Spousal Communication and Intra-HH Allocation in Kenya

Carolina Castilla[1]

Yuta J. Masuda[2]

Wei Zhang[3]

PRELIMINARY AND INCOMPLETE

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Abstract:

The study of intra-household allocation has become an increasingly relevant concern when designing development policy as empirical studies continue to observe non-cooperative behavior. In this paper we present results from a field-laboratory experiment in Kenya where individuals in established marriages were asked to play several rounds of the investment game. We varied whether spouses were allowed to communicate prior to making their decisions. We find evidence to reject both the unitary and cooperative models of the household as senders transfer on average 62% of their endowments resulting in an average loss of earnings of Ksh 170, even when spouses are allowed to discuss allocations. Communication does improve efficiency by 4 percentage points. Interestingly, we find that couples whose beliefs over each other's behavior and actual allocations match, are less efficient suggesting that spouses in non-cooperative households invest in acquiring more information.

Keywords: investment game experiment, intra-household allocation ; Kenya

JEL Classification: D13, O12, J12.

[1] Contact Author. Economics Department, Colgate University. *Postal*: 13 Oak Dr., Hamilton, NY 13346. *Email*: ccastilla@colgate.edu.

[2] Office of the Chief Scientist, The Nature Conservancy. Boston, MA.

[3] Research Fellow, International Food Policy Research Institute

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1. Introduction

In this paper we present experimental results from investment games conducted between spouses in Kenya. Established married couples are perhaps the best population to examine whether socially efficient outcomes can be attained because decision-making within the household is characterized by repeated interaction and caring. It is usually assumed that spouses have perfect information, and make binding, costlessly enforceable agreements. However, individuals in married couples cannot formally enforce the allocations they prefer. Household members then rely on informal contracting enforcement mechanisms to hinder the incentives for non-cooperative behavior that prevail when contracts are incomplete. Under a unitary or cooperative household, trust, reciprocity, and altruism are expected to eliminate the frictions of incomplete contracting. Nonetheless, the empirical evidence on efficiency in intra-household allocation under complete information in developing countries is mixed. Rangel and Thomas (2005) in West Africa, Bobonis (2009) and Attanasio and Lechene (2014) in Mexico, and LaFave and Thomas (2014) in Indonesia fail to reject efficient intra-household allocation across different margins of expenditure. In contrast, Udry (1996) in Burkina Faso, Duflo and Udry (2004) in Côte d'Ivoire, and Robinson (2012) in Kenya (as well as Kebede et al. 2013; Munro et al. (2008a; 2008b); Munro et al. (2011); Castilla (2015)) find evidence consistent with inefficient allocation within families in a context with perfect information.

When spouses are cooperative, asymmetric information is inconsequential as they can communicate directly, or through the expenditure process let each other know about the presence of additional resources. However, a growing literature using field and experimental data suggest individuals in households exploit their information advantage. Field experiments between spouses in developing countries have found evidence of strategic behavior, inefficient allocations, and hiding of income between spouses resulting in efficiency losses (Ashraf, 2009; Ashraf, Field and Lee, 2010; Schaner, 2012; Hoel, 2015; Iversen et al., 2010; Castilla & Walker, (2013a; 2013b)).

Our goal in this paper is to examine whether communication improves intra-household allocative efficiency in the laboratory, and to determine whether spouses' beliefs are consistent with each other's behavior. The literature using laboratory experiments to test for intra-household efficiency in developing countries finds that spouses behave opportunistically and that control over money matters (Hoel, 2015; Jakiela & Ozier, 2015; Castilla, 2015; Schaner 2015). However, in these experiments spouses are not allowed to communicate. In a cooperative household, it is implicitly assumed that spouses communicate freely. When spouses are used to discussing and/or making decisions jointly on a regular basis, the experiment setting can potentially interfere with their ability to maximize household earnings. If that is the case, we would be mischaracterizing households as non-cooperative. To test the effect of communication on intra-household efficiency, we conducted a laboratory experiment in the Sasumua watershed boundaries in Kenya. We used a two stage simple random selection process to select 540 households located in 28 villages in the area. A subset of these households was asked to participate in the laboratory experiment discussed in this paper. The sample of spouses consists of 121, partially due to some being single headed households, and others to selection out of the spousal games, or due to unavailability of both spouses at the same time. The household head answered a survey, then spouses played some games with each other, and finally responded to an individual survey on gender, time use, and control over money.

Participant households were asked to play 4 rounds of an investment game, followed by 4 rounds of the dictator game. In the last two rounds of each game, spouses were allowed to communicate prior to making individual decisions. For the investment game, one spouse was randomly chosen to be the sender and another the receiver. The sender was given an endowment and was told he or she had to choose how much to keep and how much to send to their spouse. The amount sent was tripled prior to reaching the receiving spouse. Participants were told that once a sender was chosen, that individual played that same role for all rounds. The envelope with the tripled amount was shown to the sender before transferring it to the receiver. The receiver was not given an endowment and had to decide how much to keep and how much to send back. They were informed that only one out of the eight rounds would be randomly chosen to be paid for real money.

There were two within-subject treatments. Spouses played four rounds of each game alternating the sender's endowment between 100 or 200 Kenyan shillings in notes. Spouses

played the first two rounds of each game without communication, and in the last two they were allowed to communicate. For the communication treatment rounds, participants were told they would be given a chance to talk to each other for a little bit before making their private decisions. There was no limit on how long they could talk. After they were done talking, the female enumerator took the wife back to a separate room prior to any decisions. In all households, the games were played in the same order. A novel part of the experiment consisted on the elicitation of expectations from each spouse about what their partner would do in each round. After the sender decided on how much to transfer, she was asked how much he or she expected the receiver to return. Likewise, prior to getting the transfer the receiver was asked what she expected her partner to send and how much she would return.

The subgame perfect Nash equilibrium of an investment game played between strangers under anonymity is for the sender to keep the entire endowment as the receiver's best response is to keep the entire transferred amount. In contrast, the optimum household-earnings maximizing strategy is for the sender to transfer the entire amount as it earns interest. This strategy could be observed under a unitary and/or cooperative household as transfers between spouses do not change the equilibrium allocations due to income-pooling (Lundberg and Pollak, 1993; Chiappori & Browning, 1998) and efficiency is attained. Thus, in a household where spouses jointly make decisions over how to allocate resources, there are no motives for the sender to transfer less than the entire amount, nor there should be gender differences in sending behavior. In a non-cooperative household, however, control over money matters which leads to efficiency losses and potential gender differences in both sending and returning behavior.

In the standard investment game (played between strangers and under anonymity) the proportion transferred by the sender is an indicator of trust that the receiver will share some of the earnings, while the proportion that is returned is an indicator of reciprocity (Camerer (2003)). Cox (2004) suggests further reasons to transfer a non-zero amount on either case, such as other-regarding preferences, pure altruism, or inequality aversion. In the case of married couples, the experiment is just a snap-shot of a dynamic and more complex game due to the lack of anonymity and because spouses interact on a regular basis. For this reason, we refrain from using the game results to identify trust and reciprocity, or to disentangle alternative explanations for sharing, as it is plausible to assume that spouses have altruistic preferences as they care for each other, in addition to trusting each other (at least to some extent). Instead, we focus on the

efficiency implications of the behavior in the game and how it relates to household and individual characteristics.

One of the common critiques of laboratory experiments is whether the choices made in the games reflect behavior outside the laboratory. We show that behavior in the game correlates to survey responses in a plausible way. Although survey responses do not negate the need for actual observed behavior, we believe this is a contribution towards understanding the link between insights from experiments to real-world intra-household decisions. Further, even if the allocation of experimental earnings can be modified after the experiment is over (and spouses go home), the efficiency losses caused by sender decisions cannot as only the amount that is sent is tripled.

