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Heterogeneous Households:
Laboratory Tests of Household Model Assumptions in Kenya

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Abstract

Using varieties of dictator games played between spouses in rural Kenya, I test common assumptions of household models. Because I use a within-subject (panel data) design, I am able to test each assumption for each individual, providing a unique measure of the distribution of behavior across households. I test for efficiency by setting the value of tokens given higher than the value of tokens kept, measuring how much household income each individual is willing to forgo to maintain control over personal income. I find that 97 percent of choices do not maximize household income, with respondents sacrificing an average of 16 percent of potential income, suggesting that the Collective model is inappropriate for the vast majority of this sample. I also test for an effect of asymmetric information, and find that 37 percent of people give more when their choice will be revealed to their spouse, 50 percent do not respond to asymmetric information, and 13 percent are actually more efficient when their decision remains hidden. That nearly all people behave inefficiently, but only half respond to asymmetric information suggests that information problems are not the main cause of inefficiency in this sample. Further, I show that those who behave more inefficiently actually report *better* information in their household. The heterogeneous response to information also suggests that policy makers should consider that information may have different effects for different households, and that information may not always increase efficiency.

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1 Introduction

Households are heterogeneous. While the literature has recognized that households may have different incomes, different preferences, and make different choices, tests between models of how those choices are determined have implicitly assumed that all households make decisions in the same way. With rare exception, tests between models of household decision-making have examined only average statistics. There are two limitations in this strategy. First, means cannot measure heterogeneity. Mean statistics cannot tell us if there are different types of households in the population, and cannot tell us what fraction of households conform to one model or another. Second, it is possible that a minority of households could be so strongly different as to generate a misleading average statistic. In some cases, the mean of a distribution may obscure what is in fact true for most of the population.

In this study of household decision-making, I use laboratory games played between spouses to identify whether an *individual* adheres to different household model assumptions, allowing a classification of not only the average behavior in the population but also a count of how many people are best fit by each assumption. Specifically, I play dictator games between spouses in rural Kenya. I first test for efficiency in the household by setting the value of tokens given to the spouse at 30 KSH while tokens kept for self are worth 20 KSH. This asymmetric payoff structure allows me to clearly observe how much household income players are willing to forgo to maintain control over personal income. I observe that most people do not maximize household income from these one-off transfers. The household income maximizing option is chosen in fewer than three percent of observations. Individuals forgo an average of sixteen percent of possible household earnings to maintain personal control over half the realized pot. This behavior violates the efficiency assumption that defines the Collective model of household decision making, and is observed nearly universally in the sample.

Theorists often suggest that imperfect information between spouses can cause inefficiency in the household. I test for an effect of asymmetric information by playing two types of dictator game, one in which the respondent's decisions remain secret and another in which his choices are revealed to his spouse. I find that the average statistic indicates a different conclusion than does the distribution of behavior. On average, men give 9.2 percentage points more in the public game than in the

secret game, while women increase their giving by 6.9 percentage points when their choices will be revealed. These average differences are statistically different from zero. This average statistic indicates that the perfect information assumption does not hold in the sample. However, *most* people do not respond to asymmetric information. Men give the same amount in public and secret in 49 percent of games, and women give the same in 50 percent of games. I also find that some people respond to asymmetric information in an unexpected way. Some people give more in the secret game than in the public game, precisely when their generosity cannot be observed. This happens in fourteen percent of all observations, and many of those people are consistently generous in secret: eight percent of individuals give more in secret for at least two of the three stakes offered in the games. These "Secret Benefactors" are discussed in depth in other work, but are a reminder that allowing for heterogeneous responses sometimes uncovers unexpected behavior.

That I do not observe heterogeneity in efficiency but do observe significant heterogeneity in information responses suggests that imperfect information is not the only cause of inefficiency in these households. In fact, people who respond to asymmetric information behave *more* efficiently in the public game. Further, when I compare survey measures of information in the household to behavior in the games, I find that those who are more inefficient actually report *better* information in their household. This further indicates that by these measures and in this sample, information problems are not the driving cause of inefficiency.

The paper is organized as follows: in Section 2 I briefly review the theoretical and empirical literature on household decision-making, and describe some relevant studies in the experimental literature; Section 3 describes the setting for this study and explains the experimental design; Section 4 presents results of tests of efficiency, information, and the relationship between them; Section 5 discusses and concludes.

