Are informal transfers driven by strategic risk-sharing or fairness? Evidence from an experiment in Kenya*

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Abstract

Individuals often manage low and risky earnings using informal transfers, which are influenced by both fairness norms and the desire for informal risk-sharing. This paper develops an experiment that allows us to disentangle these motives when income can depend on effort. The empirical analysis shows that people are equally likely to give transfers from high-income to low-income partners when income is due to chance as when both participants exert effort to increase expected income; however, participants are less likely to give transfers when one or both partners do not exert effort. These transfers are more likely due to risk-sharing than inequity aversion.

JEL: C92, D63, O17

Keywords: Informal Insurance, Risk-sharing, Fairness, Social preferences, Laboratory experiment

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1 Introduction

People in low-income communities often use informal transfers between family members, neighbors, or community members to manage low and risky income (Cox, 1987; Platteau and Abraham, 1987; Udry, 1994; Fafchamps, 2011). In such settings, risk-sharing (i.e. informal insurance) motives likely interact with fairness norms, with both having important influence on transfer behavior. Literature exploring informal risk-sharing transfers between households focuses on identifying explanations for limited risk-sharing, including imperfect monitoring, hidden income, and moral hazard (Kinnan, 2021; Jain, 2020; Chandrasekhar et al., 2018; Ligon et al., 2002; Albarran and Attanasio, 2003; Barr et al., 2012). This literature largely ignores the roles of social preferences and fairness norms in shaping informal transfers. A separate literature has shown that fairness norms, such as inequity aversion or respect for earned entitlement, can also influence sharing behavior (Fehr and Schmidt, 1999; Bolten and Ockenfels, 2000; Cappelen et al., 2007; Jakiela, 2015; Barr et al., 2015; Cappelen et al., 2013; Mollerstrom et al., 2015; Becker, 2013). In this paper, we disentangle these fairness motives from risk-sharing motives by exploring how people manage transfers when partners can exert effort to increase their expected payout.

The paper develops a laboratory experiment in which participants from informal settlements (slums) in Nairobi, who commonly use informal transfers, play a series of sharing games with randomly-assigned partners in which they can make transfers to each other. The games vary whether each partner's risky income is the result of pure luck (Luck Only) or a combination of observable effort and luck (Observable Effort). In the Observable Effort game, exerting effort increases the likelihood that a participant draws high income. Importantly, partners agree upon binding contracts that specify transfers before their income draws are determined. Transfers can be conditioned on each potential combination of own and partner's income and, in the Observable Effort game, whether partners exert effort. The structure of the contracts allows us to infer how participants manage transfers when partners can choose to exert effort and sheds light on the fairness and risk-sharing motives that govern these informal transfers.

We compare ex-ante contracts agreed upon for each combination of own and partner's effort in the Observable Effort game to ex-ante contracts agreed upon in the Luck Only game, within each possible combination of income draws. We find that people are just as likely to agree, ex-ante, to give transfers in the Observable Effort game when both partners exert effort as they are in the Luck Only game, when neither partner has the opportunity to exert effort. However, partners are less likely to agree to give transfers in the Observable Effort game when one or both partners do not exert effort and income draws are unequal. This tendency to withhold transfers when one partner does not exert effort is not present when risky income draws are equal.

Using measures derived from the post-game survey, we show that informal transfers of unequal income are more common among inequity averse participants when income is purely a result of luck. The pattern of withholding transfers of unequal income when one or both partners choose not to exert effort, however, is more common among people who are less risk averse, suggesting that self-interested risk-sharing motives are active when income can be earned. This finding is reminiscent of Ligon and Schechter (2012), who find that within-game sharing of windfall income is primarily driven by pro-social preferences while sharing outside of experiments is more likely a consequence of self-interested reciprocity. Further, it supports the assumption common in the experimental risk-sharing literature that informal transfers of unequal income are driven by informal insurance motives, rather than fairness (as in Barr et al., 2012; Barr and Genicot, 2008; Chandrasekhar et al., 2018; Attanasio et al., 2012; Fischer, 2013; D'Exelle and Verschoor, 2015; Jain, 2020). The behavior identified in this paper may contribute to limited risk-sharing in the real world by encouraging people who earn income through effort to limit transfers to low-earning counterparts.

This paper uses the same set of experiments as Jain (2020), and similarly allows for social preferences and risk-sharing motives. It differs from Jain (2020) because it compares informal transfers of risky earned income when effort is observable with informal transfers of risky unearned income. Jain (2020), on the other hand, compares informal transfers of risky earned income when effort is observable with informal transfers of risky earned

income when effort is unobservable, finding that social proximity decreases the moral hazard problem when an individual cannot see whether her partner exerted effort and contracts cannot be conditioned on effort. In the current paper, social proximity does not explain the main pattern of results; this finding is consistent with Jain (2020), which posits that the mechanisms by which social connections increase risk-sharing transfers are only active when information is imperfect and effort is unobservable.

The results presented in this paper also speak to the literature on social preferences and effort. First, they are consistent with respect for earned entitlement only when an active decision not to exert effort is available, adding an interesting perspective to the consistent finding that people in developing countries tend to respect earned entitlement less than those in developed countries (Fahr and Irlenbusch, 2000; Oxoby and Spraggon, 2008; Krawczyk, 2010; Jakiela, 2015; Barr et al., 2015; Caballero, 2017; Gee et al., 2017). Second, the results are inconsistent with an accountability principle of fairness, which holds that inequalities should be equalized if they are the result of uncontrollable luck but not if they are the result of individual choices; here, people who receive high income draws without exerting effort withhold transfers from partners who receive low income draws and exert effort (Cappelen et al., 2013; Mollerstrom et al., 2014; Becker, 2013). Third, our finding that people withhold transfers when one or both partners do not exert effort is, at face value, consistent with social norms that include implicit punishment for deviating from behavior that supports the common good (Fehr and Fischbacher, 2004a; Fehr and Fischbacher, 2004b; Fehr and Gächter, 2000). Yet, the fact that it is primarily individuals who are less risk-averse withholding transfers suggests that this behavior is better explained by individuals acting in their own self-interest; these are the individuals willing to risk a low payoff when one or both partners does not exert effort.

Section 2 describes the experimental design and context. Section 3 describes how transfers differ across games and effort-pairs. Section 4 discusses the interpretation of the results. Section 5 concludes.

2 Experimental design and context

2.1 Experimental design

The experiment is an artefactual field experiment (Harrison and List, 2004) conducted with the Busara Center for Behavioral Economics in Kenya. Participants make choices on touch-screen computers, conducted with z-Tree (Fischbacher, 2007). Instructions are presented orally by trained enumerators in both English and Kiswahili, and also provided in written form in English. Participant understanding is verified with periodic comprehension questions. If a participant does not correctly answer a comprehension question, then enumerators explain to each participant individually and participants must re-answer the question correctly to proceed. On average 24% of comprehension questions are not correctly answered on the first attempt; all participants were able to answer the comprehension questions correctly and proceed in the study.