We find evidence that households in the sample behave non-cooperatively which results in efficiency losses. Spouses in the sender role transfer 62 percent of their endowment on average to their partners, which is higher than the results found in the literature. However, they are still failing to earn up to Ksh 480. Communication does improve allocation efficiency by 4 percentage points, and has no effect of the final distribution of resources between spouses. We elicited beliefs on what each partner expected the other to do. Senders were asked how much they thought their spouse would send back after making the decision on how much to transfer and prior to finding out how much the receiver returned. Receivers were asked how much they expected their partner to transfer before being informed of the sender's choice. We find that matching of expected and actual behavior is correlated with a lower proportion sent and thus less efficiency. This suggests that spouses in less cooperative household invest in knowing what their partners will do more than those in more cooperative households. Interestingly, after communicating both spouses, both spouses adjust the shares transferred and their beliefs over what their partner will transfer upwards by the same proportion.

The research conducted in this paper has clear policy implications. Many of the recently ratified Sustainable Development Goals rely on intra-household mechanisms to achieve their goals, especially ones around family and children (e.g., Gender equality (Goal 5), quality education (Goal 4), reduce inequalities (Goal 10)). For instance, intra-household allocation has clear consequences for women's autonomy and empowerment, which itself is positively associated with decreased fertility and labor hours for girls, and increased nutritional status of girls, prenatal and delivery care, spending on children's clothing and education, and resources

allocated to boys (Haddad and Haddinot 1994; Abadian 1996; Quisumbing and Maluccio 2000; Quisumbing and de la Briere 2000; Beegle et al. 2001; Sahn and Stifel 2010; Reggio 2011; de Brauw et al. 2013).

2. Experimental Design and Sample

Sample:

Our sampling frame consisted of all households in the Sasumua watershed boundaries. The study area consisted of 68 villages across four wards, although for two wards only some of the villages were in the study watershed. Due to resource constraints we employed a two stage simple random selection process. First, we randomly selected 30 out of the 68 villages. In the next stage we randomly selected households from each village to be surveyed. While in most cases we aimed to select the same number of households from each village (i.e., around 18 households), there are cases in which we had smaller numbers of households due to village size. We couldn't obtain a reasonable size of households in two of the 30 villages selected. This resulted in 540 households total across 28 villages who participated in the household survey. The sample of spouses consists of 121 (a subset of these households), partially due to some being single headed households, and others to selection out of the spousal games, or due to unavailability of both spouses at the same time[2]. In the descriptive statistics section we compare the subset households who participated in the spousal experiments from the rest of the randomly selected households in the sample on observables.

The field work included a gendered disaggregated household survey, couple games (dictator game and trust game), and group games (public good and resource extraction). The household survey included 1) the main household information module which was answered by both spouses (when they were both available), the household head, or in a few cases the spouse of household head, and 2) a gender-disaggregated module that was answered by each of the spouses separately. The gender-disaggregated module included questions on information sources and access, intra-household decision-making, and time use. Each household (and spousal) survey

[2] Originally there were 130 households who played the games. However, in 5 of them one or both spouses stopped playing after round 1, and in 4 there were data-imputing errors.

was administered with CSPro Android tablets, provided by IFPRI, and carried out by a team of two enumerators, one male and one female. Mobile phone numbers were collected from survey respondents to enable mobile phone-based follow up survey.

Experimental Procedure:

Participants answered the household survey and then were told they would be playing some games for real money. Participants' tasks involved playing multiple rounds of a trust game followed by the same number of rounds of the dictator game. In each household, spouses were randomly assigned to the role of sender or receiver through a coin flip. They were read instructions aloud together and then a female enumerator took the wife into a separate room. Participants were informed that their earnings of the games would be the amount of money they had in hand at the end of one round chosen at random once all decisions had been made. Participants were invited to participate in another set of experiments the following day. They were also told they would play multiple rounds and that one of them would be randomly selected to be paid for real cash, and payments would be made the following day at the location where the other experiments would be run. It was made clear to participants that their payment from the spousal games and their choice to participate in the other experiments were independent. Endowments, actions, and payments were common knowledge to both spouses. After the game, each individual answered the gender module of the survey separately and privately with an enumerator of the same gender.

For the investment game, the sender was given an endowment and was told he or she had to choose how much to keep and how much to send to their spouse. The amount sent was tripled prior to reaching the receiving spouse. Participants were told that once a sender was chosen, that individual played that same role for all rounds. The envelope with the tripled amount was shown to the sender before transferring it to the receiver. The receiver was not given an endowment and had to decide how much to keep and how much to send back. We elicited expectations from each spouse about what their partner would do in each rounds. After the sender decided on how much to transfer, she was asked how much he or she expected the receiver to return. Likewise, prior to getting the transfer the receiver was asked what she expected her partner to send and how much she would return.

After the investment game, spouses in both the sender and receiver roles played multiple rounds of the dictator game. Each was asked to make a second set of decisions. Participants were told to divide a new individual endowment between themselves and their spouse, but that with the dictator game the game ended with the divided endowment. Enumerators also explained that the amount their partner would receive would not be tripled and that the receiver would not have any further decisions to make. Each spouse knew their partner was playing the exact same game.

There were two within-subject treatments. Spouses played four rounds of each game alternating the sender's endowment between 100 or 200 Kenyan shillings in notes. Spouses played the first two rounds of each game without communication, and in the last two they were allowed to communicate. For the communication treatment rounds, participants were told they would be given a chance to talk to each other for a little bit before making their private decisions. There was no limit on how long they could talk. After they were done talking, the female enumerator took the wife back to a separate room prior to any decisions. In all households, the games were played in the same order. The investment game was played before the dictator game, the endowment was Ksh 100 first, and the no communication rounds were played before the communication rounds.

Charness et al. (2012) highlight the potential issues arising from within-subject experimental designs. The main concern is that identification may be threatened by exposing each subject to multiple treatments as a result of anchoring, framing, demand effects, and so on (Charness et al. (2012)). In any experimental design compromises are made. The within-subject design allows us to control for unobserved individual/couple heterogeneity econometrically via fixed-effects which is particularly relevant when using heterogeneous subjects in a sample.

This investment game differs from Berg et al. (1995) in three ways. There was no anonymity as spouses knew they were playing with each other. The receiver did not receive an endowment because the goal of the experiment was to test whether spouses attained efficient allocations, instead of disentangling whether sharing was driven by trust, altruism, or other alternative explanations. Finally, in half of the rounds spouses were allowed to communicate and discuss strategies in the game. This feature allows us to test whether communication improves allocation efficiency.

Testable Hypotheses:

The unitary and cooperative models of the household implicitly assume intra-household allocation is Pareto optimum. It is assumed that spouses have perfect information, and make binding, costlessly enforceable agreements. However, individuals in married couples cannot formally enforce the allocations they prefer. Instead, they rely on caring, trust, and repeated interaction as informal contract enforcement mechanisms. The investment game allows for a direct test of whether intra-household allocation is efficient. The household earnings maximizing strategy in the game is for the sender to transfer the entire endowment, and any distribution of final earnings chosen by the returner is efficient. Sending less than the entire endowment implies losses in efficiency because the household is giving up the opportunity to earn 300% interest on the amount that is kept. On the other hand, sending a proportion of the endowment below 100% indicates that individual spouses are willing to incur a cost in order to maintain control over money.

Hypothesis 1: If intra-household allocation is cooperative, the sender transfers the entire endowment to his or her partner and the household earnings maximizing strategy is attained.

The literature using laboratory experiments to test for intra-household efficiency in developing countries finds that spouses behave opportunistically and that control over money matters (Hoel, 2015; Jakiela & Ozier, 2015; Castilla, 2016; Schaner 2015). However, in these experiments spouses are not allowed to communicate. In a cooperative household it is implicitly assumed that spouses communicate freely. When spouses are used to discussing and/or making decisions jointly on a regular basis, the experiment setting can potentially interfere with their ability to maximize household earnings. If that is the case, we would be mischaracterizing households as non-cooperative. For this reason, in half of the rounds of the investment (and the dictator game) spouses were allowed to communicate prior to making individual choices.