2 Relevant Literature

2.1 Household Models: Theory, Tests, and Heterogeneity

The Collective model is currently the most popular model of the household.[1] Efficiency is the defining characteristic of the Collective model. The model assumes two agents that make choices that affect each other, and through some form of bargaining, arrive at decisions that are Pareto optimal.[2] In the words of those who defined the model, "the cooperative approach does recognize that the allocation of resources within the household may (and generally will) depend on the members' respective 'weights'; it simply posits that however resources are allocated, none are left on the table" (Browning, Chiappori, and Weiss (2011)). The Collective model then implies, for income streams that do not change bargaining weights, the efficient household will maximize total household income.

The assumption of efficiency is justified by the idea that because spouses interact frequently, they must know each other's preferences, resources, and choices, and they must also be able to come to binding agreements that at the very least do not leave money on the table. While formally the assumption of efficiency is what defines the collective model, practically the notion of efficiency rests on the assumptions of complete and perfect information and perfect contracts between spouses.

Models that do not assume efficiency at the outset are classified as non-cooperative models. These models allow for asymmetric information about choices or preferences, limited commitment, or both. Misinformation and the possibility of cheating are especially relevant in dynamic settings; thus, non-cooperative models are more common in models of decisions across periods.[3] The theoretical literature has not yet settled on a canonical form of the non-cooperative model, in part because we do not know which assumptions better approximate the non-cooperative household: imperfect or

[1] Note that the unitary model is a special case of the collective model in which the bargaining weights are unaffected by external factors. The unitary model is not discussed here because it has been widely dismissed by the empirical literature (Alderman et al. (1995)).

[2] The collective model concludes that the household acts as if it is maximizing a weighted utility function, with utility weights a function of the bargaining weights. Bargaining weights are determined by external factors like wages and legal structures. The canonical form of the collective model was developed in Manser and Brown (1980) and McElroy and Horney (1981), and solidified in Chiappori (1988) and Chiappori (1992).

[3] Representative non-cooperative models include include Lundberg and Pollak 1993 (limited commitment; static setting), Bloch and Rao 2002 (incomplete information; static setting), Chen 2013 (imperfect information and limited commitment; static setting), and Ligon 2002 (limited commitment; dynamic setting).

incomplete information, limited commitment, or some combination of these elements.

Tests of household models typically come in one of two forms. Many studies test for inefficiency in household decisions directly, often by testing for household income maximization or efficient expenditures, with inefficiency taken as evidence against the Collective model. Other studies test to see if people behave differently when their spouse will or will not find out their choices, with households responding to asymmetric information classified as non-cooperative households.[4] To test one model against another in a sample, the econometrician will generally sum the responses to asymmetric information or the extent of inefficiency across households, calculate the mean response or inefficiency, and test to see if that mean is statistically distinguishable from zero.

Economists in several literatures have recognized the importance of heterogeneity,[5] so why have household economists looked almost exclusively at average behavior? I see two reasons. First, data about household decisions are usually available only in cross-section (also known as between-subject) formats. Each respondent is usually observed in the dataset only once, in one state of the world or treatment condition. We do not observe the individual in the counter-factual situation, thus we rely on large and randomly assigned samples in each state of the world or treatment group to difference away individual fixed effects on average. Because it is nearly impossible to construct a proper counter-factual for an individual using cross-section data, we rely on group averages to draw conclusions about mean treatment effects.[6]

Second, even if we were to able observe households more than once, standard tests of household model assumptions are complex, thus measurement of the test statistics difficult, and the variables used to construct the tests are often noisy. We would need to observe each household many times to make inferences about an individual household specifically. For example, a common test of efficiency in the household is the test of collective rationality, or efficiency in expenditure decisions. The test statistic is constructed by comparing the ratios of the derivatives of Engel curves for two goods across the two members of the couple. Measuring the components of this test statistic is

[4]It is more difficult to test for limited commitment directly in households because there are few things that can vary commitment exogenously.

[5]Blundell and Stoker (2005) discuss issues of "Heterogeneity and Aggregation" in consumer demand, consumption and savings, and wages and labor participation.

[6]In principal, it would be possible to use quantile regression, matching, or sub-group analyses to test for heterogeneous behavior, but these techniques require strong assumptions and still fundamentally estimate average behavior for more narrowly defined groups.

difficult. Expenditures and incomes are often highly variable, thus respondents' reports of them prone to measurement error. It's also likely that people make small, random deviations from perfect efficiency in their real-world decisions. We require large sample sizes to mitigate these random measurement and optimization errors. The need for large samples is compounded because even perfectly measured and perfectly efficient expenditures are an inherently high-variance outcome, so especially large samples are needed to generate statistical power. It is usually necessary to pool observations across individuals even if panel data are available, thus leading to measures of only average behavior.

