed to communicate with each other.

In the representative sharing treatment, introducing endowment inequality does not change the existence of the equilibrium where one group member is the highest contributor and keeps all aid resources while all other group members do not contribute anything. With unequal endowment, however, players with higher endowments are more capable of overbidding the players with lower endowment. As a consequence, high endowment players have the highest chance of becoming the highest contributor.

Besides the experimentally induced inequality through differences in endowments, real-life inequality may be brought into the experiment. As the participants knew the other group members in the experiment, they were able to compare their individual wealth with the average group wealth. It is assumed that participants bring this variation spontaneously into the game, which is a realistic assumption for participants from populations where heterogeneity is substantial, and who frequently interact with each other in their daily life (Cardenas and Ostrom 2004).

Both sources of inequality may have a different effect on individual behaviour. Whereas endowment inequality leads to variation in the technical upper bound of contributions, real-life economic inequality does not have an influence on the range of feasible options in the experiment. It is not clear what the overall effect of real-life inequality will be on individual behaviour in the representative sharing treatment, as there may be two opposing effects. First, because of social preferences poorer (richer) people may expect richer (poorer) people to contribute more (less). Second, socio-economic heterogeneity may also translate into differences in risk aversion as suggested by some experimental studies (Miyata 2003; Wik, Kebede, Bergland, and Holden 2004). Richer people tend to be less risk averse and may therefore be more inclined to compete for the representative's role.

3 Analyses

In this section, we present the empirical results. We start with an analysis of descriptive statistics that look at treatment effects and time trends. Thereafter, we report the results of regression analyses that investigate how individual contributions to community mobilization and aid distribution are influenced by economic inequality, both induced by the experiment and from real life.

3.1 Co-operation

Table 2 shows the average contribution in each round, separately for the equal and unequal endowment treatments. As explained before, in the first five rounds the attracted aid is distributed equally (equal sharing treatment) whereas in the last five rounds a representative distributes the resources (representative sharing treatment). We observe that in the equal sharing treatment average contributions decline over time. This is consistent with existing evidence from experimental public good games (Fischbacher et al. 2001). After a while people start to realise that others free ride, and as a reciprocal reaction reduce their contributions. In the representative sharing treatment, in contrast, average contributions slightly increase over time. The same patterns are observed in the equal and unequal endowment treatments. As explained before, this is the result of (anticipation of) punishment by the representative and/or competition among group members to become the representative.

To analyse whether these observations are statistically meaningful, we take the average contribution in each group across all rounds as the independent unit of observation. Calculating Spearman correlation coefficients between the average contribution per session and the round number, we find that the average contribution decreases in the equal sharing treatment (first five rounds) both with endowment equality (Spearman's rho -0.619, two sided $p = .000$; $N = 40$) and endowment inequality (Spearman's rho -0.651, two sided $p = .000$; $N = 40$). In the representative sharing treatment, average contributions increase over time with endowment equality (Spearman's rho 0.453, two sided $p = .003$; $N = 40$) and endowment inequality (Spearman's rho 0.319, two sided $p = .045$; $N = 40$).

Comparing the average contributions between the first five rounds and the last five rounds, it appears that contributions are higher in the representative sharing treatment than in the equal sharing treatment. Applying a Wilcoxon signed ranks test to the average contributions of each group, we find that the distribution of group averages is statistically different between the equal sharing and representative sharing treatments, both in the equal endowment treatment (two sided $p = 0.012$; $N = 16$) and the unequal endowment treatment (two sided $p = 0.017$; $N = 16$).

Furthermore, we observe that in the equal sharing treatment contributions are lower in the equal endowment treatment than in the unequal endowment treatment, but that such difference is absent in the representative sharing treatment. Applying a Mann–Whitney test to compare the average contributions of each group between the equal and unequal endowment treatments, we find that this difference is statistically significant in the equal sharing treatment (two-sided $p = 0.016$; $N = 16$), but not in the representative sharing treatment (two-sided $p = 1.000$; $N = 16$).

To analyse this further, we calculate averages separately for low and high endowment players. Figure 1 pools both treatments and shows the average contribution separately for equal, high, and low endowment players. We observe that both high and low endowment players contribute more than equal endowment players. The first is in line with existing fairness theories, according to which people are inequality averse and therefore distribute resources in such a way that inequality is reduced. However, the same theories would also predict that low endowment players would contribute less, which is contradicted by our data. Buckley and Croson (2006) came to a similar finding. They attribute this to people's belief that free riding is morally wrong as suggested by Sugden (1984), and hence, both poor and rich players need to contribute their fair share. As a consequence, low endowment players contribute an equally large *absolute* share as high endowment players. This explains why average contributions are higher in the unequal endowment treatment.

This difference between low and high endowment players disappears in the representative sharing treatment. We observe that the increase in contributions between rounds five and six is larger for high endowment members than for low endowment members. Whereas in the equal sharing treatment high and low endowment players contribute equally, in the representative sharing treatment high endowment players contribute more than low endowment players. This gives high endowment players a higher chance to become the representative. In 32 of the 40 observations of the representative sharing treatment with unequal endowments the representative was a high endowment player.

3.2 Aid distribution

On the basis of these observations, one may conclude that to maximize community mobilization, and hence the amount of aid attracted to the community, aid distribution by community representatives is better than equal distribution. However, it is also necessary to assess the distributive implications of devolving aid distribution to community members. It may be the case that community representatives keep large part of the aid for themselves, making community members actually worse off than with equal aid distribution.

To assess this, we look at the average aid received by the group members. Figure 2a plots the average aid resources group members receive in the equal sharing and representative sharing treatments. We observe that in the equal sharing treatment, average received aid shows a similar pattern as the average contributions (Table 2), i.e. declining over time and higher with endowment inequality. This is of course not surprising given the perfect relation between total contributions and available aid, and the fact, that aid is equally distributed in this treatment. In the representative sharing treatment, average aid received (excluding the aid kept by the representative) does not increase above the levels of the last round of the equal sharing treatment. This is a striking result as in the representative sharing treatment substantially more aid is attracted. As demonstrated in Figure 2b, which plots the relative aid shares distributed among the group members (except for the community representative), we find that in the representative sharing treatment more than 40 per cent of the aid resources is kept by representatives. This suggests serious aid capture by representatives.