Hypothesis 2: Communication improves intra-household allocative efficiency.

In the case of married couples, the experiment is just a snap-shot of a more complex dynamic game. Spouses have prior information on their partners' behavior due to day-to-day interaction

which informs both their choices and their beliefs not only of their partners' response in the game, but also of what can happen with their earnings after the experiment. We elicited beliefs about each spouse's partner's behavior for every round of the game. This allows us to compare the beliefs of the receiver (sender) on the transfer made by the sender (receiver) to the actual amount sent (returned). By comparing beliefs to actual transfers we can examine whether there is heterogeneity across matching and not matching couples on efficiency and the effect of communication.

Hypothesis 3: Consistent households (matching beliefs) are more efficient (likely to be efficient) than households where actual and expected behavior in the game does not match.

We also conducted a household survey and a gender disaggregated survey. We use this data to explore household and individual spouse observables that correlate with inefficient behavior and with the probability of matching of beliefs with actual choices.

3. Experimental Results

The investment game allows for a direct test of whether intra-household allocation is efficient. The household earnings maximizing strategy in the game is to send the entire endowment as it is tripled, which should be observed in unitary or cooperative households. On the other hand, a proportion sent below 100% indicates that control over money matters and there are efficiency losses. Among the households in the sample the average amount transferred by senders is 62%, which is larger than what has been found in India (Castilla, 2015) or other regions in Kenya (Hoel, 2015). There were 51 spouse-round instances where the sender transferred the entire endowment, concentrated among 22 households (out of 119) averaging 2.3 (out of 4) decisions in which 100% was sent. There were only 6 households where the sender transferred everything on all four rounds. There were no instances where spouses in either role transfer nothing to their partners. These results imply that households are failing to earn on average Ksh 170, and up to Ksh 480, which is a considerable amount of money. The receiver's actions do not have efficiency consequences; however, receivers' decide the distribution of the earnings from the

game. Receiving spouses return 54% of the tripled amount on average. There are 17 households in which the receiver returns the entire amount at least in one round, and 4 households where he or she returns everything in all rounds.

Table 1: Beliefs and Actual shares transferred to spouse by communication treatment

	Share Sent				Share Returned			
	Overall	Control	Treatment	Diff. by Treat	Overall	Control	Treatment	Diff. by Treat
Actual	62.25	60.19	64.31	-4.118**	54.30	53.50	55.10	-1.593
	(19.73)	(19.33)	(19.95)	[1.800]	(21.43)	(20.34)	(22.49)	[1.965]
Beliefs of Partner	57.86	55.65	60.06	-4.412**	54.19	52.01	56.38	-4.372**
	(20.58)	(19.42)	(21.49)	[1.877]	(21.50)	(19.92)	(22.80)	[1.962]
Differences	4.391***	4.537***	4.243***		0 .108	1.497	-1.281	
Actual - Beliefs	[0.996]	[1.593]	[1.200]		[1.036]	[1.571]	[1.349]	
Wilcoxon Sign Test	0.0001	0.0068	0.0088		0.6448	0.1111	0.2869	
Earnings Lost	169.5	176.9	162.1	15.126				
	[107.9]	[104.6]	[110.8]	[9.855]				
N	476							

Note: Standard deviations in parenthesis, standard errors in brackets. Treatment refers to communication. Earnings lost are computed as the differences between potential and realized earnings in any particular round. *** p-value<0.01, ** p-value<0.05, * p-value<0.10

Result 1: Intra-household allocation is not cooperative on average as couples are unable to attain the maximum possible earnings.

The literature has found that inefficient intra-household allocation is prevalent in laboratory experiments in developing countries (Hoel, 2015; Jakiela & Ozier, 2015; Castilla, 2015; Schaner 2015). However, it is possible that these findings can be explained by not allowing spouses to communicate during the experiment, if it is the case that lack of discussion is foreign relative to the way they make decisions on a regular basis. In the last two rounds, spouses were allowed to talk to each other before they made their choices. During the no-communication rounds, senders transfer 4 percentage points less than in the rounds were they are allowed to communicate. Receivers do not exhibit any differences on the average proportion returned across the no-communication and communication rounds. The average earnings lost under the communication treatment are Ksh 15 lower than in the first two rounds, though the difference is not statistically significant. Therefore, while communication between spouses during laboratory

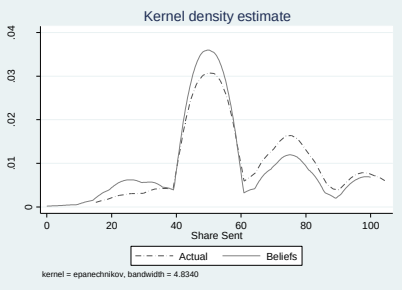
experiments improves efficiency, couples continue to fail to attain the maximum possible earnings. The results are presented in Table 1.

Result 2: Communication improves allocative efficiency by 4 percentage points on average.

How well can spouses predict each other's behavior? We elicited beliefs on what each partner expected the other to do. Senders were asked how much they thought their spouse would send back after making the decision on how much to transfer and prior to finding out how much the receiver returned. Receivers were asked how much they expected their partner to transfer before being informed of the sender's choice. Table 1 contains averages of actual and expected behavior, as well as tests for differences. Senders transfer 4 percentage points more on average than what their partners expect, and this difference, while small, is statistically different from zero. In Figure 1 we present the kernel density estimates of both actual and expected behavior. The first notable result is that not only the average share sent, but the entire distributions of actual and believed behavior are statistically different. The reason why beliefs differ from actual choices of senders and not of receivers has an intuitive explanation. Senders have more information when we elicit their expectations relative to receivers because they know how much they sent and can better predict the response of their partners. Further, the returner's role is to divide the final earnings between them, which is similar to everyday decisions, while high stakes investment opportunities are not as common.

Figure 1: Comparison of Actual versus Expected Behavior, by Role in the Investment Game

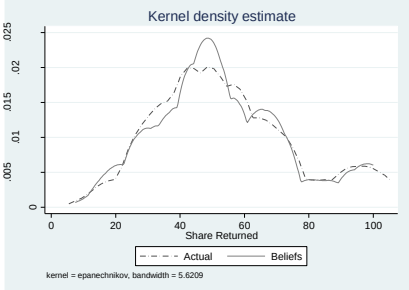
Sender



Mann-Whitney Test: 0.0003

Epps-Singleton Test: 0.0010

Receiver



Mann-Whitney Test: 0.988

Epps-Singleton Test: 0.821

Are senders reacting to receiver's behavior in the previous round? Senders transfer on average an increasingly larger proportion of their endowment as the rounds progress, from 58% on the first round to 64% on the fourth. Contrastingly, receivers return on average 53% on all rounds (except the 3rd round where they transfer 56%). If senders where responding to the behavior of their partners in the receiving role then increasing in shares returned would be expected.

It is also possible that senders are deciding the proportion of their endowments to transfer based on their expectations about how their partners will divide the money. While senders' beliefs about the way their partners will distribute the transferred money do not change the household earnings maximizing strategy in a cooperative household, in a non-cooperative household control over money matters. Therefore, senders can be underinvesting in anticipation of their partner's behavior. The results suggest this is not the case. On the left panel of Table 1 we test for average differences in the actual and expected share returned. We find there are no average differences on the actual or expected share returned on average or in their distributions (Figure 1). Further, the share sent and the beliefs about the share returned by senders are not significantly correlated.

