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# REDISTRIBUTION AND GROUP PARTICIPATION: COMPARATIVE EXPERIMENTAL EVIDENCE FROM AFRICA AND THE UK

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Redistribution and Group Participation: Comparative Experimental Evidence from Africa and the UK

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## ABSTRACT

We design an original laboratory experiment to investigate whether redistributive actions hinder the formation of Pareto-improving groups. We test, in an anonymous setting with no feedback, whether people choose to destroy or steal the endowment of others and whether they choose to give to others, when granted the option. We then test whether subjects join a group that increases their endowment but exposes them to redistribution. We conduct the experiment in three very different settings with a priori different norms of pro-social behavior: a university town in the UK, the largest urban slum in Kenya, and rural Uganda. We find a lot of commonality but also large differences between sites. UK subjects behave in a more selfish and strategic way -- giving less, stealing more. Kenyan and Ugandan subjects behave in a more altruistic and less strategic manner. However, pro-social norms are not always predictive of joining behavior. African subjects are less likely to join a group when destruction or stealing is permitted. It is as if they are less trusting even though they are more trustworthy. These findings contradict the view that African current underdevelopment is due to a failure of generalized morality.

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## 1. Introduction

Economic efficiency often cannot be achieved without team work. The provision of local public goods, for instance, typically requires voluntary participation in a group – be it a parent-teacher association (e.g., Coleman 1988, Pradhan et al. 2014), a community-based organization (e.g., Bernard et al. 2010), or a farmers' marketing cooperative (e.g., Cook 1995, Fafchamps and Hill 2005).

Building on the work of Olson (1971) and Ostrom (1990), a large literature has emerged that seeks to understand the root causes of the underprovision of beneficial local public goods. In this literature much attention has been devoted to certain possible causes, such as free-riding (e.g., Baland and Platteau 1995) and imperfect monitoring (e.g., Barr, Lindelow and Serneels 2009). The literature has also argued that equity considerations and redistribution pressures affect collective action in heterogeneous groups (e.g., Baland and Platteau 1995, Banerjee et al. 2005, Barr, Dekker and Fafchamps 2013). This is the mechanism we focus on, drawing on the experimental literature on other-regarding preferences (e.g., Fehr and Schmidt 1999, Charness and Rabin 2002). In particular we test whether people choose to eschew the returns to joining a group because of the ad hoc redistributive opportunities that arise once in the group.

We design an original laboratory experiment to investigate whether redistributive actions hinder the formation of Pareto-improving groups. The experiment is designed such that there is no room for free-riding and imperfect monitoring is not an issue. Subjects derive a purely

individual benefit from joining a group, but expose themselves to ad hoc redistribution when they join. Redistributive behavior is captured in three different, stylized ways described as 'confiscating', 'taking' and 'giving' to subjects and as 'burning', 'stealing', and 'giving' (respectively) in the related literature.

In 'burning' treatments, subjects who join the group are given an opportunity to destroy all or part of the endowment of others who join (e.g., Zizzo 2003a, Zizzo and Oswald 2001, Kebede and Zizzo 2011). In 'stealing' treatments, subjects who join can appropriate all or part of the endowment of others who join (e.g., Zizzo 2003b). In 'giving' treatments, group members can give all or part of their endowment to other group members (e.g., Null 2011). Subjects must pay a price to destroy or appropriate someone else's endowment, or to transfer part of their endowment to others. This price varies across treatments. To eliminate reputational concerns and strategic considerations, play is anonymous throughout the experiment and subjects are not provided any feedback about others' play during or after the experiment. The purpose of the experiment is to elicit behavior towards anonymous members of the same subject pool.

The experiment is implemented with three different populations: students in Oxford, England; slum dwellers in Nairobi, Kenya; and farmers in Uganda. The purpose of using such a diverse subject pool is twofold. First, we are interested in obtaining generalizable results that are not limited to specific subject populations, e.g., students in top universities. Second, we wish to investigate whether human populations differ in their willingness to join efficiency-enhancing groups. The Oxford subject pool is chosen to facilitate comparison with other laboratory experiments, the majority of which involve university students in developed economies. To ensure the robustness of our results, we run two sets of laboratory sessions on this population, two years apart. The two African subject pools are chosen based on the commonly held perception that developing economies – and especially those of Africa – have a social capital deficit. Because of

this deficit, opportunistic behavior is believed to weaken governance and undermine the provision of local public goods. To the extent that social capital is facilitated by common values and ancestry, we expect the social capital deficit to be strongest among city dwellers in an urban slum. This is why we have chosen two sites in Africa, one rural, and the other urban.

We find many commonalities across the three subject pools: in all three, a few subjects give away part of their endowment; some subjects destroy the payoff of others; and many more appropriate (part of) others' endowment. There are also important differences: stealing is more prevalent in the UK subject pool; giving is more common in the two African populations; and burning is least common among Nairobi slum dwellers. Although the three subject pools are not directly comparable, this nevertheless contradicts the commonly held view that Africans are more opportunistic in their relations with strangers.

We also investigate how burning, stealing and giving affect the formation of Pareto-improving groups. We find that subjects are less likely to join groups when such redistribution is possible, but we do not find that joining a group is uniformly less common in subject populations that redistribute more. In the burning and stealing treatments, joining a group is *less* common in Kenya and Uganda even though subjects in these countries burn and steal *less*. In the giving treatment, there is no difference in the propensity to join a group between sites even though giving is observed much more often in the two African experiments.

Although burning is uncommon in all three populations, a large proportion of African subjects refuse to join a group in the burning treatment, that is, when joining a group makes them vulnerable to the destruction of their endowment. This feature is less robust in the UK study population. In contrast, many UK subjects refrain from joining a group when joining enables them give some of their endowment away. This is true even though UK subjects are also the least likely to give among the three subject populations.

To investigate these findings further, we compare subjects' behavior to archetypes of selfish and other-regarding preferences discussed in the literature – i.e., altruistic and invidious preferences, inequality aversion, and warm glow. The choices of most subjects do no satisfy any of these archetypes. One in ten UK participants behaves consistently in a selfish manner, fewer in Uganda and Kenya. One in seven African participants behaves in a way consistent with altruist or warm glow preferences, compared to only one percent in the UK population. This confirms that there is more fairness towards strangers in the two African sites.

At the end of the experiment but before revealing payoffs, participants were asked to estimate other players' propensity to burn, steal, and give. We find that subjects massively overestimate burning and giving by other participants. They also overestimate the frequency of stealing, but to a lesser extent. Many subjects join a group in the stealing treatment, but are less likely to do so when they expect others to steal more. We also find that subjects who give more are more likely to join a group in the giving treatment, and subjects who steal more are more likely to join a group in the stealing treatment, suggesting that some subjects join a group in order to give or to steal.

Our results suggest that group formation can be hindered by the fear of endowment destruction by other group members, even if such destruction is uncommon. This may be because people find such destruction emotionally painful and seek to avoid it even if the financial cost of doing so is large. We also find that some people refrain from joining a group that makes it possible to give to others. More research is needed on this issue, for which African and UK participants differ.

These findings complement the existing literature in several ways. Jakiela and Ozier (2013) use an experiment to show that social pressure to share income causes individuals to forgo investment returns. This is consistent with our finding that individuals are more likely to

forgo the return to joining a group when they perceive forced redistribution to be more likely. Goldberg et al (2013) finds that the impact of a commitment savings product on saving behavior is consistent with the need to resist demands to give to others. This is consistent with our finding that some people avoid situations (e.g., joining a group) that generate opportunities to give to others. This paper adds further insight to this finding, by showing that people also avoid situations even when giving is unsolicited and anonymous. One possible explanation is that individuals face an internal pressure to give, and are willing to incur a reduction in payoff to avoid this internal pressure and, presumably, the associated guilt (e.g., Battigali and Dufwenberg 2009). This avoidance is stronger among non-African subjects.

The findings also have significant relevance for public policy, particularly in Kenya and Uganda where formalized social insurance systems are weak and where various forms of ad hoc redistribution are relied upon to help those in need. The widespread presence of informal redistributive mechanisms is a common justification given by Ugandan policy makers for not investing in formal, public insurance. The results of this work suggest that redistributive behavior may nonetheless discourage the formation of groups that bring about pareto-improving returns.

The paper is organized as follows. In Section 2 we present the experimental design in detail. A conceptual framework is introduced in Section 3 and is used to generate testable predictions about preference archetypes often used in economics. Experimental choices and joining decisions are analyzed in Section 4. Section 5 concludes.

## 2. Experimental Design

The ultimate objective of the experiment is to identify the motivations individuals have when they consider joining a group that raises individual payoffs but allows different types of redistribution among subjects. This is an extremely common situation that arises whenever people

pool resources for the generation of a common good or service. Examples include ride sharing, co-authorship among researchers, and farmers' marketing cooperatives. Market transactions also fall in this general category.[1] To keep the focus on individual motivations, we deliberately omit externalities, strategic interactions, reputation, and feedback. We also do our best to avoid contextualizing the choices people make so as to avoid framing effects.

The experiment is divided into three parts.[2] Each part is divided into multiple rounds played among sets of three players. The identity of all players is kept anonymous throughout the experiment and sets are reshuffled each round so that, within each part, subjects never play against the same subject twice. At the beginning of each round $t$ each subject $i$ receives an endowment $e_{it}$ for that round. Endowments vary across subjects within each round, with no carry-over across rounds.