However, two observations are required. First, as can be observed in Table A2 in the Appendix 1, there is substantial variation in the average share kept by the representative. Second, representatives may keep larger shares than other group members to compensate for

their higher contributions. To come to a more nuanced picture, we should look at the share of aid the representative keeps relative to his/her contribution to community mobilization. Figure 3 plots the proportion of the relative aid share kept over the relative contribution. A value 1 means that the representative keeps a proportion of aid relative to his/her contribution similar to the other group members. In addition to the mean value, the figure shows the minimum and maximum values across groups, for equal and unequal endowments separately. We observe that the value of this indicator is on average around 2, which indicates that community representatives keep more aid than they deserve given their contribution and confirms there is substantial aid capture by representatives.

3.3 Competition among highest contributors

As indicated by the large shares kept by the representatives, being a representative can be very profitable. The other group members do not have any way to punish the representative directly. They could reduce their contribution, but this would also affect other group members. The best way to react against capture by representatives is to contribute as much as (or more than) the representative in an attempt to seize the representative role. In this section, we analyze competition among largest contributors.

Figure 4 plots the number of group members who make the largest contribution in a particular group and round, for equal and unequal endowment treatments separately. We observe that while both treatments start with a similar average number of largest contributors, in the equal endowment treatment competition increases, whereas in the inequality treatment it slightly declines (after an incidental increase in round three). This difference between both treatments is not surprising, as with inequality the pool of potential competitors is half as large as in the equal endowment treatment. Low endowment group members have a lower chance of becoming the largest contributor. As shown in Table 3, which shows the distribution of the largest contributions per group and round, the highest contributions are higher in the unequal endowment treatment compared to the equal endowment treatment. According to a Mann–Whitney test, this difference is statistically significant ($z = 2.831$, two-sided $p = 0.005$). The stronger competition for the representative role in the equality treatment is also reflected in that in 55 per cent of observations the highest contribution equalled the total endowment in the equality treatment compared to 12.5 per cent of observations in the inequality treatment.

The fact that representatives keep large aid shares would not be a problem if there is sufficient rotation among group members to assume the representative role. To study change in the representative role, we create a variable that counts for each group the number of rounds (out of a maximum of four) in which the current representative is different from the one in the previous round (Indicator 1). An alternative way is to count the number of rounds (out of a maximum of five) in which the representative is a group member who has not had this role before (Indicator 2). Table 4 shows the distribution of both indicators, separately for the equal and unequal endowment treatments. We observe that the change of community representatives is considerable. Using a Mann–Whitney test, we find that the distributions of Indicator 1 (two-sided $p = 0.825$) and Indicator 2 (two-sided $p = 0.578$) are not statistically different between both treatments.

3.4 The influence of real-life economic inequality

So far, we have only looked at the influence of inequality induced by experimental treatments. However, as the participants knew the other group members in the experiment, they were able to compare their individual wealth with the average group wealth. As a consequence, participants may bring real-life inequality into the experiment. To analyse the influence of real-life economic inequality on the participants' behaviour, we make use of regression techniques.

In the first analysis, we investigate what determines one's contribution. We estimate different models. In the first model we use the positive and negative standardized deviations from the group average of livestock as explanatory variables and only use the data of the equal endowment treatment (Model 1). Livestock is one of the major determinants of wealth in the region. The positive deviation is calculated as the absolute value of the standardized difference between the participant's livestock and the group average if it is positive, otherwise zero.[3] The negative deviation is equal to the absolute value of this difference if it is negative, otherwise zero. In Model 2, we only use the data of the unequal endowment treatment and add a control for the endowment of the group member, using a dummy variable equal to 1 in case the group member receives a high endowment. In Model 3, we extend Model 2 by adding interaction terms between the group members' endowment and the positive and negative deviations of the number of cows they have.

Table 5 shows the results for the equal sharing treatment. The results in all models confirm a negative time trend, which was previously observed in the descriptive analysis. Looking at the individual models, we find that in contrast to the equality treatment (Model 1) where no effects of real-life inequality were observed, in the inequality treatment (Model 2) poorer group members tend to contribute more. When adding interaction effects with the endowment dummy variable (Model 3), we find that this effect is mainly driven by poorer group members who are high endowment players in the experiment. Apparently, participants who are comparatively poorer than the other participants in real-life find they should contribute more than others if they are more able to do so (i.e. when they receive higher endowments).

We now investigate individual contributions in the representative sharing treatment. We estimate the same models as we did for the equal sharing treatment. Table 6 shows the results. Here again we do not find any effect of real-life inequality in the equal endowment treatment (Model 1). In the unequal endowment treatment, we again find a positive effect of being at the same time poorer than the group average and being a high endowment player (Model 3). This effect, however, is much stronger than in the equal sharing treatment. This suggests that especially the poorer participants want to benefit from the opportunity provided to become the group representative (and to benefit from large aid shares).

Being among the highest contributors in the representative sharing treatment gives one the chance to be the representative, and hence distribute the attracted aid resources; it is interesting to identify the determinants of being the highest contributor. Table 7 shows the results of a series of probit regression models that estimate the likelihood that one makes the largest contribution, controlling for the same variables as in the previous regressions. Whereas in the equality treatment (Model 1) none of the coefficients are statistically significant, with endowment inequality the coefficients of cows above and below the group

[3] To make sessions comparable we standardize these variables by dividing by the group average.

average as well as the interaction with the endowment dummy (Model 3), are all statistically significant. To interpret the size of these effects in probability terms we calculate predicted probabilities for different values of cattle property (we use values 0 and 1 above/below group average) and 95 per cent confidence intervals. We find that high endowment group members have a significantly higher likelihood of being the largest contributor if they have less livestock than the group average (30.93 per cent; 95 per cent confidence interval: 15.37 per cent, 46.50 per cent) than when they have more livestock than the group average (5.01 per cent; 95 per cent confidence interval: -3.56 per cent, 13.59 per cent), or equal livestock as the group average (2.52 per cent; 95 per cent confidence interval: -3.30 per cent, 8.34 per cent). This again suggests that real-life inequality induces poorer community members to make use of the opportunity provided by the high endowment they receive in the experiment.