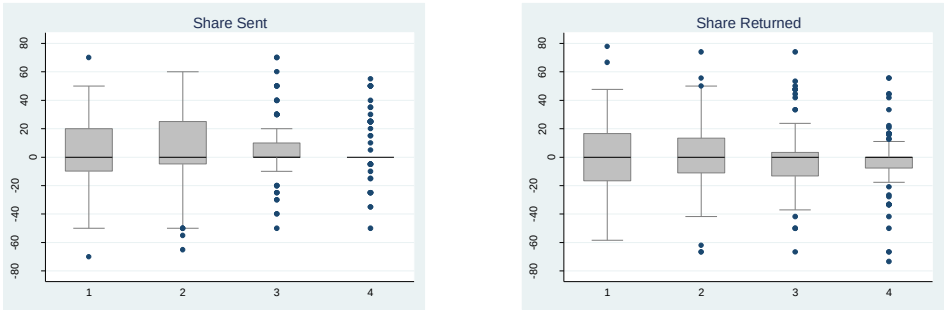
Can communication reduce the gap between beliefs and actual behavior in the game? On average, communication significantly reduces the gap between actual and expected behavior by about 4.4 percentage points for both senders and receivers. In Figure 2 we present boxplots of the difference between actual and believed behavior for each round. The average difference ranges between 3.5 and 5.5 percentage points across rounds for senders, and between -1.7 and 0.8 percentage points for receivers. Averages, however, obscure a great degree of heterogeneity. In the first two rounds, the gap between actual and expected share sent ranges from -70 to 70, while for returning behavior the gap ranges from -70 and 80. The spread in the gap between actual sending and returning behavior and beliefs closes considerably over rounds. By the last round, 64% of couples have perfectly aligned expectations over the share sent; the 1st quartile, median, and 3rd quartile are equal to zero, making those couples with a non-zero gap outliers. Therefore, communication reduces both the average and spread of the difference between expectations and beliefs though not enough to have a significant effect on efficiency.

An alternative explanation for the reduction in the gap between actual and expected share sent is learning. As individuals get more practice and more information, it is possible they adjust

their behavior even when they know only one round will be chosen at random to be paid for real. Evidence from multi-round games (trust, public goods, etc) indicates subjects get closer to the Nash equilibrium over rounds. However, in the case of spouses it is possible that as they get more practice they realize they can increase household earnings if they send more money. The results indicate senders transfer on average an increasingly larger proportion of their endowment as the rounds progress, from 58% on the first round to 64% on the fourth. Contrastingly, receivers return on average 53% on all rounds (except the 3rd round where they transfer 56%). This would suggest that only senders learn. Further, the jump in the spread of the gap in both sending and returning from round 2 to round 3 is unlikely to be exclusively explained by learning. In learning one would expect a steady decline in the gap, not a sudden jump.

Figure 2: Difference by Actual and Beliefs across Rounds and Role

Sender **Receiver**



Figures 1 and 2 illustrates there is considerable heterogeneity both in play in the games and in whether beliefs match. Couples in which one spouse's beliefs accurately predict the others' behavior are different from those who cannot. It may be they can better communicate regarding financial decisions, or it could be they invest more in monitoring as a result of observed non-cooperative behavior. The experiment is well suited to examine differences in efficiency depending on whether actual and expected behaviors coincide. We define the couple's type using the frequency of matches between the share sent and the beliefs by the sender's spouse. If the actual choice of the sender and the beliefs of his or her partner match in 3 or more (out of 4) rounds, we say the couple is consistent. This way, whether beliefs match actual behavior is not only measured as a result of allowing spouses to communicate in the last 2

rounds. There are 28% of couples (34 out of 119) whose beliefs and actual sending behavior are consistent.

In Table 2 we present summary statistics by type. Interestingly, couples where the share sent matches beliefs transfer on average 6 percentage points less and thus give up an average of Ksh 27.6 in potential earnings from the experiment; both statistically significant. Further, the majority of the mismatched decisions are such that senders transfer more than their spouses expect. The implication of these findings is that spouses who have accurate expectations are also those married to partners who invest resources less efficiently. Contrastingly, receiving spouses in inconsistent couples underestimate their partners' willingness to share. These results have important implications for efficient intra-household allocation. If individuals believe their partners will behave non-cooperatively, invest resources less efficiently, they potentially will do the same, furthering the losses. These results in a reduction of Ksh 48 in earnings lost.

Result 3: Consistent households (matching beliefs) are less efficient than households where actual and expected behavior in the game does not match.

Table 2: Beliefs and Actual shares transferred to spouse by type

	Share Sent			Share Returned		
	Inconsistent	Consistent	Diff. by Type	Inconsistent	Consistent	Diff. by Type
Actual	63.99	57.48	6.081***	54.83	53.22	1.862
	(20.84)	(15.78)	[1.984]	(22.22)	(19.45)	[2.175]
Beliefs of Partner	58.29	56.32	1.529	54.5	53.73	1.081
	(22.07)	(16.17)	[2.089]	(22.25)	(19.65)	[2.183]
t-test differences	5.691***	0.331		0.331	-0.449	
Actual - Beliefs	[1.342]	[0.902]		[1.324]	[1.486]	
Wilcoxon Sign Test	0.000	0.905		0.845	0.625	
N	340	136		340	136	

Note: Standard deviations in parenthesis, standard errors in brackets. Treatment refers to communication. Earnings lost are computed as the differences between potential and realized earnings in any particular round. *** p-value<0.01, ** p-value<0.05, * p-value<0.10

We examine whether matches are concentrated around 50% because it is a common focal point. There are 201 decisions where senders transferred 50% of their endowment, 68% of these

were matched. Further, among the 232 decisions where the actual and beliefs of the share sent match, 59% correspond to senders transferring 50% of their endowment. A 50-50 split among returners, or even in the dictator games are justifiable as a focal point, however, for senders transferring only half of their endowments means they are giving up half of potential household earnings.

We further examine the robustness of the aforementioned results by regressing allocative inefficiency and the share sent on indicators of communication and matching of beliefs. Inefficiency is defined as the potential household earnings lost as a result of the decisions made by the sender. Because couples played multiple rounds of the game, we can control for household unobserved heterogeneity using a fixed-effects estimation strategy. We run the following model:

$$Y_{it,r}^{k} = \beta_0 \ + \beta_1 \ C_t \ + \beta_2 \ I_{it} \ + \beta_3 \ b_{it,-r}^{k} + \alpha_i + \varepsilon_{it}$$

Where Y_{it}^{k} is either the allocative inefficiency indicator, the share sent, or the share returned by spouse i in round t; C_t is an indicator equal to 1 if communication was allowed in round t; I_{it} is an indicator equal to 1 when beliefs and actual behavior matched, and zero otherwise; $b_{it,-r}^{k}$ is the share that spouse i in role r expected spouse in role $-r$ to transfer in round t given endowment w_t. The indicator of matching beliefs considers the share sent (returned) relative to the beliefs of the receiver (sender) over the share sent.

The results in Table 3 indicate that communication improves efficiency by Ksh 21 on average, even after controlling for beliefs and whether the couple is consistent. This increase in efficiency comes from a 5 percentage point increase in the share of the endowment sent to the receiver. There are no differences by communication treatment of matching of beliefs on the share returned. Consistent couples are more inefficiency giving up on average Ksh 29 of potential earnings. Nonetheless, there is a significant, small, and positive correlation between the expected and actual share sent. Likewise, the expected share returned is significantly and positively correlated with the actual share returned to the sender. Interestingly, all of these differences seem to be driven by men.