In the first part subjects are automatically assigned to a group of three subjects. Each subject is then given the choice to destroy, appropriate, or transfer endowments within the group in a precise way we describe below. The first three rounds of part 1 are practice rounds that do not affect final payoffs. In the second part subjects can elect to join a group, in which case their endowment $e_{it}$ is multiplied by $p_t \geq 1$. The third part combines parts 1 and 2, that is, subjects first choose whether to join a group, in which case their endowment is multiplied by $p_t$. They then choose how much to destroy, appropriate, or transfer within the group. Subjects who do not join the group keep their initial endowment $e_{it}$. Subjects are never told the burning, stealing, or giving choices of other participants. They are only told their final aggregate payoff at the end of the experiment.

The three treatments, dubbed here 'burning', 'stealing' and 'giving', all follow the same

[1] A market transaction can be seen as the formation of a group of two individuals pooling resources (e.g., money and a good or service) to achieve mutually beneficial gains. Scope for redistribution arises in several ways, such as price bargaining, hold-up and renegotiation, or poor contractual performance.

[2] The Oxford experiment includes a fourth part that is not used in the analysis and is ignored from this paper.

general design. Each subject is told the endowment $p_t e_{jt}$ of each other subject $j$ in their group in that round. They can then choose to affect $p_t e_{jt}$ as follows. In a given round $t$ each subject in a set of three subjects faces the same treatment. This is common knowledge.

In the burning treatment, the subject chooses $\tau_{ijt}$, with $0 \leq \tau_{ijt} \leq 1$ for each $j$, such that payoffs of subjects are determined as:

$$\begin{aligned} \pi_{it} &= p_t e_{it} - \gamma_{bt} \sum_{j \in N_{it} ijt} p_t e_{jt} \\ \pi_{jt} &= p_t e_{jt}(1 - \tau_{ijt}) \end{aligned}$$

where $N_{it}$ is the set of players in $i$'s group in round $t$.[3] Parameter $p_t$ captures the efficiency gain from joining a group. Parameter $\gamma_{bt}$ captures the cost to $i$ of destroying the endowment of $j$. Parameters $p_t$ and $\gamma_{bt}$ are common to all subjects in a set of three, and this is common knowledge.

To illustrate, let $N_{it} = \{2, 3\}$, $e_{it} = 4$, $e_{2t} = 6$, $e_{3t} = 2$, $p_t = 1.5$, $\gamma_{bt} = 0.1$, and $\tau_{i2t} = 50\%$ and $\tau_{i3t} = 0\%$. Payoffs are:

$$\begin{aligned} \pi_{it} &= 6 - 0.1 \times (0.5 \times 9 + 0 \times 3) = 5.55 \\ \pi_{2t} &= 9(1 - 0.5) = 4.50 \\ \pi_{3t} &= 3(1 - 0) = 3.00 \end{aligned}$$

In this example subject $i$ has destroyed part of subject 2's endowment, ensuring that $j$ now receives a payoff lower than his own. Burning is obviously wasteful since it reduces aggregate payoffs by $(1 + \gamma_{bt}) \sum_{j \in N_{it}} \tau_{ijt} p_t e_{jt}$. In the above examples, the efficiency waste is 4.95 – what

[3] In the z-tree code we impose the restriction that $\pi_{it} \geq 0$ – a subject cannot spend more than his/her endowment $p_t e_{it}$ to destroy the payoff of other subjects. In practice, this restriction is never binding.

subject 2 loses plus what $i$ pays to destroy subject 2's endowment. Player 2 is also asked to independently make choices about $\tau_{2it}$ and $\tau_{23t}$, and similarly for player 3.

In the stealing treatment, payoffs are given by:

$$\begin{aligned} \pi_{it} &= p_t e_{it} + (1-\gamma_{st}) \sum_{j \in N_{it}} \tau_{ijt} p_t e_{jt} \\ \pi_{jt} &= p_t e_{jt}(1-\tau_{ijt}) \end{aligned}$$

with $0 < \gamma_{st} < 1$ the parameter capturing the (efficiency) cost of stealing from others.

In the giving treatment, payoffs follow:

$$\begin{aligned} \pi_{it} &= p_t e_{it}(1-\gamma_{gt} \sum_{j \in N_{it}} \tau_{ijt}) \\ \pi_{jt} &= p_t e_{jt} + \tau_{ijt} p_t e_{it} \end{aligned}$$

Here parameter $\gamma_{gt}$ captures the efficiency loss or gain from giving to others: if $\gamma_{gt} < 1$ giving is efficiency enhancing – it costs less than $\tau_{ijt}$ to $i$ to transfer $k_{ijt}$ to $j$ – and vice versa if $\gamma_{gt} > 1$.[4]

At the end of the experiment, three rounds are selected at random and payoffs are determined based on play during these three rounds only. Within each of the selected round, one of the subjects in a group is then randomly selected. His or her choices in that round determine the payoffs of all three players in the set. This rules out any strategic interaction between players in burning, stealing and giving decisions, and is akin to a dictator game setup. Players who, in parts 2 and 3, elect not to join a group receive a payoff $\pi_{it} = e_{it}$. All these features are explained to all subjects at the beginning of the experiment. Subjects are never told the choices $k_{jit}$ of other participants and, since they are only told their aggregate payoff at the end of the

[4] In the z-tree code, we impose the restriction that $i$ cannot give more than he/she has. In practice this restriction is not binding.

experiment, it is impossible for them to work them out from their final payoff. Before being told their final payoff, subjects answer a short questionnaire about their expectations regarding burning, stealing and giving by other participants.

The experiment was implemented in z-tree (Fischbacher 1999). In the United Kingdom we ran two batches of sessions. The first batch was run in September 2012 at the Centre for Experimental Social Sciences at Nuffield College, Oxford. The second batch was run in September 2014 using the same laboratory and subject pool. In Kenya the sessions were run in March 2013 at the Busara laboratory in Nairobi. In Uganda, the experiment was run in Masaka in April 2013 with coffee growers from Masaka district. The code used in Nairobi and Masaka was designed for use with touchscreen tablets, so that people who were not familiar with using computers could easily be instructed how to play. The screens were made as visual as possible to facilitate play by those with limited levels of formal education.

There are small differences in z-tree code between the first batch of Oxford sessions and the other three batches of sessions. In the 2012 Oxford sessions, there were 7 rounds in part 1 and 3 of the game and 2 rounds in part 2 of the game. In all subsequent sessions there were fewer rounds to minimize participant fatigue (5, 1 and 5 rounds in parts 1, 2 and 3 respectively). In Oxford each 2012 session contained 24 participants. In Nairobi, Masaka, and the 2014 Oxford sessions, the number of participants in each session was 18. We conducted 11 and 9 sessions in Nairobi and Masaka, respectively. In Oxford 8 sessions were conducted in 2012 and 4 sessions in 2014. In the two African sites the instructions were read out to maximize the chance that they were properly understood. The set of parameter vectors used in the experiments is the same for all sessions except the 2012 sessions, which sometimes use different parameter values. There are some other small differences between the 2012 Oxford sessions and all the others.[5]

[5]Compared to the 2012 Oxford sessions, all the other sessions use larger fonts and occasional color in the z-tree visual display. The 2012 Oxford sessions include an additional part administered at the end. This part was

## 3. Conceptual framework

Our experimental design is closely related to the well-known Dictator Game. In the Dictator Game a player is anonymously matched with another player in a one-shot interaction (as in our experiment, given all players in our experiment were matched with each other player only once in each part of the experiment) and is provided with a sum of money. The player must decide how to divide this sum of money between himself or herself and the partner with whom he or she is matched. This is very similar to the 'giving' version of our game in which a player decides how much of an allotted sum of money to divide with the other player. The 'stealing' game of our experiment is also similar, although it is the partner that decides what the share should be. The difference in our context is that the cost of giving (stealing) is varied across rounds. As such our giving experiment is identical to the modified Dictator Game used in Andreoni and Miller (2002) and Andreoni and Vesterlund (2001) in which the cost of giving is also varied. They find, as we do, that the amount of money given falls as the cost of giving increases. Andreoni and Vesterlund (2001) also find that, when giving is cheap, men are more altruistic. But they are more responsive to the price of giving so that, when giving is expensive, women are more altruistic.

### 3.1. Predicted play and preferences over outcomes

The first part of the experiment reveals information about individual preferences over outcomes. The experiment was designed to distinguish among six preference archetypes commonly used in economics. To simplify the presentation, we drop the time index from the notation.

The first archetype, which we refer to as 'selfish', equates the utility of subject $i$ with his or

subsequently dropped and is not discussed here. The 2012 Oxford sessions make more of an effort to use neutral language throughout – e.g., 'to eliminate' rather than 'to confiscate', 'to appropriate' rather than 'to take'; and 'to transfer' rather than 'to give'. These words were often beyond the English language comprehension of African subjects, which is why we use a more direct language all other sessions.

her payoff $\pi_i$, i.e.:

$$U_i^S = \pi_i$$

The second archetype captures altruism a la Becker, represented as:

$$U_i^A = \pi_i + \frac{\alpha}{n_i} \sum_{j \in N_i} \pi_j$$

where $n_i = \{0, 1, 2\}$ is the number of subjects in group $N_i$. Parameter $\alpha$ represents the strength of altruism. Concern for aggregate efficiency (e.g., Charness and Rabin 2002) can be represented as:

$$U_i^E = \pi_i + \sum_{j \in N_i} \pi_j$$

It is equivalent to setting $\alpha = n_i$ in the altruism model.