After having studied what influences individual contributions, we look at the distribution of aid. Two aspects are important: how much the representative keeps and how the remaining resources are distributed among the rest of the group. We start with the latter. Remember that a representative has three options: giving a high share, a low share, or nothing to each of the other group members. As the latter option was selected in only very few cases, we limit the analysis to the choice of a high share compared to either a low or no share. In particular, we estimate the likelihood that a particular group member receives a high share. For this, we estimate a probit regression controlling for the positive and negative deviation from the average contribution. The positive (negative) deviation is calculated as the absolute value of the standardized difference between the participant's contribution and the group average if it is positive (negative), otherwise zero. Table 8 reports the results.

According to the results of Model 1, which uses the data of the equal endowment treatment only, the aid share that group members receive from the representative is lower when they contribute less than the group average. Calculating marginal probabilities we find that the likelihood of receiving a high share decreases with 12.93 per cent for each unit below the average contribution. In Model 2, which uses the data of the unequal endowment treatment only, we use the same explanatory variables as in Model 1, and add a control for the endowment of the group member. Converting the results into probability terms, we find that the likelihood that a group member receives a high share decreases with 18.45 per cent for each unit below the average contribution, and, ceteris paribus, is 14.45 per cent lower for high endowment group members. To test whether the marginal effect of one's relative contribution differs between high and low endowment players, in Model 3 we also add interaction effects between the group member's endowment and his/her relative contribution. The interaction effects are not statistically significant.

In the final analysis, we investigate the aid representatives keep for themselves. For this we estimate a regression on the pooled treatments with the proportion of aid kept by a representative in a specific round as dependent variable. We control for the endowment of the representative, the representative's livestock, and his/her share in the total contribution made by the group (Model 1). In a second model (Model 2), we also control for the representative's livestock and the interaction with his/her endowment. Table 9 shows the results. In Model 1, without the interaction effects, we observe that the representatives' contribution correlates positively with the share of aid resources they keep. In Model 2, where we add interaction effects between real-life inequality and endowment inequality, we find that representatives who are less wealthy than the group average (as measured by livestock) tend to keep a higher proportion of aid for themselves in the unequal endowment treatment, but not in the equal endowment treatment (where the interaction effect nullifies this effect). Representatives also

keep larger shares if they are wealthier than the group average and they have a low endowment in the experiment, but this effect is reduced when they have a high endowment or endowments are equal among all players.

4 Conclusion

In this article, we study the effect of economic inequality on co-operation and aid distribution in community-based development schemes in rural Nicaragua. For this, we use a field experiment in which individual community members contribute resources to a collective effort to attract external aid, and investigated the influence of economic inequality, both induced by experimental treatments and resulting from real-life heterogeneity outside the lab. We find that community mobilization is higher when aid distribution is devolved to community representatives. This increases the amount of aid attracted, but as community representatives keep high aid shares, this does not lead to more aid for the other community members. In addition, endowment inequality leads to higher levels of mobilization when aid resources are equally distributed but not when aid distribution is devolved to community representatives. Finally, although community representatives keep high aid shares, they do take fairness considerations into account. They give higher aid shares to poorer community members and lower shares to community members who contribute relatively little. Moreover, representatives with lower wealth relative to the group average, tend to keep more aid for themselves. They also do so when they contribute more relative to the group average. The latter two elements, however, cannot fully justify the very high shares community representatives keep for themselves.

To assess fully the distributional implications of such community-based scheme, we also need to look at the change in community representatives over the different rounds. We find that in consecutive rounds the representative role tends to be assumed by different community members. This indicates that the high aid shares representatives keep has less serious consequences for the final distribution of economic resources. If the representative role were always assumed by the same person, high aid capture would be a much more serious issue.

In reality, however, it is more common that community members do not have equal opportunities to become the community representative. In our experiment we find that community members with high endowment can contribute more and hence have better chances of becoming the representative. There may be more variables on which community members differ and that correlate with people's capacity to act as a community representative. One such variable is the experience community representatives acquire at the interface between aid donors and communities. As documented by Bierschenk, Chauveau, and Olivier De Sardan (2000), the capacity to work at the interface and to make contact with aid providers is mainly acquired through experience at the interface. As a consequence, the chance of becoming the community representative not only depends on one's decision in the current round, but also on one's previous experience as a community representative. When this is the case, changes in community representatives will become less frequent over time.

In addition to texperience, the following three factors, which have not been dealt with in our research, may also have an influence on community mobilization and aid sharing. First, we assumed that aid donors did not exert any influence on the selection of community

representatives. While in reality community representatives are indeed endogenously selected, there may be some room for aid donors to interfere and eventually influence who gets the role of local aid distributor. As argued by D'Exelle (2009), this is necessary if aid donors are really committed to discouraging recurrent exclusion processes and aid capture by community representatives. Second, in our experimental design the information on the aid distribution is always made public. However, in reality community representatives oftentimes manage to conceal information on (part of) the distribution. That this may influence individual behaviour has been demonstrated by D'Exelle and Riedl (2008) who found an important effect of information on aid distribution. Third, as indicated by previous experimental work (see, for example, Cappelen, Sorensen, and Tungodden 2010), variation in the causes of wealth/needs of individual community members as well as the sources of the economic resources that are distributed, may be of important relevance when aid resources are distributed. Undoubtedly, a further investigation of the determinants of aid mobilization and aid distribution, taking due consideration of these factors, would certainly be a valuable extension to our research.