Potential subjects are invited to session via SMS text message. All participants are also compensated with 200 Kenyan shillings (KES) in cash (with an additional KES 50 for on-time arrival to the session) to allay transportation and opportunity costs they might incur in attending the session. Each of the 676 participants in the experiment play three sharing games, with sessions lasting approximately three hours. The order of the games is randomized and participants are paid for the decisions made in one of the three games. Additionally, participants are randomly assigned partners between games.

Each sharing game is a variation on a standard one-shot interpersonal insurance game (Selten and Ockenfels, 1998) and builds on a larger literature that uses laboratory experiments to study informal risk-sharing (Barr et al., 2012; Charness and Genicot, 2009; Barr and Genicot, 2008; Chandrasekhar et al., 2018; Attanasio et al., 2012; Fischer, 2013; D'Exelle and Verschoor, 2015). In the Luck Only game, income is solely the result of chance. In the Observable Effort game, income depends on both observable effort and chance. In the Unobservable Effort game, income depends on both unobservable effort and chance. A summary of the sessions, game scripts, and handouts used in the experiment are in Appendix A. Since one game is randomly chosen for payment and income is risky, risk-averse participants can use transfers to decrease the variability of payment.

This paper focuses on the Luck Only and Observable Effort games with an eye toward determining whether partners share income differently when income is the result of chance versus when income is the result of both chance and effort.[1] Figure 1 depicts the structure of these games. In both games, participants begin with an endowment. Income is risky and each participant independently receives a high income draw (H) or a low income draw (L).[2] In the Luck Only game, income is solely the result of chance. Each person then faces a 75% chance of receiving a high income draw and a 25% chance of receiving a low income draw. In the Observable Effort game, participants have the opportunity to complete a real-effort task. An individual that exerts effort (E) faces a 75% probability of drawing high income and a 25% probability of drawing low income while an individual that does not exert effort (N) faces a 25% chance of drawing high income and a 75% chance of drawing low income. To complete the real-effort task, participants have five minutes to correctly count the total number of zeros contained in a pre-specified number of grids composed of zeros and ones. Since realized effort is not an outcome of interest, we pool across three effort thresholds that vary across sessions; specifically, participants have to count either 20, 35, or 45 grids correctly to complete the task. An image of the task is provided in Appendix Figure A.2.[3] Under this income process, the portion of income due to luck is not clearly separable from the portion of income due to effort; effort increases the chance that individuals draw high income, but it does not guarantee that they receive higher income than people who do not exert effort.

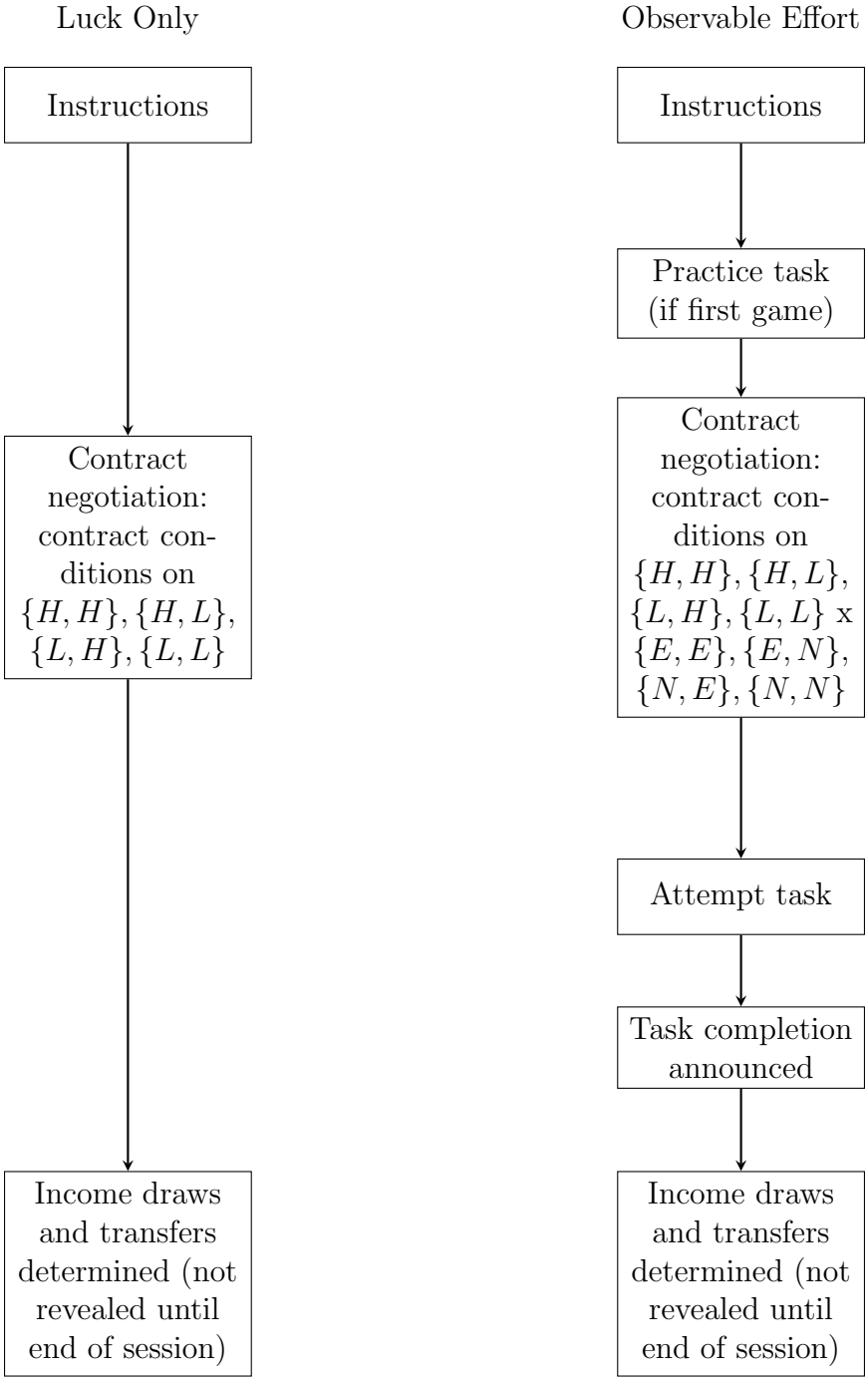
Income is independently distributed and observable. Prior to drawing their income

[1] Jain (2020), instead, uses the Observable Effort and Unobservable Effort games to study the effect of social ties on risk-sharing in the presence of imperfect monitoring. Further, this paper pools across three effort thresholds that vary across sessions, while Jain (2020) uses data from one of the three effort thresholds. In Jain (2020), realized effort is also an outcome of interest.