Invidious (or rival or spiteful) preferences can be represented as:

$$U_i^R = \pi_i - \frac{\beta}{n_i} \sum_{j \in N_i} \pi_j$$

Here individuals derive dissatisfaction from others doing well.[6] Following Okada and Reidl (2005), altruistic and invidious preferences can be combined into a single utility function characterized by inequality aversion (Fehr and Schmidt 1999):

$$U_i^I = \pi_i - \frac{\alpha}{n_i} \sum_{m_j > m_i} |\pi_j - \pi_i| - \frac{\beta}{n_i} \sum_{m_j < m_i} |\pi_i - \pi_j|$$

with $\alpha \geq 0$ and $\beta \geq 0$. These preferences nest altruistic and invidious preferences as follows.

[6] Unlike Blanchflower and Oswald (20XX), we write utility in levels, not in logs, but as long as the magnitude of payoffs is relatively similar across games, this should not matter in terms of inference. Using levels facilitates comparison with other utility functions.

Let $\beta = -\alpha$. We have:

$$\begin{aligned} U_i^I &= \pi_i - \frac{\alpha}{n_i} \sum_{j \in N_i} (\pi_j - \pi_i) \\ &= \pi_i(1+\alpha) - \frac{\alpha}{n_i} \sum_{j \in N_i} \pi_j \end{aligned}$$

from which we see that preferences are altruistic if $\alpha < 0$ and invidious if $\alpha > 0$.

We also consider the possibility of warm glow preferences defined as:

$$U_i = \left( \pi_i - \sum_{j \in N_i} g_{ij} \right) + \omega(1-G) \sum_{j \in N_i} g_{ij}$$

where $\omega$ is the warm glow parameter, $g_{ij}$ is a transfer from $i$ to $j$, and $G$ is the Gini coefficient of the $g_{ij}$'s calculated over the neighborhood of $i$, $N_i$. It is clear that $1 - G$ is maximized when $G = 0$ and thus when all $g_{ij}$'s are equal. This last feature is inspired by Null (2011) findings regarding giving to charities.

Through straightforward though tedious algebra, it is possible to derive predictions for burning, stealing and giving as follows. To simplify the presentation, let us define an absolute transfer from $j$ to $i$ as $k_{ij} \equiv \tau_{ij} p e_j$ for burning and stealing, and $k_{ij} = \tau_{ij} p e_i$ for giving. Predicted choices of $k_{ij}$ are summarized in Table 1 for different preference archetypes.

| | Burning | Stealing | Giving |
|---|---|---|---|
| Selfish | $0$ | $p\pi_j$ | $0$ |
| Altruist | $0$ | $\gamma_s < \frac{\alpha}{n_i} \Rightarrow k_{ij} = p\pi_j$<br>$\gamma_s > \frac{\alpha}{n_i} \Rightarrow k_{ij} = 0$ | $\gamma_g < \frac{n_i}{\alpha} \Rightarrow \sum_j k_{ij} = p\pi_i$<br>$\gamma_g > \frac{n_i}{\alpha} \Rightarrow k_{ij} = 0$ |
| Efficient | $0$ | $0$ | $\gamma_g < 1 \Rightarrow \sum_j k_{ij} = p\pi_i$<br>$\gamma_g > 1 \Rightarrow k_{ij} = 0$ |
| Rival | $\gamma_b < \frac{\beta}{n_i} \Rightarrow k_{ij} = p\pi_j$<br>$\gamma_b > \frac{\beta}{n_i} \Rightarrow k_{ij} = 0$ | $p\pi_j$ | $0$ |
| Ineq. aversion<br>$p\pi_j > p\pi_i$ | $\gamma_b < \frac{\alpha}{\alpha+n_i} \Rightarrow k_{ij} = p\frac{\pi_j - \pi_i}{1-\gamma_b}$<br>$\gamma_b > \frac{\alpha}{\alpha+n_i} \Rightarrow k_{ij} = 0$ | $p\pi_j$ | $0$ |
| Ineq. aversion<br>$p\pi_j < p\pi_i$ | $0$ | $\gamma_s < \frac{\beta}{n_i-\beta} \Rightarrow k_{ij} > 0$<br>$\gamma_s > \frac{\beta}{n_i-\beta} \Rightarrow k_{ij} = 0$ | $\gamma_g < \frac{n_i-\beta}{\beta} \Rightarrow k_{ij} > 0$<br>$\gamma_g > \frac{n_i-\beta}{\beta} \Rightarrow k_{ij} = 0$ |
| Warm glow | $0$ | $\gamma_s < \omega \Rightarrow k_{ij} > 0, \approx p\pi_{ij}$<br>$\gamma_s > \omega \Rightarrow k_{ij} = 0$ | $\omega > 1 \Rightarrow k_{ij} = \frac{p\pi_i}{n_i}$<br>$\omega < 1 \Rightarrow k_{ij} = 0$ |

**Table 1. Behavioral predictions from preference archetypes**

Selfish players are predicted to give and burn nothing, and to steal everything. Altruistic players are predicted to burn nothing, to steal only when altruism is low and the price of stealing is high, and to give only when altruism is high and the price of giving is low. Efficient players burn and steal nothing, since doing so reduces aggregate efficiency. They give only when what they give is topped up by a matching grant. Invidious players steal everything and give nothing. They burn everything if they are sufficiently invidious and the price of burning is low. The predicted behavior of inequality averse players depends on whether their endowment is higher

or lower than the other player. If it is lower, they behave in a way similar to invidious players; if it is higher they behave like altruistic players. Warm glow players give if the cost of giving is lower than the warm glow effect; they steal if the cost of stealing is lower than the warm glow effect.

Building on these predictions, we select parameters $p$ and $\gamma_b, \gamma_s$ and $\gamma_g$ in such a way that if a player consistently follows one of the above archetypes, the combination of choices made during the experiment reveals their type. Selected parameters are summarized in Table 2.

**Table 2. Selected parameters**

| Parameter | Range of values |
|---|---|
| Return to joining the group $p$ | 1.05 to 2.5 |
| Cost of burning $\gamma_b$ | 0.05 to 1 |
| Cost of stealing $\gamma_s$ | 0.1 to 1.2 |
| Cost of giving $\gamma_g$ | 0.1 to 2 |
| Ratio of high to medium endowment | 1.5 |
| Ratio of low to medium endowment | 0.5 |

### 3.2. The decision to join

The decision to join depends on the action that subjects plan to take, and on what they expect other subjects to do. In the giving treatment, players should join if they have any of the six preference archetypes discussed so far. Those who, according to Table 1, give nothing should join because doing so multiplies their payoff by $p > 1$, even if they expect to receive nothing. Those who, in Table 1, wish to give should join because doing so increases their material payoff as above while at the same time increasing their utility through giving and, possibly, receiving.

In the burning treatment, only invidious players – and inequality averse players with a low endowment – derive utility from burning. Other players join if the material gain from joining is

larger than the expected loss from burning by other players. It follows that all players should be more likely to join if $p$ is large and if they expect less burning by others.

In the stealing treatment things are more complicated. Players who plan to steal – which, according to Table 1, is most of them – derive a expected utility gain from joining if their allocation is selected to determine final payoffs. But they also expect a utility loss if other players steal from them and their allocation is not selected. It follows that the decision to join should increase in $p$ and decrease in the expectation of stealing by other players. It should also decrease with the player's initial endowment in the round because someone with a low endowment has more to gain, and less to lose, from stealing.

### 3.3. Preferences over process

So far we have assumed that subjects make choices purely based on final material outcomes, and do not take into account how these material outcomes are achieved. This ignores the possibility that subjects find certain choices more morally acceptable than others. Given our experimental design, three considerations are potentially relevant.

First, subjects may feel guilt from taking actions that they consider morally reprehensible, such as burning or stealing. This is true even though, in the presentation of the experiment, we use slightly more neutral language such as 'confiscate' and 'take' rather than burn and steal. People from developing countries are often thought to be more morally corrupt (e.g., Fisman and Miguel 2007, Barr and Serra 2010). Based on this, we expect more burning and stealing in the African study populations than in the UK.

Second, subjects may anticipate feeling angry at discovering their endowment has been burned or stolen. Even if they cannot infer the actions of other players, they nevertheless realize that joining a group enables others to burn or steal their endowment. If they resent this

possibility enough, they may elect not to join a group even if the expected material gain from joining is positive. Put differently, people may attach such a negative subjective utility to being burned or robbed that even a small probability of such occurrence steers them away from joining a group.[7] If burning and stealing are more prevalent in Africa, people may have adjusted to it. If so, we expect the subjective cost of having endowment destroyed or stolen is less pronounced there.

Third, subjects may feel less inhibited to steal or burn other subjects' endowment if they could have chosen not to join the group. Their reasoning may be something like 'They joined to burn or steal my endowment, so why should I refrain from doing the same to them'. This line of reasoning is somewhat similar to the idea of reciprocity proposed by Charness and Rabin (2002) to describe preferences over process: 'I do to you what I believe you are doing to me'. Alternatively, they may reason that 'They could have avoided my burning or stealing by not joining the group. Having joined, they asked for it and they are fair game'. This second line of reasoning is distantly related to the literature on trolley experiments which argues that people feel less guilt when their actions affect outcomes via external devices or other people's choices (e.g., Greene 2012, Mikhael 2011).