Table 3: Fixed-Effects Experimental Results

	Overall			Women			Men		
	Inefficiency	Share Sent	Share Returned	Inefficiency	Share Sent	Share Returned	Inefficiency	Share Sent	Share Returned
Communication	-21.080***	4.930***	0.033	-4.139	1.794	1.653	-34.363***	7.358***	-1.056
(=1 if round 3 or 4)	[7.612]	[1.525]	[1.633]	[11.033]	[1.973]	[1.942]	[9.394]	[2.017]	[2.653]
Sending Beliefs Match	29.188**	-5.104***	-	4.019	-0.584	-	52.554***	-9.630***	-
	[11.163]	[1.883]		[14.732]	[2.330]		[16.119]	[2.618]	
Beliefs over Share Sent	-0.707**	0.176***	-	-0.554	0.112	-	-1.016**	0.269***	-
	[0.338]	[0.058]		[0.488]	[0.076]		[0.483]	[0.084]	
Returning Beliefs Match	-	-	2.866	-	-	4.618	-	-	1.878
			[1.993]			[2.947]			[2.765]
Beliefs over Share Returned	-	-	0.166**	-	-	0.063	-	-	0.240**
			[0.078]			[0.110]			[0.110]
Share Sent	-	-	0.065	-	-	0.094	-	-	0.042
			[0.079]			[0.134]			[0.100]
Observations	476	476	476	232	232	232	244	244	244
R-squared	0.039	0.093	0.039	0.009	0.026	0.045	0.104	0.209	0.053

Are there differences in efficiency depending on the gender of the sender? Men send on average 64.7% of their endowments, while women send 59.5. The resulting potential household earnings lost from the experiment are Ksh 181 when the sender is female, and Ksh 158 if male. In both cases, the differences are statistically significant at the 1% level. Partners of women senders accurately predict their wives behavior on average. In contrast, partners of male senders expect their husbands to transfer 7.8 percentage points less. It is possible that the differences in the share sent by gender can be explained by men senders' wives distributing money more generously. However, women receivers return 4.5 percentage points less money to their husbands relative to their male counterparts. There are no average differences in men and women's beliefs about the share returned, implying women senders underestimate their husbands' returning behavior.

Communication has no effect on women senders as they continue to transfer statistically the same proportion of their endowments. Men receivers accurately predict their wives sending behavior on average regardless of communication. In contrast, men senders transfer 6 percentage points more in the communication rounds. Women receivers update their beliefs about the share of resources they will receive by 6 percentage points when communication is allowed though continue to underestimate their partners' behavior by the same margin (7.9 percentage points).

Communication only has an effect of beliefs about returning behavior. In the first two rounds, women underestimate their partners' generosity but update their beliefs upwards in the later rounds by 6 percentage points, eliminating any statistical differences between actual and expected share returned. Men start off correctly predicting their wives returning behavior in the first two rounds but in the communication rounds update their beliefs upwards while their wives do not change their behavior. Overall, it seems that men are more responsive to communication than women.

Table 4: Gender Differences

	Women Senders				Men Senders			
	Overall	Control	Treatment	Diff. by Treat	Overall	Control	Treatment	Diff. by Treat
Share Sent								
Actual	59.48	58.53	60.43	-1.897	64.73	61.65	67.83	-6.230**
	(19.94)	(19.98)	(19.94)	[2.621]	(19.27)	(18.67)	(19.44)	[2.430]
Beliefs by Spouse	58.75	57.41	60.09	-2.672	56.76	53.8	59.75	-6.066**
in Receiver Role	(22.24)	(20.32)	(24.02)	[2.921]	(18.86)	(18.43)	(18.89)	[2.389]
Differences	0.732	1.120	0.344		7.868***	7.786***	7.951***	
Actual - Beliefs	[1.495]	[2.461]	[1.710]		[1.289]	[2.013]	[1.621]	
Share Returned								
Actual	56.58	55.09	58.07	-2.978	52.26	52.00	52.52	-0.275
	(21.49)	(20.26)	(22.65)_	[2.821]	(21.28)	(20.47)	(22.15)	[2.719]
Beliefs by Spouse in	53.15	50.06	56.23	-6.169**	55.38	53.93	56.83	-2.663
Sender Role	(21.23)	(18.90)	(23.01)	[2.764]	(21.80)	(20.82)	(22.74)	[2.784]
Differences	3.431**	5.027**	1.835		-3.051**	-1.858	-4.245***	
Actual - Beliefs	[1.575]	[2.383]	[2.060]		[1.330]	[2.028]	[1.723]	
N	232	115	116		244	121	122	

Note: Standard deviations in parenthesis, standard errors in brackets. Treatment refers to communication. Earnings lost are computed as the differences between potential and realized earnings in any particular round. *** p-value<0.01, ** p-value<0.05, * p-value<0.10

4. Is behavior in the Investment Game related to Survey Responses?

The aforementioned experimental results support the rejection of a unitary or cooperative household and indicate that spouses engage in a non-cooperative household allocation contract. Therefore, it is important to examine whether there are differences in observable individual and household characteristics across more and less cooperative households. In what follows, we examine correlates of behavior in the laboratory obtained from the household survey. We estimate the following regression using household random effects:

$$Y_{it,r}^{k} = \beta_0 + \beta_1 C_t + \beta_2 X_i + \beta_3 b_{it,-r}^{k} + \alpha_i + \varepsilon_{it}$$

Where Y_{it}^{k} is either the allocative inefficiency indicator, the share sent, or the share returned by spouse i in round t; C_t is an indicator equal to 1 if communication was allowed in round t; X_i are indicators of influence over decisions, control over money, and household decision-making; $b_{it,-r}^{k}$ is the share that spouse i in role r expected spouse in role $-r$ to transfer in round t given endowment w_t.

As mentioned when discussing Table 3, beliefs and actual behavior are positively and significantly correlated. We asked each spouse individually and separately to rate on a scale of 1 to 5 their influence over own and household savings, as well as to indicate if they consider themselves the main decision-maker in their household. Individuals who have little to no influence over their own savings send 7 percentage points more. It is also the case that being the main decision-maker in the household correlates positively with the share sent and thus with efficient allocation. This suggests that households were one spouse makes most of the decisions observe more efficient behavior in the game. We also asked spouses to rate in a scale of 1 to 5 how much they trust their spouse over financial matters. Individuals who report trusting their spouse completely or mostly also send more money.

Table 5: Correlates of Behavior in Investment Game

	Overall			Women			Men		
	Inefficiency	Share Sent	Share Returned	Inefficiency	Share Sent	Share Returned	Inefficiency	Share Sent	Share Returned
Beliefs over Share Sent	-	0.257***	-	-	0.219***	-	-	0.271***	-
		[0.050]			[0.071]			[0.071]	
Beliefs over Share Returne	-	-	0.322***	-	-	0.266***	-	-	0.427***
			[0.064]			[0.090]			[0.086]
Some or No Influence	-35.039**	7.337**	2.879	-37.107	7.990*	6.042	-39.524	8.108	-0.148
over Own Savings	[16.428]	[3.308]	[3.871]	[23.316]	[4.505]	[4.818]	[27.495]	[5.137]	[5.457]
More or Total Influence	-12.378	2.434	3.674	-38.586	9.891	8.972	-4.731	-0.668	5.976*
over Own Savings	[17.228]	[3.225]	[3.092]	[41.406]	[7.430]	[5.834]	[19.244]	[3.943]	[3.436]
Main Decision-Maker	-21.116*	4.923**	-2.974	-9.251	0.953	8.674*	-11.081	1.211	-3.996
	[12.467]	[2.410]	[2.445]	[45.741]	[9.847]	[4.787]	[35.456]	[6.323]	[5.144]
Do you buy gifts for	-9.851	1.500	6.126**	-25.936	4.665	10.850***	-19.001	3.183	3.019
your spouse?	[13.119]	[2.636]	[2.616]	[20.819]	[4.168]	[3.898]	[20.846]	[4.252]	[3.766]
Trust with Finances	-32.080*	6.880**	-1.298	-34.796	7.331*	6.056	-31.235	6.935	-7.845**
(=1 f completely or a lot)	[17.412]	[3.380]	[4.256]	[21.282]	[3.991]	[5.279]	[33.832]	[6.573]	[3.884]
Joint Finances	-6.539	-0.265	-3.168	7.817	-1.623	-8.314**	-12.863	-0.723	2.572
	[13.127]	[2.708]	[3.318]	[21.145]	[4.145]	[4.217]	[18.937]	[4.028]	[3.796]
Communication	-15.126**	2.982*	0.186	-4.267	1.312	1.336	-25.451**	4.586**	-0.863
(=1 in rounds 3 and 4)	[7.526]	[1.587]	[1.682]	[10.730]	[2.210]	[2.183]	[10.828]	[2.300]	[2.619]
N	476	476	476	232	232	232	244	244	244

Note: Standard errors in brackets clustered at the spouse level. Regressions estimated using household=spouse random effects.
*** p-value<0.01, ** p-value<0.05, * p-value<0.10

5. Conclusions

In this paper we presented results from an investment game conducted among established couples. In August through September 2015, we conducted laboratory experiments among a sample of 121 married couples in the Sasumua watershed area in Kenya. The experiment consisted of investment and dictator games where spouses were randomly assigned to the role of sender or receiver. The household earnings maximizing strategy is in direct contrast with the self-interest optimum; the household earnings maximizing strategy is to send the entire amount (as it is tripled), while the subgame perfect Nash equilibrium of the game between strangers under anonymity is to not send anything because the receiver has an incentive to keep the entire

amount. In the context of intra-household allocation, only sender behavior has efficiency implications, while receiver behavior determines the distribution of final earnings in the game.