[2] Two payment schemes are used across sessions. At the time of this study, USD 1 was equivalent to KES 98.2 and KES 39.0 at purchasing power parity, using the World Bank official exchange rate and price level ratio of PPP conversation factor (GDP) to market exchange rate for KES/USD in 2015. In payment scheme 1, 508 participants begin with an endowment of KES 350. Participants who draw high income gain KES 100 and those who draw low income lose KES 100. In payment scheme 2, 168 participants begin with an endowment of KES 250. Participants who draw high income gain KES 400 and those who draw low income do not receive any additional money. Further, scripts differ slightly and participants differ in their previous exposure to experiments (see footnote 10) across payment schemes.

[3] When the task is first introduced, participants familiarize themselves with the task in a two-minute practice round in which they are paid KES 2 for each correct answer. This task minimizes the importance of education or ability, as there are never more than fifteen zeros in a single 5-by-7 grid (Abeler et al., 2011). The task and the relative important of effort in the task is discussed in Jain (2020).

Figure 1: Structure of the Games



and, in the Observable Effort game, attempting the task, participants communicate face-to-face with their partner to negotiate a contract that specifies the transfers they are willing to give or receive for each possible combination of income draws.[4] [5] Participants can agree on a contract which specifies zero transfers and are given unlimited time to agree on a contract. If participants do not agree on a contract, then no transfers are made. More details about the negotiations and examples of the handouts used to aid participants in negotiating are in Appendix A.3 and A.4.

In the Luck Only game, the contract conditions on each possible combination of income draws: when both partners draw high income $\{H, H\}$, when both partners draw low income $\{L, L\}$, when a participant draws high income and her partner draws low income $\{H, L\}$, and when a participant draws low income and her partner draws high income $\{L, H\}$. The income process in the Luck Only games mimics random windfall income, such as lottery winnings. In contrast, the contract in the Observable Effort game conditions on partners' effort combination in addition to the set of possible income realizations as described in the Luck Only game: when both partners exert effort to increase the likelihood of high income draws and thus earn higher expected income $\{E, E\}$, when neither partner exerts effort $\{N, N\}$, when only the randomly-selected first partner exerts effort $\{E, N\}$, and when only the second partner exerts effort $\{N, E\}$. The resulting observable effort contract must describe income transfers under the sixteen possible outcomes described by the outcome-set $(\{H, H\}, \{L, L\}, \{H, L\}, \{L, H\}) \times (\{E, E\}, \{N, N\}, \{E, N\}, \{N, E\})$. Individuals choose whether to exert effort after partners agree on their contracts, and whether the partner completed the task is announced after task completion. The income process in the Observable Effort game mimics income

[4]Participants were matched to a partner sitting next to, in front of, or behind them; this ensured partners were randomized since participants were randomly seated in the laboratory. Participants negotiated in the laboratory amidst all the other participants by sitting or standing and talking with their partner, which meant that other participants could see with whom they were matched in each round.

[5]The feature of face-to-face negotiations between partners is a common feature of risk sharing experiments in developing countries (Barr and Genicot, 2008; Giné et al., 2010; Barr et al., 2012; Fischer, 2013; Chandrasekhar et al., 2018). Since participants interacted face-to-face and potentially knew their partners outside of the laboratory, we provide evidence in Appendix C.6 that our results are similar for participants that did and did not know each other. Since participants are paid for their choices in one game out of three games (played with different partners), it is unlikely that participants bargained outside of the experimental sessions rather than in the experiment.

that depends on both chance and effort, such as agricultural earnings.

After playing the three games, participants also complete a survey which includes questions about their lending behavior, perceived social status, risk preferences, and pro-social preferences and an anonymous dictator game. Participants can earn additional income for choices made in the survey. At the end of the session, income draws are realized and transfers are made according to the contracts agreed upon in one randomly selected game of the three. All participants are paid within two days of the experiment via M-PESA, a mobile-phone based money transfer service. The average payment is KES 496 (approximately USD 5.05, ranging from KES 179 to 840), in addition to a show-up fee; this is more than the average daily wage in the informal settlement, approximately KES 350 (Haushofer et al., 2014).

This experimental design is based on standard risk-sharing games; however, the structure of the games and post-game survey allows us to disentangle risk-sharing motives from pro-social motives to redistribute earned and unearned income. In contrast to risk-sharing experiments, experiments that explore pro-social preferences tend to be dictator or ultimatum games that elicit preferences of one individual (Cherry et al., 2002; Henrich et al., 2005; Engel, 2011; List, 2007). Our experiment deviates from these social preferences games in three ways to reflect realistic informal sharing environments. First, informal sharing agreements in the real world tend to be explicit or implicit agreements between two (or more) people. Thus, in our experiment, two people with conflicting interests make decisions – and must agree – on how to share risky earned and unearned income in a variety of situations.[6] Second, people who balance informal insurance motives with pro-social preferences often make informal agreements before all risk is realized and must trust each other to carry through on their promises. With this in mind, our experiment focuses on ex-ante agreements made between partners that understand the income risk they face but before that risk is realized in order to gain insight into the motives for

[6]While this structure is common in risk-sharing games, standard dictator games that measure social preferences allow one person to decide how to allocate income between themselves and a partner. Experiments that elicit social preferences from dictator games in which a team makes the decision find that teams make more self-interested decisions than individuals. Yet in these experiments, the interest of team members are aligned (Charness and Sutter, 2012; Kugler et al., 2012); in contrast, the interests of team members are not always aligned in the games presented in this paper.

giving. As our focus is disentangling risk-sharing motives from pro-social motives for sharing, the experiment abstracts from the effect of trust between partners by guaranteeing that the agreements will be carried out.[7] Third, income risk and conceptions of fairness often depend on both effort and luck, and it is often impossible to distinguish the precise contribution of each towards realized income. The income process in our experiment capture this characteristic.[8]

2.2 Context

Participants are from Kibera, one of the largest informal settlements in Africa. They must be at least 18 years of age, and have access to both a cell phone and M-PESA to participate in the experiment.[9] According to Marx et al. (2019), households have lived in Kibera for 16 years on average, and 42% of households fall below the poverty line of $2 a day. Table 1 compares participants in the experiment to the typical resident of Kibera, Nairobi, or Kenya, depending on which data is available. Participants are similar to the population of Kibera in education and ethnic makeup, but are more likely to be female because they must be available to attend experimental sessions during the weekday.[10]

Survey responses reveal that participants' households are poor and face substantial risk. They represent a population that frequently uses informal transfers and faces risk in their lives, providing an appropriate context to study informal transfers of unequal income. Sixty-four percent of participants perceive their household income in the past year to be below average, 30% report that they primarily work for themselves, 33%

[7] Informal arrangements are thought to be enforced through a mix of reciprocity in a repeated game, altruism, trust between socially connected individuals, and adherence to social norms (Coate and Ravallion 1993; Platteau 1994; Cox and Fafchamps 2007; Karlan et al. 2009).