## 4. Summary of experimental results

### 4.1. Descriptive tables

Table 3 summarizes average play in the four batches of experimental sessions. Table 4 summarizes answers to questions about expectations relative to other subjects' behavior.[8] There is a lot of similarity in Tables 3 and 4 across the two batches of Oxford sessions, suggesting that the

[7] Another illustration of the same idea is when people pay more to protect their assets than the anticipated loss from theft.

[8] Some expectation questions were not asked to Kenyan participants in the first two sessions because of a technical glitch, hence the smaller number of observations.

slight differences in experimental setting did not overly affect behavior.

When subjects are automatically assigned to a group (Part 1), we observe slightly more burning and giving in the practice rounds, possibly because subjects are experimenting with the range of actions they can take. There are strong differences between the three study populations in Part 1: in both 2012 and 2014 sessions UK participants steal more and give less than their African counterparts; Kenyan participants burn less and give less than Ugandans, but have a similar propensity to steal. These results contradict the view that Africans behave more opportunistically in an anonymous setting: if anything, our African subjects behave in less morally reprehensible way.

In the second part of the game, joining is a dominant strategy for all preference archetypes, since joining increases the subject's payoff. This is indeed what we observe: most participants join, although a significant proportion of Ugandan subjects do not. This could indicate that they understand the game less well (or trust the experiment less) than more experienced subjects from the UK and Kenya.

In part 3, group participation drops in all three treatments across the three study populations. In the two African study sites, joining falls the most in the burning treatment. The fall is particularly pronounced in the Uganda population, with three fifth of the participants refraining from joining a group in spite of the large material gain associated with it. This fall in group participation could be either because participants expect more burning, or because they associate it with a larger subjective utility loss – or both. From Table 4 we see that African subjects, and particularly Ugandan subjects, expect a lot more burning than UK subjects. As shown in Table 3, however, expectations about burning are pessimistic: there is much less burning by African subjects than they themselves anticipate. In fact, burning is least prevalent in the Kenyan sample. One possible interpretation is that African subjects do not behave more

opportunistically than UK subjects – in fact, as shown in Table 3, they often behave more fairly. But they are more pessimistic, i.e., they are less likely to trust others to behave pro-socially in an anonymous setting, and this is what undermines the formation of efficiency-enhancing groups.

In the two African subject pools there is more group participation in the stealing than in the burning treatment. In contrast, among UK subjects and across both batches of sessions, participation is higher in the burning treatment. There are several possible explanations for this: (a) African subjects expect less stealing than UK subjects; (b) they hope to steal more; or (c) they strongly dislike the prospect of their endowment being destroyed by someone else. From Table 4 we see that African subjects expect much less stealing than UK subjects, which suggests that reason (a) may explain the divergence. From Table 3 we note that African subjects steal less than UK subjects. This pretty much rules out explanation (b). It could also be the case that African subjects, who expect more burning, have a strong dislike for such destruction (reason c), and this dislike is stronger than the dislike they have for having their endowment appropriated (but not destroyed) by others.

In the 2012 sessions, nearly one third of UK subjects do not join a group in the giving treatment. This is surprising since very few UK participants give anything. It is true that few of them expect to receive anything from other subjects (Table 4), so this cannot serve as a motive to join. But by failing to join a group, they forfeit a sizeable increase in payoff.[9] The same pattern is not repeated in the 2014 sessions when joining is more frequent. In these sessions UK subjects hardly give anything at all.

[9] What could account for this behavior? One possibility is that, by not joining, they are trying to avoid the guilt they would perceive for not giving. But if this guilt is larger than the payoff increase from group participation, why not give part of it to others and avoid the guilt from not giving altogether? Another possibility is that, by not joining, UK subjects avoid the akwardness that arises if they give and others do not, or if they do not give and others do. Since the experimental design precludes coordination, such outcomes cannot be avoided. If UK participants have a strong dislike for either of these discordant outcomes, they may prefer to forfeit the payoff gain from joining. This interpretation could be seen as an extension of Charness and Rabin's (2002) reciprocity idea.

In contrast, a sizeable proportion of Kenyan and Ugandan subjects give to others. They are also highly likely to join a group in the giving treatment (Table 3). In fact, for Ugandan subjects, joining is almost twice as common under this treatment than in the burning treatment. Kenyan and Ugandan participants also expect to receive more than those in the UK (Table 4), and those in Uganda expect to receive the most. It remains that the proportion of subjects who give is much smaller than the proportion of subjects who expect to receive – or who state that others expect them to give (see Table 4). This means that there is a significant proportion of subjects who (often erroneously) expect to receive but do not give. This may explain why they join a group.

### 4.2. Regression analysis of burning, stealing and giving

To verify the statistical significance and robustness of our results to clustering, we replicate the various panels of Table 3 in a regression format. Robust standard errors are reported throughout, clustered at the session level. We begin with burning, stealing, and giving choices. The dependent variable is $\tau_{it}$, that is, the proportion of the endowment of the other players that is burned or stolen by $i$ or the proportion of $i$'s endowment that is given by $i$ to the other players. We pool decisions taken under part 1 – when joining is automatic – and part 3 – when joining is free. But we interact regressors with the free joining dummy, which is equivalent to having different average decisions for parts 1 and 3. The 2014 Oxford batch dummy is the omitted category.

Regression results, which are reported in Table 5, confirm that on average there is significantly less stealing and more giving by African subjects. There is also significantly more stealing when joining is free (part 3), a finding consistent with the idea that subjects feel less inhibited to steal from individuals who could have protected their endowment by opting out of the group.

This finding is common to all three subject populations, but is strongest for the 2014 Oxford sessions. We also find significantly more giving in Kenya when joining is free, which suggests that subjects who join are those who wish to give.

In Table 6 we repeat the same analysis but using as observations all individual choices $\tau_{ijt}$ made by experimental subjects.[10] We also introduce dyad-specific choice parameters as additional regressors. These parameters are organized into four groups: the price of burning, stealing or giving ($\gamma_{bt}, \gamma_{st}$ or $\gamma_{gt}$); the initial endowment of the player $e_{it}$; the gain from joining the group $e_{it}(p_t - 1)$; and the endowment of the other player $p_t e_{jt}$. To correct for differences in average endowments across the four sets of sessions, we normalize (i.e., divide) the initial endowment, gain from joining, and endowment of the other players by the average endowment $e_{it}$ in the session batch. Since all choice parameters are orthogonal to each other by construction, similar results are obtained if we limit the regressors to one set of choice parameters at a time. All choice parameters are interacted with batch dummies, except for the $\gamma$ parameters which show too little variation for interaction coefficients to be identified. We also include a dummy for the order in which choices are made – by design, subjects are always first asked about the other player with the largest initial endowment. We estimate a separate regression for each treatment and we cluster standard errors by experimental session.

To facilitate comparison with Table 5, columns (1), (3) and (5) present results without choice parameters. Results are quite similar to those reported in Table 5: less stealing and more giving among African subjects; more stealing when joining is free, mostly in the Oxford 2014 sessions; and more giving in Kenya when joining is free. We also note less burning and less stealing from the second other player, the one with the lower endowment $p_t e_{jt}$ of the two.

Some results change once we control for choice parameters in columns (2), (4) and (6). We

[10] In groups of 3, each subject makes two decisions, one for each of the other group members.

first observe that there is significantly less burning and stealing when the price $\gamma$ of burning or stealing is high. If we refer to Table 1, we note that this finding is not consistent with purely selfish preferences, since in this case burning and stealing is always 0 and thus does not depend on $\gamma$. Sensitivity of burning to $\gamma_b$ is consistent with invidious preferences or inequality aversion; and sensitivity of stealing to $\gamma_s$ is consistent with altruist preferences, inequality aversion, or warm glow. On this basis, it appears that the average experimental subject combines elements of invidious preferences and altruism, as in inequality aversion.

In contradiction with theoretical Table 1, we find no systematic variation in burning, stealing or giving as a function of one's own endowment. This is difficult to reconcile with inequality aversion, that is, with the idea that subject seek to correct a difference between their endowment and that of the other player. We find less stealing when the gain from joining the group is larger. This finding is common to all four batches of sessions. We find more stealing from players who received a larger endowment in all batches except Kenya where the effect is, if anything, reversed. This effect is particularly strong in the 2012 Oxford sessions, and is consistent with invidious preferences or inequality aversion. Finally, we find less giving to players with a large endowment, which is consistent with altruism and inequality aversion.

All these results are robust to alternative specifications such as adding round dummies. There seems to be no learning across rounds, which is to be expected given that no information was fed back to participants during the experiment.

### 4.3. Preference archetypes

The experiment was designed to enable us to assign subjects to one of six preference archetypes based on their burning, stealing and giving decisions, assuming that a single archetype would guide all their choices. We report in Table 7 the result of such an effort. We proceed as follows.

Based on model predictions summarized in Table 1 and discussed in Section 3, we identify a series of choices that contradict a particular archetype. For instance, if a subject destroys (part of) the endowment of another subject, this person cannot be selfish, altruist, efficient, or warm glow – the subject can only be invidious or inequality averse. Similarly, anyone who does not burn always is not invidious, etc. Based on this we can rule out that a subject has preferences corresponding to a given archetype if this person makes choices that sometimes contradict this archetype.