References

Anderson, L.R., J.M. Mellor, and J. Milyo (2008). 'Inequality and Public Good Provision: An Experimental Analysis'. *Journal of Socio-Economics*, 37(3): 1010-28.

Bierschenk, T., J.-P. Chauveau, and J.-P. Olivier De Sardan (2000). *Courtiers en Développement. Les Villages Africains en quête de Projets*. Paris: Karthala.

Buckley, E., and R. Croson (2006). 'Income and Wealth Heterogeneity in the Voluntary Provision of Linear Public Goods'. *Journal of Public Economics*, 90(4-5): 935-55.

Cappelen, A.W., E.O. Sorensen, and B. Tungodden (2010). 'Responsibility for What? Fairness and Individual Responsibility'. *European Economic Review*, 54(3): 429-41.

Cardenas, J.M. (2003). 'Real Wealth and Experimental Co-operation: Experiments in the Field Lab'. *Journal of Development Economics*, 70(2): 263-89.

Cardenas, J.C., and E. Ostrom (2004). 'What do People Bring into the Game? Experiments in the Field about Co-operation in the Commons'. *Agricultural Systems*, 82: 307-26.

Conning, J., and M. Kevane (2002). 'Community-based Targeting Mechanisms for Social Safety Nets: A Critical Review'. *World Development*, 30(3): 375-94.

D'Exelle, B. (2009). 'Excluded Again: Village Politics at the Aid Interface'. *Journal of Development Studies*, 45(9): 1-18.

D'Exelle, B., and A. Riedl (2008). 'Elite Capture, Political Voice and Exclusion from Aid: An Experimental Study', IZA Discussion Paper 3673; CESifo Working paper 2400.

Fehr, E., and S. Gächter (2000). 'Co-operation and Punishment in Public Goods Experiments'. *American Economic Review*, 90(4): 980-94.

Fischbacher, U., S. Gächter, and E. Fehr (2001). 'Are People Conditionally Cooperative? Evidence from a Public Goods Experiment'. *Economics Letters*, 71(3): 397-404.

Galasso, E., and M. Ravallion (2001). 'Decentralised Targeting of an Anti-Poverty Program'. Mimeo. Washington, DC: World Bank Development Research Group.

Ledyard, J. (1995). 'Public Goods: A Survey of Experimental Research'. In J. Kagel and A. Roth (eds), *Handbook of Experimental Economics*. Princeton: Princeton University Press.

Mansuri, G., and V. Rao (2004). 'Community-Based and -Driven Development: A Critical Review. *The World Bank Research Observer*, 19: 1-39.

Miyata, S. (2003). 'Household's Risk Attitudes in Indonesian Villages'. *Applied Economics*, 35: 573-83.

Platteau, J.P., and A. Abraham (2002). 'Participatory Development in the Presence of Endogenous Community Imperfections'. *Journal of Development Studies*, 39(2): 104-36.

Platteau, J.P., and F. Gaspart (2003). 'The Risk of Resource Misappropriation in Community-Driven Development'. *World Development*, 31(10): 1687-703.

Ravallion, M. (2003). 'Targeted Transfers in Poor Countries: Revisiting the Trade-offs and Policy Options'. Policy Research Working Paper 3048. Washington, DC: World Bank.

Sugden, R. (1984). 'Reciprocity: the Supply of Public Goods through Voluntary Contributions'. *Economic Journal*, 94: 772-87.

Takasaki, Y. (2011). 'Do Local Elites Capture Natural Disaster Reconstruction Funds?'. *Journal of Development Studies*, 47(9): 1-18.

Wik, M., T.A. Kebede, O. Bergland, and S.T. Holden (2004). 'On the Measurement of Risk Aversion from Experimental Data'. *Applied Economics*, 36: 2443-451.

Table 1: Treatments

	Equal sharing (5 rounds)	Representative sharing (5 rounds)
Equal endowments	8 sessions x 8 participants = 64 participants	
Unequal endowments	8 sessions x 8 participants = 64 participants	

Source: Data from own experiments.

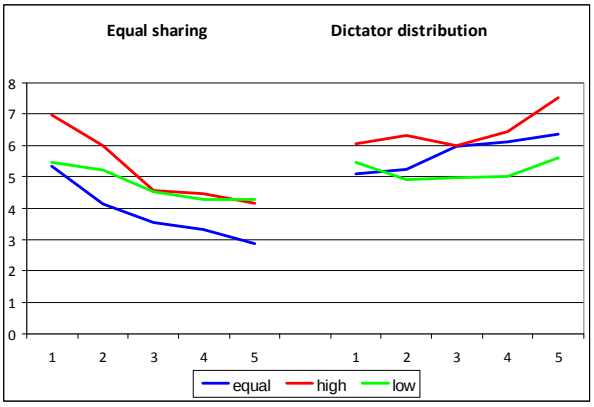
Table 2: Average contribution per round and per treatment

Round	Equal endowments	Unequal endowments
Equal sharing		
1	5.33 (2.70)	6.20 (2.80)
2	4.13 (2.36)	5.61 (2.63)
3	3.53 (2.24)	4.55 (2.15)
4	3.33 (2.21)	4.38 (2.24)
5	2.89 (2.04)	4.22 (2.54)
Total	3.84 (2.46)	4.99 (2.59)
Representative sharing		
6	5.09 (2.74)	5.75 (2.44)
7	5.23 (2.83)	5.61 (2.53)
8	5.95 (2.69)	5.48 (2.80)
9	6.11 (2.99)	5.72 (2.90)
10	6.36 (2.90)	6.56 (3.07)
Total	5.75 (2.86)	5.83 (2.77)

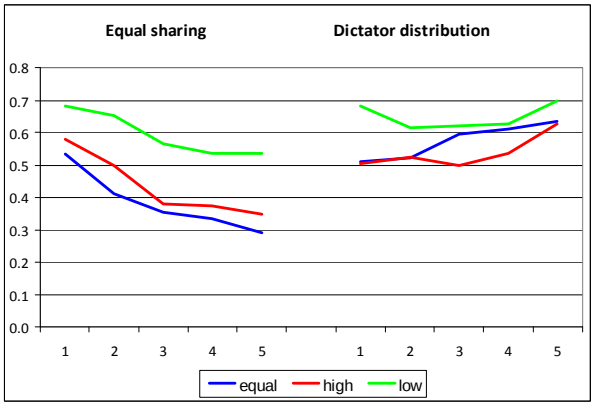
Source: Data from own experiments.