[8] Many experiments measure willingness to share earned versus unearned income by comparing sharing behavior with income that is purely a result of luck to sharing behavior with income that is purely a result of effort (Cherry et al., 2002; List, 2007; Jakiela, 2015; Barr et al., 2015; Gravert, 2013; Fahr and Irlenbusch, 2000; Gee et al., 2017). Other experiments consider income processes that are a joint product of luck and effort in which the portion of income due to luck and due to effort are clearly separable (Cappelen et al., 2013; Rey-Biel et al., 2018; Erkal et al., 2011). In contrast, we consider an income process in which income is the result of both effort and luck in a non-separable manner.

[9] Data collected in Nairobi suggest that over 90% of residents in informal settlements have access to both a cell phone and M-PESA (Marx et al., 2019). Haushofer et al. (2014) provides a detailed description of recruitment into the Busara subject pool.

[10] All participants in payment scheme 2 were newly recruited, while the median participant in payment scheme 1 was involved with three previous studies on average at the Busara Center since its founding in 2012. This should allay concerns that participants in this study are familiar with economic experiments.

Table 1: Demographic Characteristics of Sample

	(1) Nairobi/ Kenya	(2) Busara Subject Pool	(3) Experiment	(4) Range
Age (years)		31.34	33.08	19-65
Male	51.15*	45.47	38.70	
Education (%)				
Some Primary	36.95*	47.81	35.81	
Some Secondary	32.30*	39.99	52.45	
Some College or University	19.13*	9.05	11.74	
Native Language (%)				
Luhya	26.9°	19.47	33.88	
Luo	36.5°	19.16	30.46	
Kikuyu	5.9°	25.04	9.21	
Other	30.7°	36.33	26.45	
Married (%)				
Single	19.74	47.79	43.83	
Married or Cohabiting	71.17	44.84	47.40	
Divorced, separated, widowed	9.08	7.37	8.47	

Notes: 674 observations. This table uses data from Nairobi or Kibera when possible, as residents of Kibera are not representative of Kenya overall. Statistics for Nairobi/Kenya are taken from Haushofer et al. (2014) unless otherwise noted. *Data used for Nairobi. ° Data used for Kibera and taken from Marx et al. (2019).

report that they cannot find work, and 45% report that they usually work once in a while. Furthermore, 86% of participants indicate that they have faced a household shock in the past six months, with 59% reporting multiple shocks.[11] Finally, participants use informal transfers with 30% (51%) of participants indicating that they have received (given) on average KES 2428 (2371) in the past month.

One might be concerned that participants are unfamiliar with features of the games, given the binding ex-ante contracts and one-shot nature of the interaction. However, survey responses suggest that participants are familiar both with thinking ahead financially and with informal financial promises. Participants frequently engage in institutions with well-defined rules and regulations, such as Rotating Savings and Credits Associations (59% use the local equivalent of a ROSCA), and 77% of participants indicate that they have discussed with family and friends what they might do if a bad shock were to occur.

The post-game survey reveals that participants exhibit both a demand for risk sharing,

[11]Shocks include weather-related shocks, wedding or funeral expenses, eviction, loss of job or decrease in work available, or illness preventing a household member from working or requiring medical expenses.

based on their degree of risk aversion, and variation in inequality aversion; thus, this is an appropriate context to disentangle the role of fairness motives from risk-sharing motives when exploring transfers. According to a binary measure that captures the degree of each participant's risk-aversion, 248 participants (38% of those with non-missing data) are more risk averse than their counterparts who are willing to take risks.[12] According to a separate measure that indicates whether participants have any pro-social desire to equalize within-game income, 373 participants (59% of those with non-missing data) display inequity aversion by agreeing to equalizing income transfers in a dictator game.[13][14]

3 Results

We next describe informal transfers agreed upon facing different income realizations and effort combinations in the Observable Effort and Luck Only games. We focus on the extensive margin, asking whether partners' effort choice set and choices influence their willingness to make informal transfers, and separately compare transfers facing unequal and equal income draws.

We begin with three descriptive observations of the contracts. First, most transfer schemes conditional on effort-game combination specify zero transfers between participants with equal income draws, {L,L} or {H,H}, and symmetric transfers between participants with unequal income draws, {L,H} or {H,L}.[15] This pattern describes 81% of contracts agreed upon when both partners exert effort, 85% of contracts when neither

[12] This measure is constructed from a survey question that asks *"Are you a person who is generally prepared and willing to take risks?"*, set equal to one ("more risk averse") if the participant responds that they are neutral, unwilling, or not at all willing to take risks, and zero if the participant is very willing or willing to take risks. The likelihood that a participant agrees to a transfer between partners with unequal income draws in the Luck Only game is relatively similar across these two groups of participants (p-value of 0.076), suggesting that this measure captures the degree rather than existence of risk aversion.

[13] We create this binary measure of aversion to unequal income received within the game, or "inequity aversion," from an incentivized (anonymous) dictator game included in the post-game survey. The binary measure of inequity aversion is equal to zero if the participant elects not to give anything to her partner upon receiving KES 100, and equal to one if the participant gives an equalizing amount above zero and at or below KES 50. Since it is unclear how to interpret sharing above KES 50, we drop the 20 individuals who give more than KES 50 in this analysis. The likelihood of transfers in the Luck Only game differs among "inequity averse" and "not inequity averse" participants (68% and 42% respectively, with a statistical test of the difference in means resulting in a p-value of 0), suggesting that this measure indeed captures participants' desire to equalize income overall.

[14] See Appendix D for more detail on the survey, construction, and descriptive statistics of these measures. Due to zTree issues, we are missing data on both measures for 20 participants in one session.

[15] In a "symmetric" transfer, a partner who draws low income receives the same transfer (including transfers of zero) from the partner who draws high income regardless of which partner draws high income.

partner exerts effort, 70% of contracts when the high-income partner exerts effort, 83% of contracts when the low-income partner exerts effort, and 87% of contracts when income depends only on luck. Second, 12% of transfer schemes specify non-zero transfers when partners receive the same income draw; these transfers appear equally likely across effort-game combinations. Third, 62% of transfer schemes agreed upon in the Observable Effort game do not transfer any income between partners of unequal income draws, regardless of effort combination, while 19% agree to transfers between partners of unequal income draws facing all effort combinations. In the Luck Only game, 58% of transfers schemes agreed upon do not transfer any income between partners with unequal income draws. Appendix B presents further summary statistics of the contracts.