In the first panel of Table 7 we report the proportion of subjects whose choices violate 3, 4, 5 or all the 6 archetypes at least once. We find that, in all three subject populations, most subjects violate all six archetypes, i.e., make choices that are not consistent with consistently following one of our six archetypes. In other words, these archetypes are unable to account for the choices made by the overwhelming majority of subjects.

In the second panel of Table 7, we report the proportion of subjects who never violate a given archetype over the experiment. None of the six archetypes we investigate can account for a majority of the choices made by experimental subjects. In the UK sample, the archetype that 'fits' the largest proportion of subjects is the selfish archetype, followed by 9-11% of the subjects. This proportion falls to 4% in Kenya and Uganda. In these two populations, the altruist and warm glow archetypes fit the largest proportion of subjects. These results confirm earlier findings: a sizeable though small proportion of African subjects behave in a manner that is consistent with altruistic or, at least, warm glow preferences. This proportion among UK participants is negligible.

In Table 8 we take a similar approach but focus on individual choices, not individual subjects. We report, for each country, the proportion of choices made that violate a particular archetype in each of the three treatments. Some treatments are not designed to rule out a given archetype,

in which case the percent of choices that violate it is zero. Moreover, some of the choices have parameter values that cannot rule out certain archetypes.

With these caveats in mind, we note that the choices made by UK subjects are less likely to violate the selfish archetype than choices made in Kenya and Uganda. In contrast, choices made by African subjects are less likely to violate the warm glow archetype than UK subjects. The biggest difference between UK and African subjects is apparent in the giving treatment where only 8-16% of UK subjects violate the selfish archetype – i.e., give something; the proportion is much larger in the two African countries. At the same time, the warm glow archetype is violated by 94-99% of UK subjects' choices, but only by 79% and 74% of the choices made by Kenyan and Ugandan subjects.

### 4.4. Regression analysis of joining

Next we turn to regression analysis to examine the extent to which joining a group varies with choice parameters and across the three study populations. We include the information known to the subject at the time the decision to join is made: the initial endowment of the subject $e_{it}$; the gain from joining, defined as before as $e_{it}(p_t - 1)$; and the price of burning, stealing or giving ($\gamma_{bt}, \gamma_{st}$ or $\gamma_{gt}$), depending on the treatment.

Results are presented in Table 9 separately for each of the three treatments, using a linear probability model with robust standard errors clustered by experimental session. We find that, for the stealing treatment, subjects for all three populations are more likely to join if the payoff increase from joining $e_{it}(p_t - 1)$ is higher. This is consistent with theoretical predictions. For the giving and burning treatments, the payoff increase $e_{it}(p_t - 1)$ increases the probability of joining among UK subjects, albeit with some differences across the two batches of sessions. But this increase has little or no effect on the probability of joining among African subjects: the

coefficient on gain from joining is positive for the omitted category (UK 2014) but this positive effect is more or less cancelled for the Kenya and Uganda subject pools. While the contrast is striking, for the giving treatment this behavior is consistent with theoretical predictions based on preferences defined over outcomes: everybody should join in the giving treatment, as long as the gain from joining is positive. UK subjects, however, are more likely to join when $e_{it}(p_t - 1)$ is higher which, combined with the fact that fewer UK subjects join in the giving treatment, suggest that there is some subjective cost to joining that can only be overcome by the promise of a larger material gain. This effect is particularly strong in the 2012 UK sessions.

Next we observe that UK subjects are less likely to join a group in the burning and stealing treatments when their initial endowment $e_{it}$ is large. Since joining increases their endowment proportionally by a factor $p_t$, this finding seems to suggest that subjects expect to lose proportionally more when they have a large endowment. In other words, they expect proportionally more burning and stealing when their endowment is larger than that of other players – which is not what we observe. For the two African populations, the effect of $e_{it}$ on joining is either small or not present: the negative coefficient on own endowment is more or less cancelled out by interaction terms with the Kenya and Uganda dummies. This finding is consistent with the observation from Table 6 that stealing and burning do not significantly increase as a proportion of endowment.

For giving we find a similar pattern: less joining among UK subjects with a large endowment, but a smaller or non-significant effect among the two African populations. Since UK subjects give very rarely, this suggests that UK subjects with a large endowment incur a larger subjective disutility from joining, perhaps because they believe they should give more if they join. This again is consistent with the idea that UK subjects do not join to avoid the painful dilemma of deciding whether to give or not.

From Table 9 we also see that participants are less likely to join a group in the stealing treatment if the price of stealing $\gamma_s$ is high. If subjects thought that a high $\gamma_s$ would deter stealing by others, they should be more likely to join. Since we observe the opposite, this suggests that some subjects join in the hope of stealing from others – and steal more when $\gamma_s$ is low, as we have seen in Table 6. We also find that subjects are less likely to join in the giving treatment if the price of giving $\gamma_g$ is high. What does this reveal about their motivation? We know that few people give, so that for most people the main benefit from joining is the increase in material payoff $e_{it}(p_t - 1)$. Since we control for $e_{it}(p_t - 1)$ independently, $\gamma_g$ should have little or no effect of the probability of joining. From Table 4, however, we also know that many people expect to receive something from others. Perhaps they expect to receive less when $\gamma_g$ large. Since joining is materially beneficial for most players in the giving treatment, one way to explain this finding is that joining generates a negative subjective cost that must be compensated somehow by the expectation of a larger material gain for subjects to join.

### 4.5. Introducing expectations

As discussed in Section 3, the decision to join should depend on how subjects expect other participants to behave. If they expect others to burn or steal their endowment, they should be more reluctant to join the group in these two treatments. In contrast, if they expect to receive a lot from others, they should be more willing to join in the giving treatment. To investigate this idea, we reestimate Table 9 with additional regressors for the subject's expectation of play by other participants, on its own and interacted with country dummies.

For this regression to be fully convincing, we must control for the subject's intended play. To illustrate the issue, remember that people who intend to steal a lot have an incentive to join. Now imagine that subjects who expect others to steal a lot also steal a lot themselves.

If we control for expectations but not own play, we may falsely assign to a high expectation of stealing by others a behavior that is in fact driven by an intention to steal from others. To correct for this, we construct a variable that summarizes each participant's burning, stealing, and giving decisions made in part 1 (excluding practice rounds). Since subjects receive absolutely no feedback about others' play during the experiment, play in part 1 should be a good predictor of intended play in part 3.

Regression results are summarized in Table 10. We find no pattern regarding the stealing treatment. African subjects are slightly more likely to join in the giving treatment when they expect to receive more, but the effect is only significant for Kenya. Results are stronger in the burning treatment: joining is less likely for UK 2014 subjects who expect more burning, but the effect is absent or reversed for the other three batches of sessions. We also find that UK 2014 subjects are less likely to join if they burned a lot in Part 1, but the effect is reversed for all three other batches of sessions: in those sessions, subjects who burned more in Part 1 are more likely to join a group in the burning treatment, suggesting that their desire to burn partly motivates their decision to join. Since we observe some contrasting patterns between the two sets of UK sessions, we should probably regard these findings as insufficiently robust to be fully conclusive.

In Table 11 we examine whether expectations of others' play help predict own play in Part 1 and Part 3 of the experiment. We find in the UK study population a strong association between own play and expectations of others' play. This is true in all treatments, in both parts of the experiment, and the two batches of UK sessions. In the two African countries, however, this association tends to be weaker. This particularly noticeable in the stealing treatment, for which both Kenya and Uganda have significantly negative coefficients on the interaction between expectations and the country dummy. Point estimates are also mostly negative in

burning, although significantly so in one case only. Why this is the case is unclear.

## 5. Conclusion and discussion

In this paper we have reported the results from a laboratory experiment conducted in the United Kingdom, Kenya, and Uganda, with three different subject pools. We test whether people in a group choose to destroy or steal the endowment of others, if given the option, and whether they choose to give some of their endowment to others. We also test whether subjects are less likely to join a group when doing so increases their endowment but exposes them to redistribution. The experimental setting precludes any feedback between subjects during and at the end of the experiment. Play is anonymous and subjects never play twice with the same subject within the same part of the experiment.

We find a lot of commonality across the three subject populations – little giving and burning, much more stealing. We also find large differences between African and UK subjects. If anything UK subjects behave in a more selfish and strategic way – giving less, stealing more. They also are less likely to join a group when doing so enables them to receive from others, and to transfer part of their endowment to others. Why this is the case is not entirely clear, but it could be because UK subjects prefer not to incur the moral cost of receiving something without giving in return.

In contrast, African subjects are more likely to behave in an altruistic manner. From Table 11, they also appear to play in a less strategic manner – in the sense that their actions are less dictated by what they expect others to do than UK subjects. Combined with the fact that African subjects give more and steal less in general, this suggests that the actions of the African subjects are more determined by general rules of behavior – e.g., morality – rather than by strategic considerations. In contrast, UK subjects play in a more individualistic and

strategic manner – more in line with assumptions behind 'homo economicus'. Finally, we find that African subjects are less likely to join a group in the burning treatment and more likely to expect destruction by others than actually takes place. It is as if the African subjects, who behave in a more 'moralistic' manner than UK subjects, do not trust others to do the same. Put differently, they appear to be less trusting even though they are more trustworthy.