Figure 1: Contributions of high, low and equal endowment groups.

(a) Average contributions



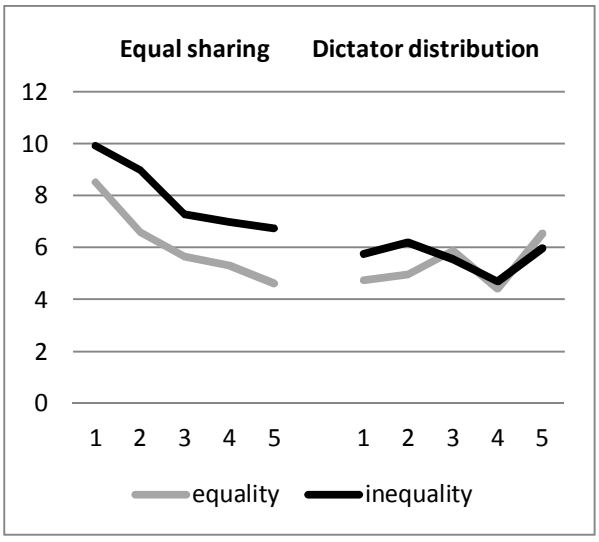
(b) Share of endowment contributed



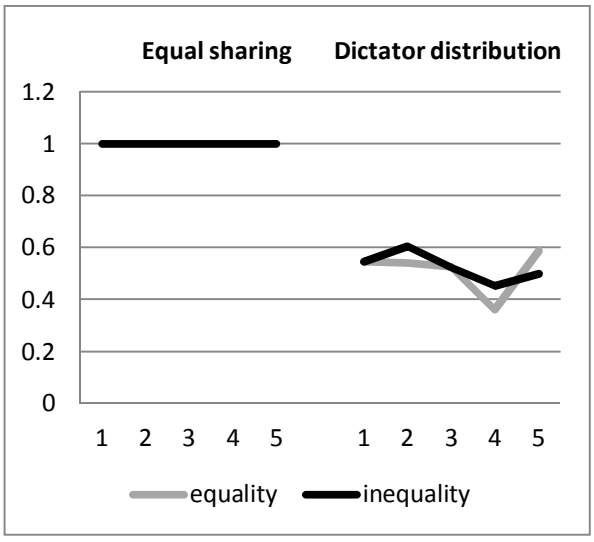
Source: Data from own experiments.

Figure 2: Average share per group member with endowment equality and inequality

(a) Average aid shares (absolute levels)

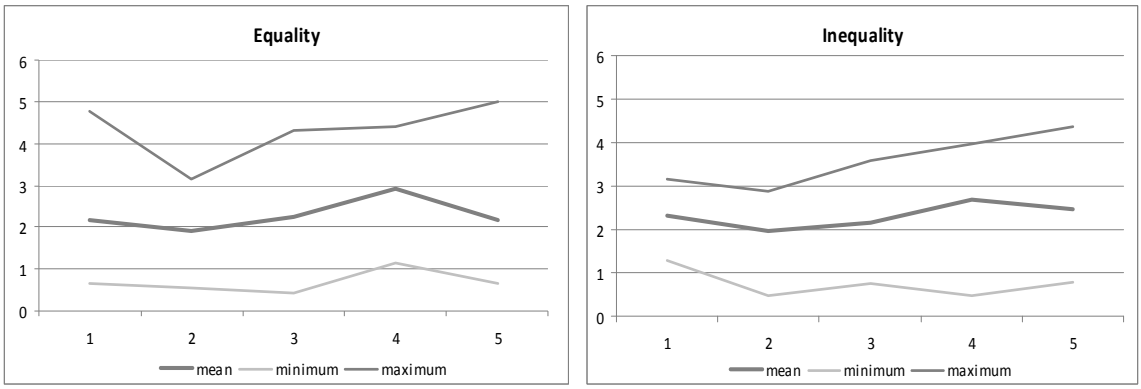


(b) Average aid shares (relative levels)



Note. Absolute aid share = amount of aid received. Relative aid share = aid received/(total aid/n), with n = 8; the share of the representative is not included in the representative sharing treatment.
Source: Data from own experiments.

Figure 3: (aid representative/total aid)/(contribution representative/total contribution)



Source: Data from own experiments.

Figure 4: Number of largest contributors with endowment equality and inequality

Source: Data from own experiments.

Table 3: Distribution of highest contribution

	Equality %	Inequality %
6	5.00	
7	5.00	2.50
8	15.00	25.00
9	20.00	15.00
10	55.00	32.50
11		12.50
12		12.50
Tot	100.00	100.00
N	40	40

Source: Data from own experiments.

Table 4: Change in community representatives

Indicator 1 *Representative round t ≠ representative round t-1*			Indicator 2 *First time group representative*		
	Equality	Inequality		Equality	Inequality
1 round	0	1	1 round	2	1
2 rounds	3	3	2 rounds	1	5
3 rounds	3	1	3 rounds	5	1
4 rounds	2	3	4 rounds	0	1
N	8	8		8	8

Source: Data from own experiments.