3.1 Empirical Specification

Equation 1 details the empirical specification that isolates differences in whether partners share income across effort combinations in the Observable Effort and the Luck Only games:

$$y_{ijt} = \beta_1 \text{EE}_{ijt} + \beta_2 \text{NN}_{ijt} + \beta_3 \text{EN}_{ijt} + \beta_4 \text{NE}_{ijt} + \mu_i + \varepsilon_{ijt} \tag{1}$$

Our primary outcome variable, y_{ijt}, is a binary variable equal to one if individual i gives any income to her partner j facing effort combination t, and equal to zero if individual i receives a transfer of income from her partner j, or if no transfer is made in either direction, when facing effort combination t. $EE_{ijt} = 1$ for observations in which both partners, individuals i and j, exert effort; $NN_{ijt} = 1$ for observations when both individuals i and j choose not to exert effort; $EN_{ijt} = 1$ for observations when individual i exerts effort and her partner j does not exert effort; and $NE_{ijt} = 1$ for observations when individual i does not exert effort and her partner j exerts effort. The omitted group includes observations from the Luck Only game. Individual fixed effects, μ_i, capture aspects, such as altruism, wealth effects, or social standing outside of the game, that uniformly influence whether an individual gives across effort-game combinations. We cluster standard errors at the session level, resulting in 41 clusters. The coefficients of interest are β_1, β_2, β_3, and β_4: they capture differences in whether a transfer is given

when both partners can choose to exert effort to earn high expected income, relative to when participants receive high expected income without effort in the Luck Only game.

Column (1) of Table 2 focuses on observations in which partners' income draws are unequal. The underlying sample includes one observation per individual, per effort-game combination, when there is inequality in income draws. Each of 676 participants results in one observation in the Luck Only game and four observations in the Observable Effort game when the participant draws high income and her partner draws low income, resulting in $676 \times 5 = 3380$ observations.[16] Column (2) focuses on observations in which partners' income draws are equal. Since there is equal income when both individuals draw high income and when both individuals draw low income, the underlying sample includes two observations per individual per effort-game realization, resulting in $676 \times 5 \times 2 = 6760$ observations. Our outcome variable captures whether an individual gives a transfer, thus this measure can vary within the partnership even when income draws are equal.

3.2 How do transfers vary across effort-game combinations?

Result 1: People are just as likely to agree to a transfer from a partner with a high income draw to a partner with a low income draw in the Observable Effort game as they are in the Luck Only game when both partners exert effort, but significantly less likely to do so when one or both partners do not exert effort.

Column (1) of Table 2 describes transfers agreed upon when individuals draw high income and their partners draw low income. In the Luck Only game, 57.8% of participants agree to transfer money to their partner if they draw high income and their partner draws low income. The small and insignificant β_1 coefficient suggests that participants with high income draws are just as likely to agree to transfers to their partners with low income draws in the Luck Only game as in the Observable Effort game when both partners exert effort. On the other hand, the negative and significant estimates of β_2, β_3, and β_4 in Column (1) suggest that partners with high income draws are less likely to agree to give

[16] Since we focus on transfers given from the high income partner to the low income partner, we drop observations that represent the transfer an individual gives when she receives a low income draw and her partner receives a high income draw. These transfers are inconsistent with the motives examined and are rare, with only five percent of people giving a transfer when they receive a low income draw and their partner receives a high income draw.

income to their partners with low income draws when the opportunity to exert effort is available but one or both partners elect not to. Specifically, β_2 indicates that participants are 9.6 percentage points less likely to agree to give transfers when both partners choose not to exert effort in the Observable Effort game than in the Luck Only game; β_3 indicates that participants are 5.6 percentage points less likely to agree to give transfers when the high-income partner exerts effort but the low-income partner does not; and β_4 indicates that participants are 7.0 percentage points less likely to agree to give transfers when the low-income partner exerts effort but the high-income partner does not.

Result 2: In contrast, people are just as likely to agree to give a transfer to a partner who receives an equal income draw in the Observable Effort game as in the Luck Only game, except when both partners chose not to exert effort.

Column (2) of Table 2 describes transfers agreed upon when partners' income draws are equal, either both high or both low. In the Luck Only game, only 4.2% of participants give transfers to their partner when income draws are equal. Further, the percent of partners making transfers when income draws are equal rarely differs across effort-game combinations (β_1, β_3, and β_4 are close to zero). The exception is that participants are 1.3 percentage points less likely to agree to give transfers when partners have the opportunity to exert effort but choose not to (β_2). While the qualitative pattern across coefficients in Column (2) is similar to the pattern in Column (1), the magnitudes are small and largely insignificant.[17] We note that these results should be interpreted with caution because few participants agree to give income to their partner when facing equal income draws. In contrast to Result 1, Result 2 suggests that participants do not specifically withhold transfers when income draws are equal and one partner chooses not to exert effort.

[17]In Appendix Section C.1, we show that this effect is driven primarily by income realizations when both partners receive high income.

Table 2: The effect of effort-game combination on the extensive margin of transfers

	(1) Give HL transfers	(2) Give HH/LL transfers	(3) All
Both effort (EE) β_1	-0.009	-0.002	-0.002
	(0.028)	(0.007)	(0.007)
Both no effort (NN) β_2	-0.096***	-0.013***	-0.013***
	(0.029)	(0.005)	(0.005)
Unequal effort (EN) β_3	-0.056*	-0.005	-0.005
	(0.030)	(0.005)	(0.005)
Unequal effort (NE) β_4	-0.070**	-0.009	-0.009
	(0.031)	(0.006)	(0.006)
HL α_0			0.536***
			(0.042)
HL × Both effort (EE) α_1			-0.007
			(0.027)
HL × Both no effort (NN) α_2			-0.083***
			(0.028)
HL × Unequal effort (EN) α_3			-0.051*
			(0.029)
HL× Unequal effort (NE) α_4			-0.061**
			(0.029)
adj. R^2	0.588	0.230	0.450
Luck only mean	0.578	0.042	0.042
N	3380	6760	10140

Notes: The data are comprised of 676 individuals across 41 sessions. "Both effort (EE)" indicates observations in which both partners exert effort in the Observable Effort game; "Both no effort (NN)" indicates observations in which both partners choose not to exert effort; "Unequal effort (EN)" indicates observations when the individual exerts effort and their partner does not exert effort; finally, "Unequal effort (NE)" indicates observations when the individual does not exert effort and their partner exerts effort. The omitted group includes observations from the Luck Only game. The dependent variable in Column (1) indicates whether individuals give income to their partner when they receive a high income draw and their partner receives a low income draw ("Give HL transfers"); in Column (2), "Give HH/LL transfers" indicates whether individuals give income to their partner when both partners draw equal income. Column (3) pools the observations from both Columns (1) and (2) and shows the results from the interacted specification presented in Equation 2. The OLS regressions include individual fixed effects and standard errors, in parentheses, are clustered at the session level. Levels of statistical significance: $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