Why do these findings say about development? There is a literature that depicts less developed societies as characterized by interpersonal morality, with little respect for contracts and property rights in anonymous interactions (Fukuyama 2011). It has often been argued (e.g., Polanyi 1944, North 1990, Platteau 1994, Bowles 1998) that strong norms of impersonal fairness are needed for trust to allow markets to blossom and development to take place. Putnam et al. (1993), for instance, argue that the difference in development levels between Northern and Southern Italy is due to historically determined differences in trust and social capital. Based on this, we would have expected less stealing by UK subjects, which is not what we find.

Those who have compared fairness across societies have uncovered a strong positive correlation between norms of fairness and the level of market integration in a society. If this view is correct, we would have again expected to find more pro-social behavior towards strangers among UK subjects than among Ugandan farmers who live in societies that have only recently emerged from a pre-market, subsistence economy. Kenyan slum dwellers occupy a intermediate position between the two, with a level of market integration that is high but historically quite recent. We do not find such pattern in our data. Our findings thus fly in the face of arguments according to which underdevelopment in Africa is due to a failure of generalized morality which undermines the functioning of organizations and markets. If anything, we find UK subjects to behave in a more opportunistic manner. What African subjects seem to be lacking is not morality but trust in each other.

There is nonetheless one characteristics of the two African study sites that could make them less opportunistic: strong adherence to a world religion.[11] Heinrich et al (2010) and House et al (2013) have documented a strong correlation between fairness towards strangers and adherence to a world religion, and Fukuyama (1991) argues that world religions historically paved the way for impersonal morality. While the UK has a long history of adherence to the Christian faith, religiosity has decreased in recent times. Can this explain our findings? We do not have enough degrees of freedom to reach such a strong conclusion – but some of the patterns observed in our data go in that direction. In particular, stealing among UK subjects is more sensitive to expectation of others' stealing than among African subjects. The behavior of our African subjects is more consistent with the view that expecting others to steal does not justify my own stealing: moral imperatives are absolute, not conditional.

The results presented here rely on an experiment that does not allow for feedback between subjects. The purpose of this design is to document how individuals approach redistribution within groups in the absence of any monitoring and punishment mechanism. Introducing feedback and sequential play may profoundly affect group cohesion. For instance, a good leader may manage to reduce people's fear of expropriation, thereby facilitating group formation. Alternatively, groups formed by individuals hoping to steal from each other are unlikely to survive long. Individuals who base their actions on general moral principles may get outraged at the opportunistic and destructive behavior of others. This in turn could unravel group cohesion, making teamwork harder to sustain in a variety of market situations, be it within organizations (e.g., workers discipline) or in market exchange (e.g., breach of contract). More research is needed on these issues.

[11] World religions have been making dramatic headway in Africa and Latin America over the last few decades. This is reflected in our study population: our two African sites have higher levels of religiosity than our UK site. The slums of Nairobi from which our sample is drawn are overwhelmingly Christian and Muslim (estimated at 98% by the Population Council) whilst a third of residents in our UK site have no religion (UK census, 2011). Our site in Uganda is also characterized by higher levels of religiosity than our UK site.

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**Table 3. Summary of play**

| Action | UK 2012 | | UK 2014 | | Kenya | | Uganda | |
|---|---|---|---|---|---|---|---|---|
| | Mean | N.obs. | Mean | N.obs. | Mean | N.obs. | Mean | N.obs. |
| **Part 1a: Practice rounds [joining imposed]** | | | | | | | | |
| burning | 17.3% | 185 | 14.1% | 144 | 4.4% | 198 | 17.3% | 162 |
| stealing | 35.2% | 185 | 34.8% | 144 | 26.0% | 198 | 30.2% | 162 |
| giving | 5.6% | 185 | 8.0% | 144 | 11.5% | 198 | 12.8% | 162 |
| **Part 1b: Joining imposed** | | | | | | | | |
| burning | 9.4% | 370 | 7.8% | 144 | 4.8% | 198 | 10.7% | 162 |
| stealing | 35.2% | 555 | 37.4% | 432 | 23.4% | 594 | 26.3% | 486 |
| giving | 2.9% | 370 | 0.7% | 144 | 4.6% | 198 | 8.4% | 162 |
| **Part 2: Joining only** | | | | | | | | |
| joining | 95.9% | 370 | 95.8% | 144 | 94.4% | 198 | 82.1% | 162 |
| **Part 3: Joining + transfers** | | | | | | | | |
| **a. Joining in:** | | | | | | | | |
| burning game | 78.4% | 555 | 82.6% | 144 | 59.6% | 198 | 42.0% | 162 |
| stealing game | 75.0% | 555 | 64.6% | 288 | 82.5% | 360 | 74.8% | 306 |
| giving game | 68.6% | 185 | 81.6% | 288 | 75.7% | 378 | 82.4% | 324 |
| **b. Transfers** | | | | | | | | |
| burning | 6.9% | 435 | 5.9% | 111 | 6.7% | 97 | 17.6% | 39 |
| stealing | 51.9% | 416 | 70.3% | 167 | 41.0% | 284 | 38.5% | 211 |
| giving | 1.7% | 127 | 0.8% | 235 | 7.1% | 286 | 8.2% | 267 |

**Table 4. Expectations of others' behavior**

| | UK 2012 | | UK 2014 | | Kenya | | Uganda | |
|---|---|---|---|---|---|---|---|---|
| | Mean | N.obs. | Mean | N.obs. | Mean | N.obs. | Mean | N.obs. |
| Percentage of subjects responding 'yes' when asked whether other will… | | | | | | | | |
| Burn their endowment | 27.8 | 185 | 29.6 | 144 | 42.4 | 198 | 51.5 | 145 |
| Steal their endowment | 75.7 | 185 | 76.9 | 144 | 53.6 | 126 | 54.7 | 145 |
| Give to them | 14.5 | 185 | 12.9 | 144 | 39.9 | 126 | 52.0 | 145 |
| Percentage of subjects responding `yes' when asked whether others expect them to give. | | | | | | | | |
| Giving norm | not asked | | 17.9 | 144 | 47.0 | 126 | 45.4 | 145 |

Note: differences between Oxford and the two African samples are all highly significant using
a t-test and joint significant tests in regressions of answers on country dummies, with session clustering

## Table 5. Individual choices by treatment

| VARIABLES | (1) Burning | (2) Stealing | (3) Giving |
|---|---|---|---|
| Kenya | -0.0298 | **-0.140*** ** | **0.0390*** ** |
| | (-1.435) | (-3.130) | (3.916) |
| Uganda | 0.0289 | **-0.111*** | **0.0776*** ** |
| | (0.962) | (-2.036) | (5.876) |
| Oxford 2012 | 0.0158 | -0.0217 | **0.0189*** ** |
| | (0.768) | (-0.578) | (4.402) |
| Free joining dummy | -0.0101 | **0.345*** ** | 0.00119 |
| | (-0.767) | (7.681) | (0.366) |
| Kenya x free joining dummy | 0.0293 | **-0.169*** ** | **0.0238*** ** |
| | (1.001) | (-3.273) | (3.035) |
| Uganda x free joining dummy | 0.0797 | **-0.222*** ** | -0.00395 |
| | (0.771) | (-3.462) | (-0.479) |
| Oxford 2012 x free joining dummy | -0.0151 | **-0.178*** ** | -0.0104 |
| | (-0.559) | (-3.278) | (-1.655) |
| Constant | 0.0779*** | 0.374*** | 0.00681** |
| | (4.418) | (9.179) | (2.433) |
| Observations | 1,556 | 3,145 | 1,789 |
| R-squared | 0.012 | 0.090 | 0.058 |
| F-test Africa = Oxford | 2.906 | 4.904 | 23.642 |
| Prob > F | **0.072** | **0.003** | **0.013** |
| F-test Africa x Free join | 0.757 | 7.068 | 5.094 |
| Prob > F | 0.479 | **0.015** | **0.000** |