In the standard investment game (played between strangers and under anonymity) the proportion transferred by the sender is an indicator of trust that the receiver will share some of the earnings, while the proportion that is returned is an indicator of reciprocity (Camerer (2003)). Cox (2004) suggests further reasons to transfer a non-zero amount on either case, such as other-regarding preferences, pure altruism, or inequality aversion. In the case of married couples, the experiment is just a snap-shot of a dynamic and more complex game due to the lack of anonymity and because spouses interact on a regular basis. For this reason, we refrained from using the game results to identify trust and reciprocity, or to disentangle alternative explanations for sharing, as it is plausible to assume that spouses have altruistic preferences as they care for each other, in addition to trusting each other (at least to some extent). Instead, we focused on the effect of communication on allocative efficiency and whether spouses are able to predict their partners' behavior.

We find that spouses in the sender role transfer 62 percent of their endowment on average to their partners. However, they are still failing to earn between Ksh 170 and Ksh 480. Communication does improve allocation efficiency by 4 percentage points, and has no effect of the final distribution of resources between spouses, aka returning behavior. We elicited beliefs on what each partner expected the other to do. Senders were asked how much they thought their spouse would send back after making the decision on how much to transfer and prior to finding out how much the receiver returned. Receivers were asked how much they expected their partner to transfer before being informed of the sender's choice. We find that matching of expected and actual behavior is correlated with a lower proportion sent and thus less efficiency. This suggests that spouses in less cooperative household invest in knowing what their partners will do more than those in more cooperative households. Interestingly, after communicating both spouses, both spouses adjust the shares transferred and their beliefs over what their partner will transfer upwards by the same proportion.

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Appendix A: Experiment Instructions

Programmer note: These games are at the individual- and household-level. There is a male enumerator version and a female enumerator version, where the male will collect data from the husband and the female will collect data from the wife.

Trust game – MALE ENUMERATOR VERSION

Read the following script to both the husband and wife together before having them join an enumerator in separate rooms

Script: Now we'll be playing some games for real money. We'll play two games today, and these are part of a series of games that you will continue to play tomorrow. Out of the many games you will play, one will be randomly for payment so do your best in every game. Because of logistical reasons, you can pick up your payment tomorrow at [SELECT LOCATION IN THE VILLAGE].

Do you have any questions about the games or the payment?

Now we will start the first game.

One of you will be the sender and the other the receiver. We will flip a coin to decide which of you will be the sender. The sender will receive some shillings and has to decide how much to keep and how much to send to the receiver. The amount sent is tripled, so that the receiver gets 3 times as much as what the sender transferred. Then the receiver has to decide how much to keep and how much to send back. Your final earnings from the game will be the amount of money you have once all decisions have been made. You will play this game several times, and one game, along with the games you will play tomorrow, will be randomly chosen to be paid with real cash.

Flip coin to determine who is sender and receiver

TG0. Who is the sender?		1. Husband 2. Wife

WITHOUT COMMUNICATION
Round 1: 100 Shilling round WITHOUT communication

If the husband is the sender

Script: We have placed 100 shillings worth of notes in this envelope and we are giving you some blank notes that are worth nothing. You have to now decide how much to keep for yourself and how much to give to your wife. However, whatever amount you give to your wife will be tripled before reaching her. Then it will be your wife's decision on how much to give you back from the tripled amount.

For example: If you decide to give 30 Shillings to your wife and keep the rest for yourself, then your wife will receive 90 Shillings (30 * 3 = 90). Then, your wife can return to you something less than 30 Shillings, exactly 30 Shillings or something more than that.

Take out the amount that you want to keep for yourself from the envelope and leave the amount that you wish to be sent to your wife. Again, note that your wife will receive three times the amount you left in the envelope. Please take this decision freely as we will not be seeing them. We will turn our heads around while you take this decision. You can stuff the envelope with the blank papers provided to you when you feel you are sending too little. We will then show you the tripled amount being placed in the envelope that will be transferred to your wife.

Do not ask the following question, just record. TG1. How much did the husband send?		Unit in Shillings
TG2. How much do you think your wife will send back?		Unit in Schillings

If the husband is the receiver

Script: We have asked your wife to divide 100 Kenyan shillings into two parts, something for you and the remainder for herself. But she was told that whatever amount she sends to you will be tripled and then you will have to make a decision about how much of the tripled amount to return.

Before the wife sends the money ask the following

TG3. How much do you think your wife will send?		Unit in Shillings
TG4. Given the amount you believe your wife will send, how much would you send back?		Unit in Schillings

Once the husband has seen the envelope

Do not ask the following question		Unit in Schillings

TG5. How much did the husband send back?		

Now, this envelope contains the tripled amount of what she had originally sent you. You must open this envelope, count how much money it contains, and then place whatever amount you want to return to your wife back in the envelope. It is purely a personal decision and we will then take this envelope back to your wife.

For example: If you had 90 Shillings in the envelope, your wife must have originally sent 30 Shillings out of the 90 Schillings given to her. Now it's your decision whether you want to return something less than 30 Schillings, more than that, or exactly the same amount.

I will turn our heads around while you make this decision. You can also stuff up the envelope with the blank papers provided in case you feel that you are sending too little.

Round 2: 200 Shilling round WITHOUT communication
Script: Now we will play the game again, but this time with 200 Shillings instead of 100 Schillings.

If the husband is the sender

Do not ask the following question, just record. TG6. How much did the husband keep?		Unit in Shillings
TG7. How much do you think your wife will send back?		Unit in Schillings

If the husband is the receiver

Before the wife sends the money ask the following

TG8. How much do you think your wife will send?		Unit in Shillings
TG9. Given the amount you believe your wife will send, how much would you send back?		Unit in Schillings

Once the husband has seen the envelope

Do not ask the following question		Unit in Schillings

TG10. How much did the husband send back?		

WITH COMMUNICATION

Script: Now we will play the same game, but we are going to allow you to talk to your wife for a little bit before you make your decisions. Otherwise, the rules of the game are the same as before.

Round 3: 100 Shilling round WITH communication

If the husband is the sender

Do not ask the following question, just record. TG11. How much did the husband keep?		Unit in Shillings
TG12. How much do you think your wife will send back?		Unit in Schillings

If the husband is the receiver

Before the wife sends money ask the following

TG13. How much do you think your wife will send?		Unit in Shillings
TG14. Given the amount you believe your wife will send, how much would you send back?		Unit in Schillings

Once the husband has seen the envelope

Do not ask the following question TG15. How much did the husband send back?		Unit in Schillings

Round 4: 200 Shilling round WITH communication

If the husband is the sender

Do not ask the following question, just record.		Unit in Shillings

TG16. How much did the husband keep?		
TG17. How much do you think your wife will send back?		Unit in Schillings

If the husband is the receiver

Before the wife sends money ask the following

TG18. How much do you think your wife will send?		Unit in Shillings
TG19. Given the amount you believe your wife will send, how much would you send back?		Unit in Schillings

Once the husband has seen the envelope

Do not ask the following question TG20. How much did the husband send back?		Unit in Schillings

Dictator game – MALE ENUMERATOR VERSION

Script: We would also like you to make a second decision. You have to divide 100 Shillings into two parts, something for yourself and the remainder for your wife. However, the game ends with your split decision. Your wife will receive the exact amount you send, NOT the tripled amount. Further, your wife will have no further decisions to make.