3.3 Robustness

We confirm the robustness of these results in Online Appendix C. First, we show that the level of transfers, which captures adjustments to transfers on both the intensive and extensive margins, does not vary significantly across effort-game combination (Section C.2); this result is consistent with Jain (2020). Second, we confirm that results are similar when we include one observation per partnership, transforming the outcome variable to capture whether any transfers are agreed upon, and cluster the standard errors at the partner level. This alleviates concerns of bias due to the fact that contracts are negotiated at the partner rather than individual level (Section C.3). Third, we confirm that the results remain when using wild-cluster bootstrapped standard errors, following Cameron et al. (2008), to alleviate concerns arising from the small number of clusters (Section C.4). Fourth, we show that the pattern of transfers is similar across payment schemes and across effort thresholds (Section C.5). Fifth, we show that the results do not vary across partnerships with different levels of social connections (Section C.6); this alleviates the concern that social relationships outside of the experiment influence agreed-upon transfers within the experiment. This is consistent with Jain (2020), since the mechanism by which social connections influenced transfers in that paper operates when effort is unobservable.

Finally, to disentangle risk sharing from pro-social motives in determining transfers between partners with unequal income draws, we use a difference-in-difference specification to isolate differences in agreed-upon transfers given due to inequality in income draws. Let r index income realization (equal or unequal) and HL_{ijr} equal one when player i receives a high income draw and player j receives a low income draw. We run the following specification on the full sample, pooling unequal income realizations, {H,L}, from Column (1), with equal income realizations, {H,H} and {L,L}, from Column (2):

$$\begin{aligned} y_{ijtr} =& \beta_1 \text{EE}_{ijt} + \beta_2 \text{NN}_{ijt} + \beta_3 \text{EN}_{ijt} + \beta_4 \text{NE}_{ijt} + \alpha_0 \times \text{HL}_{ijr} \\ &+ \alpha_2 \text{NN}_{ijt} \times \text{HL}_{ijr} + \alpha_3 \text{EN}_{ijt} \times \text{HL}_{ijr} + \alpha_4 \text{NE}_{ijt} \times \text{HL}_{ijr} + \mu_i + \varepsilon_{ijtr} \end{aligned} \tag{2}$$

This specification controls for motives that differ across effort-game combinations but influence transfers across equal and unequal income realizations alike. One example of such a motive is an individual, believing she is substantially better-off than her partner, who wants to give her partner money when her partner exerts effort regardless of their in-game income realization.[18] The estimates presented in Column (3) of Table 2 show that our main results (now $\alpha_1, \alpha_2, \alpha_3$, and α_4) are unchanged with the inclusion of controls for such transfers motives. This analysis is discussed in more detail in Appendix C.7.

4 Discussion: What preferences could explain observed pattern of transfers?

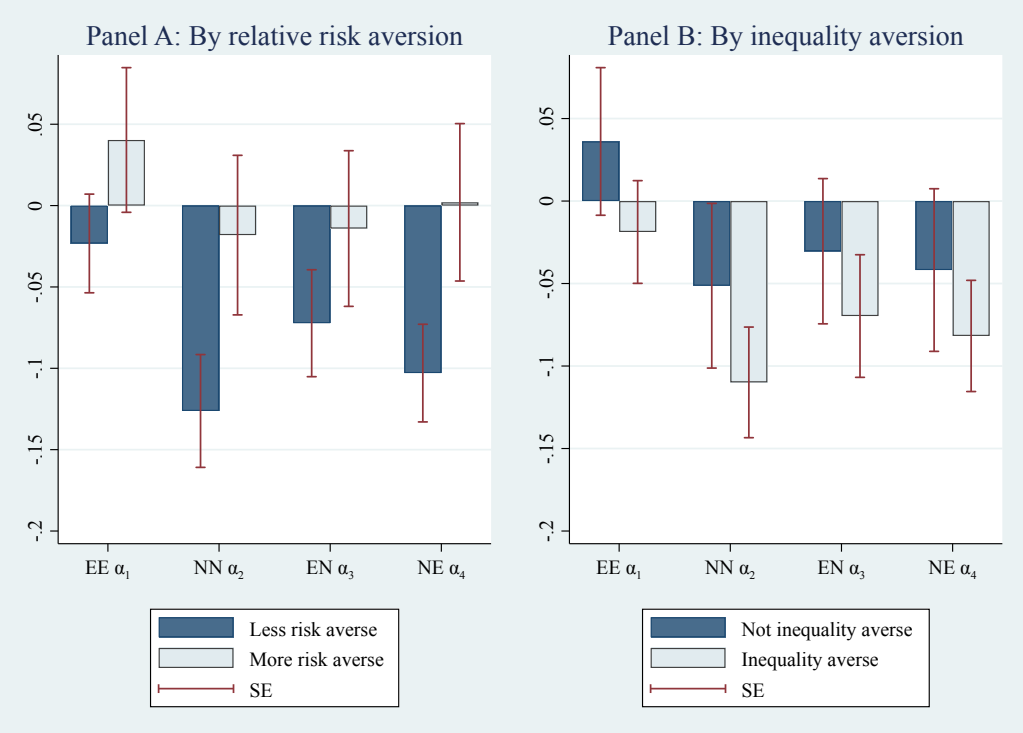
Section 3 describes a clear pattern of ex-ante contracts upon which participants agree facing unequal income draws and various effort choices: participants who receive high income draws are as likely to share income with their partners who receive low income draws when both participants exert effort as they are when their income is purely the result of luck. They are less likely, however, to share income with their partners who receive low income draws when one or both of the partners actively chooses not to exert effort. Empirically, this pattern manifests in Table 2, Column (1) as $\beta_1 = 0$ and $\beta_2, \beta_3, \beta_4 < 0$.

Both risk sharing or fairness norms could explain the pattern of transfers observed in Table 2, and the contract structure of these games does not allow us to distinguish between the two. However, using our binary measures of risk aversion and inequity aversion described in Section 2.2, we show that the pattern is stronger among less risk-averse participants, but does not differ across more and less inequity-averse participants. We run Equation 2 separately for people who are more and less risk averse, and similarly for people who display inequity aversion in the anonymous dictator game and those who do not. We show the coefficients of interest, that is $\alpha_1, \alpha_2, \alpha_3$, and α_4, in Figure 2, and the underlying regression results in Appendix D.3.

The observed pattern differs meaningfully by the degree of risk aversion in Figure

[18] These motives are identified in charitable given and dictator games. List (2011) provides a detailed review of the market for charitable giving. One characteristic is that charitable giving demonstrates a U-shape in individual income: the poor and the rich are more likely to give and give higher portions of their income to charity than the middle class. Several papers within the broader literature that uses dictator games to reveal pro-social preferences to give to others suggest that income inequality can affect these preferences (Gee et al.,2017; Agranov and Palfrey, 2015; Erkal et al., 2011; Krawzcyk, 2010).