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Table 6. Average choices by treatment -- with choice parameters**

| VARIABLES | (1) Burning | (2) Burning | (3) Stealing | (4) Stealing | (5) Giving | (6) Giving |
|---|---|---|---|---|---|---|
| Kenya | -0.0298 | -0.0721 | **-0.140*** ** | -0.0901 | **0.0390*** ** | 0.0482 |
| | (-1.436) | (-0.887) | (-3.131) | (-1.217) | (3.919) | (1.523) |
| Uganda | 0.0289 | -0.0892 | **-0.111*** | **-0.147*** | **0.0776*** ** | 0.0444 |
| | (0.963) | (-0.974) | (-2.037) | (-1.737) | (5.880) | (1.286) |
| Oxford 2012 | 0.0158 | -0.0809 | -0.0217 | -0.0850 | **0.0189*** ** | **0.0265*** |
| | (0.769) | (-1.075) | (-0.578) | (-1.144) | (4.405) | (1.764) |
| Free joining dummy | -0.0204 | -0.0718 | **0.321*** ** | **0.183*** ** | 0.000872 | -0.000785 |
| | (-1.541) | (-1.460) | (6.846) | (4.802) | (0.291) | (-0.260) |
| Kenya x free joining dummy | 0.0298 | 0.0608 | **-0.154*** ** | **-0.112** ** | **0.0276*** ** | 0.0161 |
| | (1.076) | (1.048) | (-2.871) | (-2.112) | (3.060) | (1.512) |
| Uganda x free joining dummy | 0.0882 | 0.0810 | **-0.204*** ** | **-0.166*** ** | 0.00298 | 0.0109 |
| | (0.739) | (1.138) | (-3.222) | (-2.833) | (0.328) | (0.716) |
| Oxford 2012 x free joining dummy | -0.00934 | 0.0574 | **-0.160*** ** | **-0.0576*** | **-0.0152*** ** | -0.0134 |
| | (-0.329) | (0.885) | (-3.061) | (-1.926) | (-4.382) | (-1.669) |
| gamma | | **-0.199** ** | | **-0.327*** ** | | -0.0136 |
| | | (-2.608) | | (-8.957) | | (-1.575) |
| Initial endowment | | -0.131 | | 0.102 | | 0.00189 |
| | | (-1.365) | | (0.906) | | (0.466) |
| Kenya x initial endowment | | 0.0615 | | -0.116 | | -0.0196 |
| | | (0.623) | | (-0.853) | | (-0.828) |
| Uganda x initial endowment | | -0.0895 | | -0.126 | | 0.0126 |
| | | (-0.583) | | (-0.909) | | (0.358) |
| Oxford 2012 x initial endowment | | 0.148 | | -0.174 | | 0.00169 |
| | | (1.277) | | (-1.377) | | (0.0868) |
| Gain from joining | | 0.102 | | **-0.342*** | | 0.00257 |
| | | (0.734) | | (-1.781) | | (0.317) |
| Kenya x gain from joining | | -0.0427 | | 0.313 | | -0.0239 |
| | | (-0.287) | | (1.271) | | (-0.969) |
| Uganda x gain from joining | | 0.351 | | 0.301 | | 0.0115 |
| | | (1.463) | | (1.152) | | (0.334) |
| Oxford 2012 x gain from joining | | -0.0915 | | 0.307 | | -0.0106 |
| | | (-0.601) | | (1.342) | | (-0.335) |
| Endowment of other player | | 0.00870 | | **0.0643*** ** | | **-0.0190*** |
| | | (0.469) | | (4.977) | | (-1.985) |
| Kenya x endowment of other player | | 0.00164 | | **-0.0838*** ** | | 0.0231 |
| | | (0.0537) | | (-4.489) | | (1.342) |
| Uganda x endowment of other player | | 0.0282 | | 0.0117 | | 0.0139 |
| | | (0.661) | | (0.490) | | (0.846) |
| Oxford 2012 x endowment other player | | 0.00366 | | **0.0671*** ** | | -0.00566 |
| | | (0.174) | | (6.223) | | (-0.615) |
| Dummy for rank = 2 | **-0.0273*** ** | **-0.0194*** | **-0.0415*** ** | -0.0139 | -0.00154 | -0.00516 |
| | (-5.135) | (-2.026) | (-5.479) | (-1.258) | (-0.468) | (-1.425) |
| Constant | 0.0916*** | 0.171** | 0.395*** | 0.623*** | 0.00758** | 0.0330** |
| | (5.047) | (2.411) | (9.532) | (8.867) | (2.469) | (2.128) |
| Observations | 2,924 | 2,882 | 5,944 | 5,880 | 3,214 | 3,199 |
| R-squared | 0.014 | 0.027 | 0.076 | 0.162 | 0.055 | 0.061 |
| F-test country | 2.912 | 0.529 | 4.908 | 1.509 | 23.676 | 1.749 |
| Prob > F | 0.072 | 0.480 | 0.015 | 0.023 | 0.000 | 0.576 |
| F-test country#freejoin | 0.812 | 0.753 | 5.761 | 4.368 | 4.682 | 1.370 |
| Prob > F | 0.454 | 0.595 | 0.008 | 0.239 | 0.018 | 0.666 |
| F-test country#initial | | 0.924 | | 0.466 | | 0.413 |
| Prob > F | | 0.409 | | 0.632 | | 0.271 |
| F-test country#gain | | 1.885 | | 0.938 | | 0.563 |
| Prob > F | | 0.171 | | 0.404 | | 0.193 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

**Table 7. Compatibility of choices with utility archetypes**

% of subjects whose choices violate:

| | UK 2012 | UK 2014 | Kenya | Uganda |
|---|---|---|---|---|
| 3 archetypes | 0.5% | 0.7% | 1.0% | 1.2% |
| 4 archetypes | 0.0% | 5.6% | 16.2% | 14.2% |
| 5 archetypes | 17.3% | 11.8% | 3.0% | 5.6% |
| 6 archetypes | 82.2% | 81.9% | 79.8% | 79.0% |
| N.subjects | 185 | 144 | 198 | 162 |

% of subject who do not violate the archetype even once in the experiment

| | UK 2012 | UK 2014 | Kenya | Uganda |
|---|---|---|---|---|
| U.Selfish | 11.4% | 9.0% | 4.0% | 3.7% |
| U.Efficient | 0.5% | 0.7% | 1.0% | 1.2% |
| U.Altruist | 1.1% | 1.4% | 15.2% | 14.2% |
| U.Invidious | 2.2% | 9.0% | 2.5% | 1.9% |
| U.Warm glow | 0.5% | 1.4% | 15.2% | 14.2% |
| U.Inequal. Averse | 3.2% | 3.5% | 0.5% | 2.5% |
| N.subjects | 185 | 144 | 198 | 162 |

**Table 8. Proportion of choices that violate each archetype**

| | All | **Burning** | **Stealing** | **Giving** |
|---|---|---|---|---|
| **A. UK 2012** | % | % | % | % |
| U.Selfish | 37% | 25% | 58% | **16%** |
| U.Efficient | 51% | 25% | 55% | 70% |
| U.Altruist | 27% | 25% | 0% | 70% |
| U.Invidious | 44% | 51% | 58% | 16% |
| U.Warm glow | 34% | 25% | 0% | **94%** |
| U.Inequal. Averse | 43% | 61% | 36% | 37% |
| N.observations | 1295 | 370 | 555 | 370 |
| | | | | |
| **A. UK 2014** | % | % | % | % |
| U.Selfish | 40% | 18% | 58% | **8%** |
| U.Efficient | 54% | 18% | 52% | 99% |
| U.Altruist | 23% | 18% | 0% | 99% |
| U.Invidious | 44% | 38% | 58% | 8% |
| U.Warm glow | 23% | 18% | 0% | **99%** |
| U.Inequal. Averse | 46% | 41% | 53% | 29% |
| N.observations | 720 | 144 | 432 | 144 |
| | | | | |
| **B. Kenya** | % | % | % | % |
| U.Selfish | 44% | 13% | 58% | **30%** |
| U.Efficient | 51% | 13% | 54% | 79% |
| U.Altruist | 18% | 13% | 0% | 79% |
| U.Invidious | 49% | 40% | 58% | 30% |
| U.Warm glow | 18% | 13% | 0% | **79%** |
| U.Inequal. Averse | 49% | 44% | 57% | 32% |
| N.observations | 990 | 198 | 594 | 198 |
| | | | | |
| **C. Uganda** | % | % | % | % |
| U.Selfish | 53% | 36% | 61% | **48%** |
| U.Efficient | 61% | 36% | 65% | 74% |
| U.Altruist | 22% | 36% | 0% | 74% |
| U.Invidious | 54% | 41% | 61% | 48% |
| U.Warm glow | 22% | 36% | 0% | **74%** |
| U.Inequal. Averse | 51% | 56% | 55% | 33% |
| N.observations | 810 | 162 | 486 | 162 |

**Table 9. Joining by treatment -- with choice parameters**

| VARIABLES | (1) Burning | (2) Stealing | (3) Giving |
|---|---|---|---|
| Kenya | **-0.397*** ** | -0.0817 | -0.0259 |
| | (-3.309) | (-0.833) | (-0.376) |
| Uganda | **-0.282*** | -0.0624 | 0.0800 |
| | (-1.916) | (-0.518) | (1.183) |
| Oxford 2012 | 0.0115 | 0.104 | -0.0684 |
| | (0.117) | (1.242) | (-0.380) |
| Gain from joining | **0.697*** ** | **0.459*** ** | **0.389*** ** |
| | (11.98) | (3.706) | (11.81) |
| Kenya x gain from joining | **-0.543*** ** | -0.0891 | **-0.446*** ** |
| | (-3.762) | (-0.214) | (-5.918) |
| Uganda x gain from joining | **-0.860** ** | -0.461 | **-0.446*** ** |
| | (-2.355) | (-1.484) | (-6.899) |
| Oxford 2012 x gain from joning | **-0.367*** ** | **-0.211*** | **0.646*** ** |
| | (-7.327) | (-1.764) | (2.785) |
| Initial endowment | **-0.635*** ** | **-0.462*** ** | **-0.110** ** |
| | (-5.001) | (-4.819) | (-2.354) |
| Kenya x initial endowment | **0.682*** ** | **0.387** ** | **0.136** ** |
| | (4.042) | (2.448) | (2.222) |
| Uganda x initial endowment | 0.538 | **0.355** ** | 0.0771 |
| | (1.511) | (2.513) | (0.826) |
| Oxford 2012 x initial endowment | **0.286** ** | 0.00931 | -0.184 |
| | (2.244) | (0.0931) | (-1.029) |
| Gamma | 0.125 | **-0.275*** ** | **-0.210*** ** |
| | (1.413) | (-4.023) | (-3.148) |
| Constant | 0.860*** | 1.024*** | 0.882*** |
| | (10.09) | (10.74) | (17.52) |
| Observations | 1,059 | 1,509 | 1,175 |
| R-squared | 0.166 | 0.098 | 0.070 |
| F-test Africa | 5.667 | 0.347 | 1.288 |
| Prob > F | **0.001** | 0.710 | 0.292 |
| F-test Africa x gain from joining | 9.338 | 1.105 | 34.579 |
| Prob > F | **0.009** | 0.346 | **0.000** |
| F-test Africa x initial endowment | 8.269 | 4.464 | 2.469 |
| Prob > F | **0.002** | **0.022** | 0.104 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Gain from joining = (groupreturn-1) * initial endowment