Table 5: Determinants of individual contribution (equal sharing treatment)

	Model 1 (Equal)	Model 2 (Unequal)	Model 3 (Unequal)
Cows above group average	-0.116	0.168	-0.292
	(0.153)	(0.135)	(0.333)
Cows below group average	-0.0873	1.643**	-0.622
	(0.464)	(0.661)	(1.017)
High endowment (dummy)		0.514	-2.512
		(0.412)	(1.360)
High endowment (dummy) x cows above group average			0.600
			(0.503)
High endowment (dummy) x cows below group average			3.541**
			(1.340)
Round 2	-1.203***	-0.594	-0.594
	(0.202)	(0.319)	(0.320)
Round 3	-1.797***	-1.656***	-1.656***
	(0.394)	(0.321)	(0.322)
Round 4	-2.000***	-1.828***	-1.828***
	(0.326)	(0.423)	(0.425)
Round 5	-2.438***	-1.984***	-1.984***
	(0.456)	(0.441)	(0.442)
Constant	4.550***	4.223***	6.406***
	(0.967)	(0.722)	(1.093)
Observations	320	320	320
R-squared	0.219	0.171	0.204

Note: OLS regression; village fixed effects; Robust standard errors to correct for intra-group dependencies in parentheses; two-sided significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
Source: Computatoins with data from own experiments.

Table 6: Determinants of individual contribution (representative sharing treatment)

	Model 1 (Equal)	Model 2 (Unequal)	Model 3 (Unequal)
Cows above group average	-0.018	0.401*	-0.437
	(0.163)	(0.187)	(0.351)
Cows below group average	-0.264	1.844	-1.784
	(0.739)	(1.019)	(1.204)
High endowment (dummy)		1.082	-3.707
		(0.769)	(2.390)
High endowment (dummy) x cows above group average			1.129*
			(0.587)
High endowment (dummy) x cows below group average			5.487**
			(2.256)
Round 2	0.066	-0.365**	-0.342**
	(0.433)	(0.144)	(0.135)
Round 3	0.760	-0.490	-0.459
	(0.582)	(0.373)	(0.389)
Round 4	0.654	-0.433	-0.319
	(0.552)	(0.261)	(0.232)
Round 5	0.989	0.585	0.621
	(0.555)	(0.431)	(0.431)
Constant	5.291***	3.101**	6.738***
	(0.584)	(1.107)	(1.485)
Observations	288	288	288
R-squared	0.074	0.115	0.182

Note: Previous representative excluded; OLS regression; village fixed effects; Robust standard errors to correct for intra-group dependencies in parentheses; two-sided significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
Source: Computations with data from own experiments.

Table 7: Determinants of being highest contributor (representative sharing treatment)

	Model 1 (Equal)	Model 2 (Unequal)	Model 3 (Unequal)
Cows above group average	0.049	0.180**	-0.255
	(0.063)	(0.084)	(0.160)
Cows below group average	0.096	0.734***	-0.676**
	(0.208)	(0.271)	(0.339)
High endowment (dummy)		0.651	-1.344*
		(0.498)	(0.717)
High endowment (dummy) x cows above group average			0.568***
			(0.194)
High endowment (dummy) x cows below group average			2.135***
			(0.618)
Round 2	-0.001	-0.118	-0.117
	(0.120)	(0.167)	(0.169)
Round 3	0.160	0.224	0.208
	(0.145)	(0.280)	(0.290)
Round 4	0.305	-0.061	-0.079
	(0.231)	(0.177)	(0.179)
Round 5	0.300	-0.206	-0.210
	(0.231)	(0.142)	(0.151)
Constant	-0.801***	-2.112***	-0.679**
	(0.284)	(0.465)	(0.323)
Observations	320	320	320
Pseudo R-squared	0.021	0.099	0.126

Note: Probit regression; village fixed effects; Robust standard errors to correct for intra-group dependencies in parentheses; two-sided significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
Source: Computations with data from own experiments.

Table 8: Aid distribution (representative sharing treatment)

	Model 1 (Equal)	Model 2 (Unequal)	Model 3 (Unequal)
Contribution above group average	-0.026	-0.105	0.070
	(0.043)	(0.067)	(0.176)
Contribution below group average	-0.351***	-0.532**	-0.827***
	(0.113)	(0.257)	(0.222)
High endowment (dummy)		-0.419**	-0.648
		(0.174)	(0.395)
High endowment (dummy) * contribution above group average			-0.185
			(0.198)
High endowment (dummy) * contribution below group average			0.537
			(0.339)
Constant	-0.311	0.099	0.223
	(0.297)	(0.303)	(0.215)
Observations	320	320	320
Pseudo R squared	0.131	0.190	0.230

Note: Probit regression; village and round fixed effects; Robust standard errors to correct for intra-group dependencies in parentheses; two-sided significance levels: * p < 0.10; ** p < 0.05; *** p < 0.01.
Source: Computations with data from own experiments.

Table 9: Proportion of aid kept by representative

	Model 1 (Pooled)	Model 2 (Pooled)
Treatment: 1= equality 0 = inequality	0.007	0.475
	(0.133)	(0.299)
High endowment (dummy)	-0.029	0.224
	(0.156)	(0.395)
Share of total contribution	1.780*	1.673
	(0.972)	(1.009)
Cows above group average	0.010	0.320*
	(0.022)	(0.154)
Cows below group average	0.163	0.577*
	(0.116)	(0.273)
Equal treatment (dummy) * cows above group average		-0.336**
		(0.140)
Equal treatment (dummy) * cows below group average		-0.468*
		(0.257)
High endowment (dummy) * cows above group average		-0.279*
		(0.155)
High endowment (dummy) * cows below group average		-0.261
		(0.298)
Constant	-0.151	-0.542*
	(0.190)	(0.299)
Observations	80	80
R-squared	0.1834	0.2062

Note: Tobit regression; village and round fixed effects; Robust standard errors to correct for intra-group dependencies in parentheses; two-sided significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
Source: Computations with data from own experiments.