Figure 2: Extensive-margin transfers by participants' risk aversion and inequality aversion



Notes. The data are comprised of 656 individuals in Panel A and 636 individuals in Panel B across 40 sessions. We present the estimated coefficients $\alpha_1, \alpha_2, \alpha_3$, and α_4 from regressions of the form presented in Equation 2, implemented separately for individuals who are more and less risk averse in Panel A and individuals who are and are not inequity averse in Panel B. These variables are defined in the text. The corresponding results are provided in Appendix Section D.3. The outcome variable is a binary indicator of whether the individual agreed to transfer a non-zero amount of money to her partner. We use standard errors, clustered at the session level, to plot the standard error bands.

2(a), but is similar across participants who are and are not inequity averse in Figure 2(b). The pattern of withholding transfers when one or both partners does not exert effort is stronger among less risk-averse participants – consistent with risk sharing since these participants are more willing to forego the insurance that informal transfers provides when one or both partners do not exert effort. This analysis suggests that the observed pattern of transfers between partners with unequal income draws is driven by risk sharing, rather than inequity aversion that depends on effort.

5 Conclusion

This paper develops an experiment to explore how social preferences and risk-sharing motives interact when people agree to give informal transfers of risky earned income. It finds that partners withhold transfers when one or both partners choose not to exert effort, but that transfers are similar when income is purely the result of luck and when both

partners choose to exert effort. Though fairness norms may motivate some of the transfers agreed upon in these contracts, the pattern of withholding transfers when partners choose not to exert effort is stronger among people who are less risk-averse, suggesting that risk-sharing drives this result.

Given that households in developing countries receive little income from public assistance and often engage in informal transfers with members of their social networks, our results suggest that beliefs regarding whether income is the result of luck or a combination of luck and deliberate choices of whether to exert effort will affect the ability of poor households to insure themselves against negative income shocks. This speaks to previous research that finds that people in developing countries are less likely to respect earned entitlement than those in developed countries – that is, they are relatively more likely to give or take money that was earned through effort than money received by luck (Jakiela, 2015; Barr et al., 2015; Cappelen, 2013). This consistent finding is often interpreted as a point of concern: redistribution systems that lack an emphasis on earned entitlement can discourage people from exerting effort, as participants know that they may have to give away their hard-earned money to people who earned less and put in less effort. Yet our findings suggest a rosier view: these poor participants from a developing country disregard earned entitlement only when they do not have the option to exert effort to increase their expected income, implying that their effort choice-set may influence their income transfers. Respect for earned entitlement is much stronger when people could exert effort to earn higher expected income but choose not to. Perhaps respect for earned entitlement is less effective or less important in encouraging effort in environments in which it is difficult to distinguish between the roles of luck and effort in determining income.

While our experiment is better able to disentangle social preferences from risk-sharing motives than many other experimental games, a limitation is that it abstracts from important features of risk-sharing, such as the repeated nature of interactions and limited commitment. Thus, we consider this paper a first step in bringing together the literatures on risk-sharing and social preferences facing earned income, both of which are key to

understanding informal transfers.

References

[1] Abeler, Johannes, Armin Falk, Lorenz Goette and David Huffman. 2011. "Reference Points and Effort Provision," *American Economic Review*, 101(2): 470-492.

[2] Albarran, Pedro and Orazio Attanasio. 2003. "Limited commitment and crowding out of private transfers: Evidence from a randomised experiment," *The Economic Journal*, 113(486): C47-C85.

[3] Attanasio, Orazio, Abigail Barr, Juan C. Cardenas, Garance Genicot and Costas Meghir. 2012. "Risk Pooling, Risk Preferences, and Social Networks," *American Economic Journal: Applied Economics*, 4(2):134-167.

[4] Barr, Abigail, Marleen Dekker and Marcel Fafchamps. 2012. "Who Shares Risk with Whom under Different Enforcement Mechanisms?," *Economic Development and Cultural Change*, 60(4):677-706.

[5] Barr, A., Burns, J., Miller, L., and Shaw, I. 2015. "Economic status and acknowledgement of earned entitlement. " *Journal of Economic Behavior & Organization*, 118: 55–68.

[6] Barr, Abigail and Garance Genicot. 2008. "Risk Sharing, Commitment and Information: An Experimental Analysis," *Journal of the European Economic Association*, 6(6):1151-1185.

[7] Belhaj, Mohamed, Renaud Bourlès, and Frédéric Deroïan. 2014. "Risk-Taking and Risk-Sharing Incentives Under Moral Hazard," *American Economic Journal: Microeconomics* , 6(1):58-90.

[8] Becker, Alice. 2013. "Accountability and the fairness bias: the effects of effort vs. luck." *Social Choice and Welfare*, 41(3): 685-699.

[9] Bolton, Gary E., and Axel Ockenfels. 2000. "ERC: A theory of equity, reciprocity, and competition." *American Economic Review*, 90(1): 166-193.

[10] Caballero, Gustavo Adolfo. 2016. "Opportunities and effort: ex-post redistribution in the lab. "Working paper.

[11] Cappelen, Alexander W., Astri Drange Hole, Erik Ø. Sørensen, and Bertil Tungodden. 2007. "The pluralism of fairness ideals: An experimental approach," *American Economic Review,* 97(3): 818-827.

[12] Cappelen, Alexander W., James Konow, Erik Ø. Sørensen, and Bertil Tungodden. 2013. "Just luck: An experimental study of risk-taking and fairness," *American Economic Review,* 103(4): 1398-1413.

[13] Cappelen, Alexander W., Moene, K.O., Sørensen, E.Ø. and Tungodden, B., 2013. "Needs versus entitlements—an international fairness experiment." *Journal of the European Economic Association*, 11(3): 74-598.

[14] Chandrasekhar, Arun, Cynthia Kinnan and Horacio Larreguy. 2018. "Social Networks as Contract Enforcement: Evidence from a Lab Experiment in the Field," *American Economic Journal: Applied Economics*, 10(4):43-78.

[15] Charness, Gary and Garance Genicot. 2009. "Informal Risk Sharing in an Infinite-Horizon Experiment," *The Economic Journal*, 119:796-825.

[16] Charness, Gary and Matthias Sutter. 2012. "Groups make better self-interested decisions." *Journal of Economic Perspectives,* 26(3): 157-76.

[17] Cherry, Todd L., Peter Frykblom, and Jason F. Shogren. (2002). "Hardnose the Dictator." *American Economic Review*, 92(4), 1218–1221.

[18] Coate, Stephen, and Martin Ravallion. 1993. "Reciprocity without commitment: Characterization and performance of informal insurance arrangements." *Journal of Development Economics,* 40(1): 1-24.

[19] Cox, Donald. 1987. "Motives for private income transfers." *Journal of Political Economy,* 95(3): 508-546.