## Table 10. Joining, expectations, and past play

| Regressor | (1) Game 1 | (2) Game 2 | (3) Game 3 |
|---|---|---|---|
| Expected burning/stealing/receiving | **-0.288**** | 0.0288 | -0.0664 |
| | (-2.581) | (0.149) | (-0.678) |
| Kenya x expected burning/stealing/receiving | **0.454**** | 0.168 | **0.219*** |
| | (2.587) | (0.836) | (1.896) |
| Uganda x expected burning/stealing/receiving | **0.293**** | 0.0594 | 0.109 |
| | (2.086) | (0.273) | (0.852) |
| Oxford 2012 x expected burning/stealing/receiving | **0.208*** | -0.217 | -0.0209 |
| | (1.853) | (-1.063) | (-0.255) |
| Own past burning/stealing/giving | **-0.333**** | -0.0213 | 0.298 |
| | (-2.503) | (-0.175) | (0.754) |
| Kenya x own past burning/stealing/giving | **0.613**** | 0.193 | 0.0812 |
| | (2.715) | (1.351) | (0.188) |
| Uganda x own past burning/stealing/giving | **0.590***** | 0.307 | -0.0203 |
| | (3.194) | (1.679) | (-0.0484) |
| Oxford 2012 x own past burning/stealing/giving | **0.495**** | 0.0209 | -0.0629 |
| | (2.752) | (0.136) | (-0.143) |
| Kenya | **-0.542***** | -0.220* | -0.116 |
| | (-4.782) | (-1.960) | (-1.175) |
| Uganda | **-0.407***** | -0.185 | 0.0250 |
| | (-3.010) | (-1.198) | (0.306) |
| Oxford 2012 | -0.0468 | **0.271***** | -0.0720 |
| | (-0.749) | (3.097) | (-0.415) |
| Gain from joining | **0.704***** | **0.442***** | **0.380***** |
| | (8.643) | (3.008) | (12.23) |
| Kenya x gain from joining | **-0.592***** | **-0.592***** | **-0.487***** |
| | (-3.877) | (-3.003) | (-7.012) |
| Uganda x gain from joining | **-0.537***** | -0.350 | **-0.416***** |
| | (-2.996) | (-0.999) | (-8.153) |
| Oxford 2012 x gain from joining | **-0.377***** | -0.226 | **0.687***** |
| | (-5.517) | (-1.633) | (3.007) |
| Initial endowment | **-0.577***** | **-0.455***** | **-0.109**** |
| | (-4.255) | (-5.104) | (-2.308) |
| Kenya x initial endowment | **0.649***** | **0.492***** | **0.176**** |
| | (3.684) | (4.017) | (2.781) |
| Uganda x initial endowment | 0.180 | **0.315**** | 0.0805 |
| | (0.756) | (2.463) | (0.792) |
| Oxford 2012 x initial endowment | **0.228*** | 0.0208 | -0.189 |
| | (1.740) | (0.205) | (-1.079) |
| Gamma | 0.127 | **-0.352***** | **-0.231***** |
| | (1.473) | (-4.642) | (-3.825) |
| Constant | 0.926*** | 1.048*** | 0.899*** |
| | (20.47) | (12.21) | (18.55) |
| Observations | 1,042 | 1,384 | 1,015 |
| R-squared | 0.198 | 0.123 | 0.093 |

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

## Table 11. Burning, stealing and giving -- controlling for expectations

| | Burning | | Stealing | | Giving | |
|---|---|---|---|---|---|---|
| Regressors | Part 1 | Part 3 | Part 1 | Part 3 | Part 1 | Part 3 |
| Expected burning/stealing/receiving | **0.167*** | **0.249**** | **0.518***** | **0.934***** | **0.0251*** | **0.0563*** |
| | (1.895) | (2.736) | (5.925) | (7.039) | (1.896) | (2.062) |
| Kenya x expected burning/stealing/receiving | -0.0959 | **-0.187*** | **-0.364***** | **-0.581***** | 0.0274 | 0.0794 |
| | (-0.995) | (-1.855) | (-3.537) | (-3.726) | (0.505) | (1.305) |
| Uganda x expected burning/stealing/receiving | -0.165 | 0.0489 | **-0.392***** | **-0.704***** | -0.0533 | -0.0761 |
| | (-1.428) | (0.206) | (-3.720) | (-4.023) | (-1.201) | (-1.595) |
| Oxford 2012 x expected burning/stealing/receiving | **0.211**** | 0.0713 | 0.0647 | -0.176 | **0.0507*** | 0.00697 |
| | (2.577) | (0.521) | (0.441) | (-0.912) | (1.910) | (0.233) |
| Kenya | -0.0437 | 0.0627 | 0.133 | **0.275**** | **-0.0561*** | 0.0581 |
| | (-0.702) | (0.634) | (1.485) | (2.160) | (-1.774) | (1.542) |
| Uganda | 0.0546 | -0.151 | **0.258**** | 0.134 | 0.0604 | **0.0902**** |
| | (0.544) | (-0.675) | (2.556) | (0.709) | (1.190) | (2.696) |
| Oxford 2012 | **-0.154***** | -0.000566 | -0.0940 | -0.108 | 0.00856 | 0.0913 |
| | (-2.948) | (-0.0128) | (-0.750) | (-0.754) | (0.598) | (1.313) |
| Difference in endowment | **0.0623***** | 0.00793 | **0.0844***** | 0.0332 | **-0.0177*** | -0.0165 |
| | (3.870) | (0.456) | (4.301) | (0.755) | (-1.977) | (-1.608) |
| Kenya x difference in endowment | -0.0186 | -0.00753 | -0.0535 | -0.0862 | **0.0333**** | 0.0417 |
| | (-0.737) | (-0.172) | (-1.647) | (-1.244) | (2.772) | (1.537) |
| Ugand x difference in endowment | **-0.0554**** | 0.162 | -0.0239 | 0.146 | 0.0215 | 0.00798 |
| | (-2.088) | (1.461) | (-0.953) | (1.669) | (0.912) | (0.606) |
| Oxford 2012 x difference in endowment | 0.0187 | 0.00316 | 0.0559 | **0.105**** | 0.00930 | **-0.147*** |
| | (1.271) | (0.145) | (1.126) | (2.339) | (0.625) | (-1.846) |
| Endowment of other player | -0.0150 | 0.0141 | 0.0318 | 0.00323 | -0.0182 | -0.0124 |
| | (-0.382) | (0.554) | (0.613) | (0.0642) | (-1.616) | (-1.187) |
| Kenya x endowment of other player | 0.0321 | -0.0230 | 0.0654 | -0.0611 | **0.0860***** | -0.0162 |
| | (0.693) | (-0.310) | (1.121) | (-0.552) | (3.745) | (-0.681) |
| Uganda x endowment of other player | 0.0167 | 0.212 | -0.0201 | 0.141 | 0.0419 | 0.0185 |
| | (0.259) | (1.330) | (-0.324) | (1.184) | (0.824) | (0.866) |
| Oxford 2012 x endowment other player | **0.154***** | -0.000906 | 0.0212 | **0.112**** | 0.00511 | -0.0865 |
| | (3.033) | (-0.0370) | (0.234) | (2.796) | (0.396) | (-1.243) |
| Gamma | -0.927 | **-0.173**** | **-0.335***** | -0.162 | **-0.0201***** | **-0.0307*** |
| | (-1.667) | (-2.213) | (-8.351) | (-1.384) | (-3.695) | (-1.925) |
| Constant | 0.0903 | -0.00665 | 0.186* | 0.0637 | 0.0332*** | 0.0247* |
| | (1.362) | (-0.180) | (2.046) | (0.495) | (2.919) | (1.894) |
| Observations | 1,714 | 1,115 | 3,600 | 1,583 | 1,570 | 1,249 |
| R-squared | 0.143 | 0.177 | 0.187 | 0.236 | 0.075 | 0.115 |
| F-test country | 0.677 | 0.457 | 3.295 | 2.464 | 2.475 | 4.899 |
| Prob > F | 0.516 | 0.638 | 0.055 | 0.107 | 0.106 | 0.321 |
| F-test country#diff | 2.183 | 1.103 | 1.376 | 3.150 | 3.851 | 1.195 |
| Prob > F | 0.132 | 0.348 | 0.003 | 0.001 | 0.036 | 0.074 |
| F-test country#expectax | 1.019 | 2.122 | 7.787 | 8.999 | 0.895 | 2.914 |
| Prob > F | 0.374 | 0.141 | 0.273 | 0.062 | 0.422 | 0.017 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1