Take out the money you want to keep for yourself and leave what you want to for your wife in the envelope. We will turn our heads around while you make this decision. You can also stuff up the envelope with the blank papers provided in case you feel that you are sending too little.

Round 1: 100 Shilling round WITHOUT communication

Do not ask the following question DG1. How much did the husband send to the wife?		Unit in Schillings

Script: Now we will do the same game but with 200 Shillings. Please take out the money you want to keep for yourself and leave what you want for your wife in the envelope.

Round 2: 200 Shilling round WITHOUT communication

Do not ask the following question DG2. How much did the husband send to the wife?		Unit in Schillings

Script: Now we will play the same game, but we are going to allow you to talk to your wife for a little bit before you make your decisions. Otherwise, the rules of the game are the same as before. There is a 100 Shillings in this envelope.

Round 3: 100 Shilling round WITH communication

Do not ask the following question DG3. How much did the husband send to the wife?		Unit in Schillings

Script: Now we will repeat this process with 200 Shillings.

Round 4: 200 Shilling round WITH communication

Do not ask the following question		Unit in Schillings

DG4. How much did the husband send to the wife?		

Trust game – FEMALE ENUMERATOR VERSION

WITHOUT COMMUNICATION
Round 1: 100 Shilling round WITHOUT communication

If the wife is the sender

Script: We have placed 100 shillings worth of notes in this envelope and we are giving you some blank notes that are worth nothing. You have to now decide how much to keep for yourself and how much to give to your husband. However, whatever amount you give to your husband will be tripled before reaching his. Then it will be your husband's decision on how much to give you back from the tripled amount.

For example: If you decide to give 30 Shillings to your husband and keep the rest for yourself, then your husband will receive 90 Shillings (30 * 3 = 90). Then, your husband can return to you something less than 30 Shillings, exactly 30 Shillings or something more than that.

Take out the amount that you want to keep for yourself from the envelope and leave the amount that you wish to be sent to your husband. Again, note that your husband will receive three times the amount you left in the envelope. Please take this decision freely as we will not be seeing them. We will turn our heads around while you take this decision. You can stuff the envelope with the blank papers provided to you when you feel you are sending too little. We will then show you the tripled amount being placed in the envelope that will be transferred to your husband.

Do not ask the following question T21. How much did the wife keep?		Unit in Shillings
T22. How much do you think your husband will send back?		Unit in Schillings

If the wife is the receiver

Script: We have asked your husband to divide 100 Kenyan shillings into two parts, something for you and the remainder for himself. But she was told that whatever amount she sends to you

will be tripled and then you will have to make a decision about how much of the tripled amount to return.

Before the husband sends money ask the following

T23. How much do you think your husband will send?		Unit in Shillings
T24. Given the amount you believe your husband will send, how much would you send back?		Unit in Schillings

Once the wife has seen envelope

Do not ask the following question T25. How much did the husband send back?		Unit in Schillings

Now, this envelope contains the tripled amount of what she had originally sent you. You must open this envelope, count how much money it contains, and then place whatever amount you want to return to your husband back in the envelope. It is purely a personal decision and we will then take this envelope back to your husband.

For example: If you had 90 Shillings in the envelope, your husband must have originally sent 30 Shillings out of the 90 Schillings given to him. Now it's your decision whether you want to return something less than 30 Schillings, more than that or exactly the same amount.

We will turn our heads around while you make this decision. You can also stuff up the envelope with the blank papers provided in case you feel that you are sending too little.

Round 2: 200 Shilling round WITHOUT communication

Script: Now we will play the game again, but this time with 200 Shillings instead of 100 Schillings.

If the wife is the sender

Do not ask the following question T26. How much did the husband keep?		Unit in Shillings
T27. How much do you think your husband will send back?		Unit in Schillings

If the wife is the receiver

Before the husband sends the money ask the following

T28. How much do you think your husband will send?		Unit in Shillings
T29. Given the amount you believe your husband will send, how much would you send back?		Unit in Schillings

Once the wife has seen the envelope

Do not ask the following question T30. How much did the husband send back?		Unit in Schillings

WITH COMMUNICATION

Script: Now we will play the same game, but we are going to allow you to talk to your husband for a little bit before you make your decisions. Otherwise, the rules of the game are the same as before.

Round 3: 100 Shilling round WITH communication

If the wife is the sender

Do not ask the following question, just record. TG31. How much did the wife keep?		Unit in Shillings
TG32. How much do you think your husband will send back?		Unit in Schillings

If the wife is the receiver

TG33. How much do you think your husband will send?		Unit in Shillings
TG34. Given the amount you believe your husband will send, how much would you send back?		Unit in Schillings

Do not ask the following question TG35. How much did the wife send		Unit in Schillings

back?		

Round 4: 200 Shilling round WITH communication

If the wife is the sender

Do not ask the following question, just record. TG36. How much did the wife keep?		Unit in Shillings
TG37. How much do you think your husband will send back?		Unit in Schillings

If the wife is the receiver

TG38. How much do you think your husband will send?		Unit in Shillings
TG39. Given the amount you believe your husband will send, how much would you send back?		Unit in Schillings

Do not ask the following question TG40. How much did the wife send back?		Unit in Schillings

Dictator game – FEMALE ENUMERATOR VERSION

Script: We would also like you to make a second decision. You have to divide 100 Shillings into two parts, something for yourself and the remainder for your husband. However, the game ends with your split decision. Your husband will receive the exact amount you send, NOT the tripled amount. Further, your husband will have no further decisions to make.

Take out the money you want to keep for yourself and leave what you want to for your husband in the envelope. We will turn our heads around while you make this decision. You can also stuff up the envelope with the blank papers provided in case you feel that you are sending too little.

Round 1: 100 Shilling round WITHOUT communication

Do not ask the following question DG5. How much did the wife send to the husband?		Unit in Schillings

Script: Now we will do the same game but with 200 Shillings. Please take out the money you want to keep for yourself and leave what you want for your husband in the envelope.

Round 2: 200 Shilling round WITHOUT communication

Do not ask the following question DG6. How much did the wife send to the husband?		Unit in Schillings

Script: Now we will play the same game, but we are going to allow you to talk to your husband for a little bit before you make your decisions. Otherwise, the rules of the game are the same as before.

Round 3: 100 Shilling round WITH communication

Do not ask the following question DG7. How much did the wife send to the husband?		Unit in Schillings

Script: Now we will repeat this process with 200 Shillings.