Appendix 1: Descriptive statistics

Table A1. Characteristics of the participants

Cows above group average	1.41	(6.15)
Cows below group average	0.65	(0.46)
Number friendship links	4.26	(2.99)
Number of family (in-law) links	0.30	(0.96)
Number of family links	0.50	(0.76)
Number of links through social public activities	2.01	(2.48)
Number of economic links	0.55	(1.43)

Source: Computations with data from own experiments.

Table A2. Aid distribution per round and per treatment (representative sharing treatment)

a) Representatives

Round	Equal endowments				Unequal endowments			
	Own share	Excl. %	Low %	High %	Own share	Excl. %	Low %	High %
6	0.46 (0.31)	16.1	42.9	41.1	0.45 (0.13)	7.1	60.7	32.1
7	0.46 (0.30)	10.7	66.1	23.2	0.39 (0.19)	7.1	51.8	41.1
8	0.47 (0.34)	1.8	41.1	57.1	0.48 (0.23)	3.6	58.9	37.5
9	0.64 (0.30)	0.0	58.9	41.1	0.55 (0.24)	5.4	55.4	39.3
10	0.41 (0.30)	1.8	48.2	50.0	0.50 (0.28)	14.3	37.5	48.2
Total	0.49 (0.30)	6.1	51.4	42.5	0.48 (0.22)	7.5	52.9	39.6

b) non-representatives

Round	Equal endowments				Unequal endowments			
	Own share	Excl. %	Low %	High %	Own share	Excl. %	Low %	High %
6	0.52 (0.27)	13.0	42.3	44.8	0.51 (0.27)	8.9	38.0	53.2
7	0.52 (0.25)	10.2	45.9	43.9	0.53 (0.26)	6.8	41.6	51.6
8	0.47 (0.27)	6.8	40.6	52.6	0.52 (0.27)	9.4	38.6	52.1
9	0.46 (0.27)	5.7	38.4	55.9	0.52 (0.27)	8.4	38.2	53.4
10	0.50 (0.28)	8.4	35.9	55.7	0.55 (0.27)	9.1	32.3	58.6
Total	0.49 (0.27)	8.8	40.6	50.6	0.53 (0.27)	8.5	37.7	53.8

Source: Computations with data from own experiments.

Appendix 2: Experimental instructions and procedures

(Translated from Spanish)
[When people enter the meeting room, they are asked for their name. The candidates are registered on a list of invited candidates. They are given a sticker with an identification letter (ID), which we ask them to stick on their shirt. It is explained that this identity letter is unique and allows us to identify them during the exercise while guaranteeing complete confidentiality. This is important, as they are able to earn real money in the exercise. They are also given a small card with a number between 1 and 8, which we ask them to keep confidential. They are asked to take a seat in the meeting room. Further instructions are given once sufficient people have shown up.]

'You are invited to participate in an exercise, which allows you to earn real money. How much you earn depends on the decisions you will be asked to make, as well as the decisions of the other participants. If you pay sufficient attention to the instructions, you can, depending on your decisions, earn a considerable amount of money. It is therefore very important that you pay good attention.'

'Participation is voluntary. Your decisions will be dealt with in a confidential way, i.e. nobody in the village will ever know your individual decisions, or the money you will have earned. The money you earn will be paid out to you privately and confidentially after the exercise. During the whole exercise, you are not allowed to communicate with the other participants. Should you have any questions please ask us. If you violate this rule, we shall have to exclude you from the exercise and from all payments.'

'This exercise consists of several parts. All parts are completely unrelated. What you earn in one part will not influence your earnings in subsequent parts of this exercise. After this exercise we will ask you to fill in a short questionnaire. Thereafter, you will be paid out your earnings.'

Part 1: Equal endowments: basic treatment

'We now start with the first part of this exercise. The game in which you will participate now is different from the ones others have already played in this community; thus, the comments that you may have heard from others do not apply necessarily to this game.'

'You have been selected to participate in a group of eight people among those that signed up for this exercise. On the card you received you see your participant number. This number will be the same during the whole exercise. On the whiteboard you also observe the player numbers. Each number represents one of you. No one will ever know which number corresponds to which participant in the room. You will be the only one who will know which of the number corresponds to you. You will never get to know the identity of the other persons. Nor will the other persons ever get to know your identity.'

[*On the whiteboard each of the participants is represented with numbers 1—8. These are not the same as the identification* letters (ID) *that are given to the participants at the beginning of the experimental session. The combination of ID letters and participant numbers allows the experimenters to identify the participants during the exercise while guaranteeing complete confidentiality among the participants.*]

‘In this part of the exercise we shall not speak of ‘córdobas’ but rather of ‘pesos’. Your entire earnings will be calculated in pesos. At the end of this exercise the total amount of Pesos you have earned will be converted to córdobas at the rate of 1 Córdoba = 10 Pesos.’

‘This exercise attempts to recreate a situation where a group of village members must make decisions about how to use their time to attract aid from external organizations. Imagine that an aid project arrives at the community, which asks the community to design a development project. For this, people need to invest time and energy to participate in meetings. The more people participate in these meetings and the more time they invest in this, the more development aid will be eventually attracted by the community.’

‘Each participant has 10 Pesos available. You have to decide how many of these 10 Pesos you want to dedicate to such meetings and how many to spend on your own economic activities. You can thus decide to either keep money for your private account, which will be paid out to you individually. Either you give money to the collective account.’

‘The total number of Pesos contributed to the group account is invested to attract a development project. The development programme will give aid money to the community up to an amount that is equal to the total amount in the collective account, increased with 60 per cent. This money will be equally distributed over all eight members.’

Thus, your income consists of the following two parts:

1) the Pesos you have kept for yourself (your private account)

2) your share of the ‘attracted aid money’.

‘The income of each group member from the project is calculated in the same way. This means that each group member receives the same income from the aid project, irrespective of his contribution to the group account. Suppose the sum of the contributions of all group members is 40 Pesos. In this case, the total amount of aid is 64 Pesos, which is equally distributed among the eight participants, i.e. each receives 8 Pesos from the aid project.’