[20] List, John A and Todd L Cherry. (2008) "Examining the role of fairness in high stakes allocation decisions." *Journal of Economic Behavior & Organization*, 65(1), 1–8.

[21] Cox, Donald, and Marcel Fafchamps. (2007). "Extended family and kinship networks: economic insights and evolutionary directions." *Handbook of Development Economics*, 4: 3711–3784.

[22] D'Exelle, Ben and Arjan Verschoor. 2015. "Investment Behaviour, Risk Sharing and Social Distance," *The Economic Journal*, 125:777-802.

[23] Engel, Christoph. 2011. "Dictator games: A meta study," *Experimental economics,* 14(4): 583-610.

[24] Erkal, Nisvan, Lata Gangadharan, and Nikos Nikiforakis. (2011). "Relative Earnings and Giving in a Real-Effort Experiment." *American Economic Review*, 101(7): 3330–3348.

[25] Fahr, René, and Bernd Irlenbusch. (2000). "Fairness as a constraint on trust in reciprocity: Earned property rights in a reciprocal exchange experiment." *Economics Letters*, 66(3): 275–282.

[26] Fafchamps, Marcel. 2011. "Risk Sharing Between Households," *Handbook of Social Economics,*, Volume 1B.

[27] Fehr, Ernst, and Urs Fischbacher. (2004a). "Third-party punishment and social norms." *Evolution and Human Behavior*, 25(2): 63–87.

[28] Fehr, Ernst, and Urs Fischbacher. (2004b). "Social norms and human cooperation." *Trends in Cognitive Sciences*, 8(4): 185–190.

[29] Fehr, Ernst, and Simon Gächter. (2000). "Cooperation and Punishment in Public Goods Experiments." *American Economic Review*, 90(4): 980–994.

[30] Fehr, Ernst, and Schmidt, Klaus M. (1999). "A theory of fairness, competition, and cooperation." *The Quarterly Journal of Economics*, 114(3): 817–868.

[31] Fischbacher, Urs. 2007. "z-Tree: Zurich toolbox for ready-made economic experiments," *Experimental Economics*, 10(2):171-178.

[32] Fischer, Greg. 2013. "Contract Structure, Risk-Sharing and Investment Choice," *Econometrica*, 81(3):883-939.

[33] Gee, Laura K., Marco Migueis, and Sahar Parsa. (2017). "Redistributive choices and increasing income inequality: Experimental evidence for income as a signal of deservingness." *Experimental Economics*, 20(4); 894–923.

[34] Giné, Xavier, Pamela Jakiela, Dean Karlan, and Jonathan Morduch. 2010. "Microfinance Games," *American Economic Journal: Applied Economics*, 2:60-95.

[35] Gravert, Christina. (2013). "How luck and performance affect stealing." *Journal of Economic Behavior & Organization*, 93: 301–304.

[36] Harrison, Glenn W. and John A. List. 2004. "Field Experiments," *Journal of Economic Literature*, 42(4):1009-1055.

[37] Haushofer, Johannes, Marie Collins, Giovanna de Giusti, Joseph Muiruri Njoroge, Amos Odero and Cynthia Onyango, James Vancel, Chaning Jang, Maneesh Varghese Kuruvilla and Conor Hughes. 2014. "A Methodology for Laboratory Experiments in Developing Countries: Examples from the Busara Center,"Working Paper.

[38] Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, Richard McElreath et al. 2005. ""Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies," *Behavioral and brain sciences*, 28(6): 795-855.

[39] Jain, Prachi, 2020. "Imperfect monitoring and informal insurance: The role of social ties." *Journal of Economic Behavior & Organization*, 180:241-256.

[40] Jakiela, Pamela. 2015. "How Fair Shares Compare: Experimental Evidence from Two Cultures", *Journal of Economic Behavior & Organization*, 118:40-54 .

[41] Karlan, Dean, Markus Mobius, Tanya Rosenblat, and Adam Szeidl. 2009. "Trust and social collateral.", *The Quarterly Journal of Economics,* 124(3): 1307-1361.

[42] Kinnan, Cynthia. 2021. "Distinguishing barriers to insurance in Thai villages,"Working paper.

[43] Krawczyk, Michał. (2010). "A glimpse through the veil of ignorance: Equality of opportunity and support for redistribution." *Journal of Public Economics*, 94(1–2): 131–141.

[44] Kugler, Tamar, Edgar E. Kausel, and Martin G. Kocher. (2012). "Are groups more rational than individuals? A review of interactive decision making in groups: Are groups more rational than individuals?" *Wiley Interdisciplinary Reviews: Cognitive Science*, 3(4): 471–482.

[45] Lefgren, Lars J., David P. Sims, and Olga B. Stoddard. (2016). "Effort, luck, and voting for redistribution." *Journal of Public Economics*, 143: 89–97.

[46] Ligon, Ethan, Jonathan P. Thomas and Tim Worrall. 2002. "Informal Insurance Arrangements with Limited Commitment: Theory and Evidence from Village Economics," *The Review of Economic Studies*, 69(1):209-244.

[47] List, John A. 2007. "On the Interpretation of Giving in Dictator Games," *Journal of Political Economy*, 115(3):482-493.

[48] Marx, Benjamin, Thomas Stoker and Tavneet Suri. 2019. "There Is No Free House: Ethnic Patronage in a Kenyan Slum," *American Economic Journal: Applied Economics*, 11(4): 36-70.

[49] Mollerstrom, Johanna, Bjørn-Atle Reme, and Erik Ø. Sørensen. (2015). "Luck, choice and responsibility—An experimental study of fairness views." *Journal of Public Economics,* 131: 33-40.

[50] Oxoby, Robert J., and John Spraggon. 2008. "Mine and yours: Property rights in dictator games." *Journal of Economic Behavior & Organization,* 65(3-4): 703–713.

[51] Platteau, Jean-Philippe. 1994. "Behind the market stage where real societies exist-part II: The role of moral norms," *Journal of Development Studies*, 30(4):753–817.

[52] Platteau, Jean-Philippe and Anita Abraham. 1987. "An inquiry into quasi-credit contracts: The role of reciprocal credit and interlinked deals in small-scale fishing communities," *Journal of Development Studies*, 23(4):461-490.

[53] Rey-Biel, Pedro, Roman Sheremeta and Neslihan Uler. 2018. "When income depends on performance and luck: The effects of culture and information on giving." *Emerald Publishing Limited.*

[54] Selten, Reinhard and Axel Ockenfels. 1998. "An experimental solidarity game," *Journal of Economic Behavior and Organization*, 34(4):517-539.

[55] Udry, Christopher. 1994. "Risk and Insurance in a Rural Credit Market: An Empirical Investigation in Northern Nigeria," *The Review of Economic Studies*, 61(3):495-526.