Round 4: 200 Shilling round WITH communication

Do not ask the following question DG8. How much did the wife send to the husband?		Unit in Schillings

Appendix X:

Table X: Gender differences by Couple Type

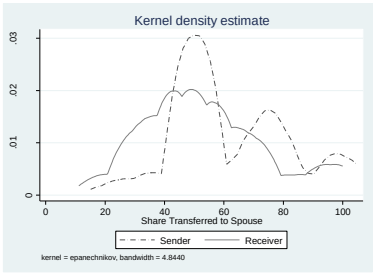
	Women Senders				Men Senders			
	Overall	Inconsistent	Consistent	Diff. by Treat	Overall	Inconsistent	Consistent	Diff. by Treat
Share Sent								
Actual	59.48	59.78	58.82	0.962	64.73	67.72	55.90	10.847***
	(19.94)	(20.64)	(18.41)	[2.835]	(19.27)	(20.36)	(11.92)	[2.711]
Beliefs by Spouse	58.75	58.66	58.96	-0.302	56.76	57.97	53.20	3.675
in Receiver Role	(22.24)	(23.82)	(18.38)	[3.163]	(18.86)	(20.45)	(12.52)	[2.742]
Differences								
Actual - Beliefs	[1.495]	[2.461]	[1.710]		[1.289]	[2.013]	[1.621]	
Share Returned								
Actual	52.26	52.15	52.58	0.07	56.58	57.85	53.76	4.087
	(21.28)	(22.54)	(17.20)	[3.091]	(21.49)	(21.53)	(21.28)	[3.045]
Beliefs by Spouse in	55.38	55.94	53.71	2.884	53.15	52.88	53.74	-0.862
Sender Role	(21.80)	(23.10)	(17.49)	[3.165]	(21.23)	(21.21)	(21.42)	[3.019]
Differences								
Actual - Beliefs	[1.575]	[2.383]	[2.060]		[1.330]	[2.028]	[1.723]	
Inefficiency	181.50	179.90	185.00	-5.094	158.00	144.80	197.00	-48.526***
	(110.4)	(112.6)	(106.0)	[15.693]	(104.4)	(106.5)	(87.36)	[14.828]
N	232	115	116		244	121	122	

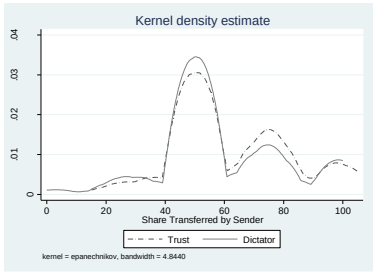
We found that consistent couples exhibit greater efficiency losses, and thus are less cooperative. It is also of interest to identify observables that can predict the probability of consistency in actual behavior and beliefs within couples. However, few of the indicators of influence over decisions and expenditure correlate with the probability of matching. Having more (than their spouse) or total influence over the decision to work decreases the likelihood of matching by 29 percentage points.

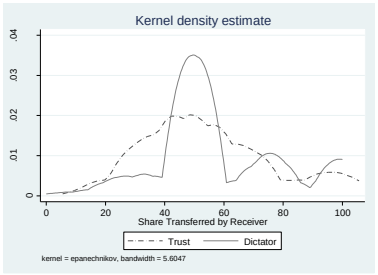
Table X: Correlates of Couple Type

	Type	Share Sent	Share Return
Some or No Influence over Work	-0.151	-2.232	-2.389
	[0.102]	[3.690]	[4.116]
More or Total Influence over Work	-0.290***	3.898	-3.205
	[0.093]	[3.667]	[4.430]
Some or No Influence over Major Purchases	-0.185*	3.040	3.776
	[0.102]	[3.418]	[4.473]
More or Total Influence over Major Purchases	-0.127	-0.098	2.351
	[0.112]	[4.164]	[3.980]
Years Married	-0.004	-0.036	-0.105
	[0.003]	[0.131]	[0.143]
Bride Price Paid (=1 if yes)	0.080	1.591	-1.995
	[0.094]	[3.511]	[4.483]
No Schooling (=1 if no schooling)	0.360*	-1.569	-1.162
	[0.188]	[6.780]	[8.065]
College or Above (=1 if college or above)	0.136	12.198**	0.647
	[0.131]	[5.650]	[6.427]
Read Easily (=1 if read easily)	-0.027	-3.124	-2.063
	[0.095]	[3.548]	[4.107]
No. Children	0.047*	-0.436	-0.146
	[0.025]	[0.857]	[0.868]
Observations	119	119	119
R-squared	0.192	0.089	0.019

Figure X: Kernel Density estimates by Role in the Trust Game and Dictator Game







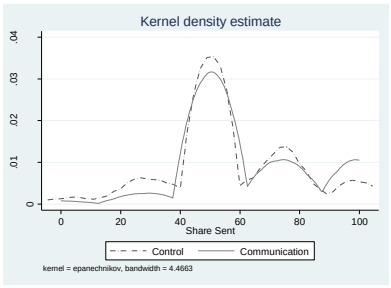
Mann-Whitney Test: 0.000

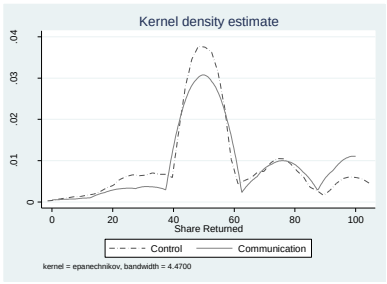
(b/c independent samples)

Wilcoxon Signed-Rank Test: 0.000

Wilcoxon Signed-Rank Test: 0.772

Dictator Game





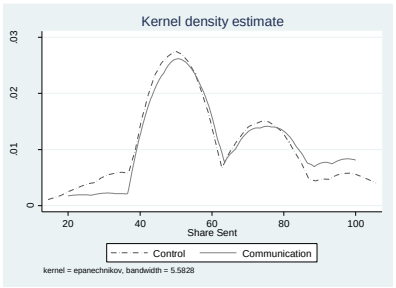
Mann-Whitney: 0.004

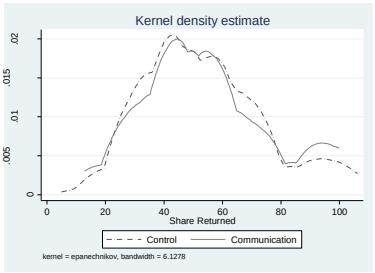
Epps-Singleton: 0.000

Mann-Whitney: 0.002

Epps-Singleton: 0.005

By Communication





Mann-Whitney Test: 0.018

Epps-Singleton Test: 0.115

Wilcoxon Signed-Rank Test:

Wilcoxon Sing Test:

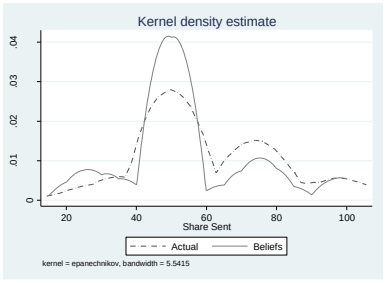
Mann-Whitney Test: 0.537

Epps-Singleton Test: 0.406

Wilcoxon Signed-Rank Test:

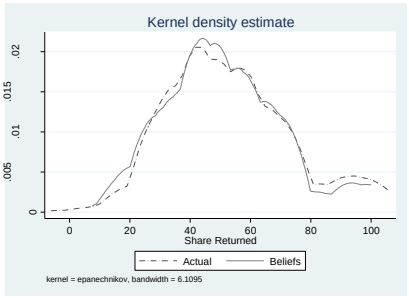
Wilcoxon Sing Test:

Beliefs, no communication



Wilcoxon Signed-Rank Test: 0.001

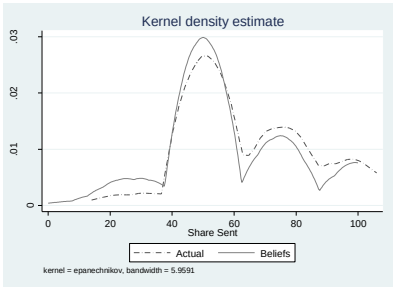
Wilcoxon Sing Test: 0.006



Wilcoxon Signed-Rank Test: 0.256

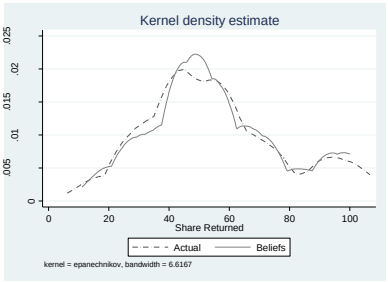
Wilcoxon Sing Test: 0.111

Beliefs, with Communication



Wilcoxon Signed-Rank Test: 0.003

Wilcoxon Sing Test: 0.009



Wilcoxon Signed-Rank Test: 0.229

Wilcoxon Sing Test: 0.287