‘However, if no one contributes anything to the collective account no development aid is attracted, and each of you will have 10 Pesos. Alternatively, if each of you contribute everything to the collective account, the total amount of attracted aid would be 80 + 48(60 per cent de 80) = 128 Pesos. This aid is divided equally among all group members, so that each would get 16 pesos. Finally, if all of you would contribute half of the 10 pesos (i.e. 5 pesos), the total amount in the collective account would be 40 pesos, and the total aid would be 40 + 24 = 64 Pesos.’

[*Stick flipchart with table on the wall*]

Group member	Contribution	Private account	Aid	Income
1.	5	5	8	= 13
2.	0	10	8	= 18
3.	6	4	8	= 12
4.	5	5	8	= 13
5.	10	0	8	= 8
6.	7	3	8	= 11
7.	3	7	8	= 15
8.	4	6	8	= 14

'In the following example we will present the case where each group member contributes differently. In the table we observe that the total amount of contributions to the group account is equal to 40 Pesos, hence, the amount of attracted aid equals 64 Pesos, which leads to 8 Pesos for each group member. Let's now compare the earnings of each group member. Group member 2 who did not contribute anything to the collective account, obtained the highest earnings. Member 1 contributed 5 Pesos to the collective account and obtained 13 Pesos as final earnings. In contrast, group members who contributed all their endowment to the collective account (group member 5), i.e. 10 Pesos, obtained the lowest earnings. In sum, one's earnings depend on the amount one contributes and the contributions of the other group members.'

[*Distribute decision cards. Stick flipchart with decision card on the wall*]

'We now explain how we are going to organize this exercise. To take a decision you will be given a decision card. On this decision card you will need to fill in the number of Pesetas you want to contribute to the group account, by filling in a number between 0 and 10. By deciding how many Pesos to contribute to the group account, you automatically also decide how many to keep for your private account, which is equal to the remainder of the 10 Pesos.'

CONTRIBUTION	
ID	
PLAYER NUMBER	
ROUND NUMBER	
CONTRIBUTION	
YOUR INCOME	Pesos

'After all group members have made their decision we collect all decision cards. We then put your decisions on the whiteboard, which allows you to observe how much each of you has contributed. We will calculate the total number of Pesos contributed to the group account by all eight group members (including your contribution), and the amount of aid attracted. We also put the amount of aid each of you will receive. We then calculate your final income and

fill it in on your decision card. The decision cards will be returned to you privately so that you will get to know your final income.'

'We will now play the previously described exercise several times.'

Unequal endowments—basic treatment

The sentence '**Each participant has 10 Pesos available**" is replaced with "**Four participants have 12 Pesos available, while the other four participants have only 8 Pesos available**.'

Equal endowments—representative distribution treatment

'In this second part of the exercise we ask you again to decide how much to contribute to the collective account. The amount of attracted aid is calculated in the same way as before. However, the attracted aid is now distributed by the group member who contributes most to the collective account. This implies that the attracted aid is not necessarily distributed equally. All other things remain the same.'

'We now explain how we are going to organize this exercise. After each of you decided on the number of pesos to contribute to the group account, we will collect your decision cards. We will then put your decisions on the whiteboard, which allows you to observe how much each of you has contributed. We will calculate the total number of pesos contributed to the group account by all eight group members (including your contribution), and the amount of aid attracted.'

[Distribute 'distribution' decision cards. Stick flipchart with 'distribution' decision card on the wall]

<table>
<tr><td colspan="3">DISTRIBUTION OF AID</td></tr>
<tr><td>ID</td><td colspan="2"></td></tr>
<tr><td>PLAYER NUMBER</td><td colspan="2"></td></tr>
<tr><td>ROUND NUMBER</td><td colspan="2"></td></tr>
<tr><td>YOUR SHARE</td><td colspan="2">Pesos</td></tr>
<tr><td rowspan="4">OTHERS' SHARE

O = NOTHING
X = LOW
XX = HIGH</td><td>1.</td><td>2.</td></tr>
<tr><td>3.</td><td>4.</td></tr>
<tr><td>5.</td><td>6.</td></tr>
<tr><td>7.</td><td>8.</td></tr>
</table>

‘After that, we will give you the second decision card, on which we ask you to distribute the money in the group account among the eight participants (yourself included). On the decision card, you observe the total amount of aid that arrives at your community. We ask you how you would like to distribute it among the group members. For this, we first ask you to decide on the amount of aid you want to keep for yourself. Thereafter, we ask you to distribute the remaining aid among the other seven group members. For this you choose between the following three options for each of these group members. You fill in “O” in the cell of a particular member if you do not want to give anything to that group member. You fill in “X” or “XX” if you want to give him a low or high share of the remaining aid, respectively. After collecting all decision cards, we will calculate your final earnings.’

‘Remember that only the distribution made by the participant who has contributed most, will in the end be implemented. In case two persons contribute most, we will let fate decide on who will become the representative. For this, we put all folded participant numbers that contributed most in a bag and let someone select one.’

[All group members will be asked to fill in a distribution decision card in order to guarantee anonymity of the community representative.]

‘Thereafter, we collect these decision cards as well. After calculating the earnings of each group member (endowment kept in private account + received aid) these are presented on the whiteboard and filled in on the first decision cards, which are returned to respective players. We will now play the previously described exercise several times.’

Unequal endowments—representative distribution treatment

We replace in the instructions of part 2 the phrase ‘Each participant has 10 pesos available’ with ‘Four participants have 12 pesos available, whereas the other four participants have only 8 pesos available.’

We will play the previously described exercise several times.

Final instructions

Finally, to get ready to play the game, please let us know if you have difficulties reading or writing numbers and one of the monitors will seat next to you and assist you with these. Also, please keep in mind that from now on no conversation or statements should be made by you during the game.

[We assure that there is sufficient space between each participant to guarantee privacy and to prevent copying. Once everybody is seated again, we start with the first round of the experiment.]