Measuring heterogeneity across households is difficult using standard methods, but is straightforward using experimental techniques. Laboratory games are attractive for two reasons. First, laboratory games can be designed to force choices between starkly different options, allowing clean tests of household model assumptions. Large sample sizes are then not necessary to construct strong tests. Second, each individual can be measured several times in different treatment conditions, creating a panel (or within-subject) dataset and allowing conclusions to be drawn about each individual distinctly. This allows a classification of not only the average behavior in the population but also detailed measurement of the distribution of behavior.

2.2 Household Models: Empirical Evidence

In the developing world, evidence on household model assumptions from average statistics is mixed.[7] Bobonis (2009) tests the efficiency of consumption decisions in households in Mexico, using the PROGRESA transfer and rainfall shocks to instrument for bargaining power and income. Examining the average statistic, Bobonis cannot reject efficiency in static decisions. By contrast, Robinson (2012) tests for efficiency in risk sharing between spouses in Kenya by experimentally varying income shocks, finding that on average, couples do not share risk efficiently. Duflo and Udry (2004) test for efficiency in consumption decisions in households in Cote d'Ivoire by using rainfall to instrument for income shocks to male or female income. Duflo and Udry conclude that on average, households do not behave efficiently. Using laboratory games, Kebede et al. (2011)

[7] In general, average statistics suggest that households in the developed world behave collectively in both static and dynamic decisions. See Bergstrom (1997) and Chiappori and Donni (2009) for reviews of the literature.

play voluntary contribution games between spouses in Ethiopia using a between-subject design in which each respondent is assigned to only one treatment condition.[8] They find that on average, respondents do not play the games efficiently. In a study of dynamic decisions, Udry (1996) studies agricultural investment decisions in households in Burkina Faso, finding that on average households do not invest resources efficiently. In a test of perfect information in the household, Chen (2013) finds evidence of asymmetric information on average in split-migrant households in China. In the Kebede et al. (2011) study, the authors also test for an effect of asymmetric information, finding that revealing the respondent's decision to their spouse improves efficiency in some games while having no effect in others; the authors conclude that the role of information is context dependent.

Most studies that test household model assumptions do not allow for heterogeneity across households, but there are important exceptions. Ashraf (2009) tests for the effect of asymmetric information between spouses in the Philippines, finding that on average, men are more selfish when their decisions will not be revealed to their wives. To allow for some heterogeneity, Ashraf splits the sample into households in which the woman or man is the primary financial decision maker, and finds that the average behavior of these two groups is different. Schaner (2012) and Lich-Taylor (2001) use the same strategy to allow for heterogeneity in their studies. Schaner splits her sample of couples in Kenya into those that are well-matched in their time preferences and those that are mis-matched, and finds that the mis-matched couples make more inefficient decisions on average than do well-matched couples. Lich-Taylor splits his sample of couples in the United States into those with and without children, finding that the average behavior of these groups is best fit by different models of decision-making.

The study of households that is closest in design to my own is Mani (2010). She plays voluntary contribution games between spouses in India, testing for both efficiency and asymmetric information between spouses. Mani uses a within-subject design to test for efficiency, measuring each respondent in each treatment condition. The within-subject design allows an examination of the distribution of behavior in the sample. She finds that men do not maximize household income in 31-51% of

[8] "Between-subject" is a term often used in the experimental literature. It is analogous to cross-section data in which each respondent is observed only once in the data, in one treatment condition. By contrast, "within-subject" means that each respondent plays several games in several different treatment conditions. The term is analogous to panel data, in which each respondent is observed more than once such that individual fixed effects can be differenced out of the final measure.

decisions while women behave inefficiently in 9-28% of decisions. Mani also varies the information the respondent's spouse receives to test for an effect of asymmetric information on efficiency. The test of information uses a between-subject design, with respondents making decisions in only one information condition, allowing only an analysis of the change in mean behavior with information. Mani finds that information does not improve efficiency on average.

2.3 The Experimental Literature

In the non-household experimental literature, there are two studies that are similar in design to my own. Leider et al. (2009) play a variety of dictator games between friends at Harvard University. To test for an effect of information, some games are played in secret, while in others the respondent's decision will be revealed to their game partner. The study uses a within-subject design, with each respondent making decisions in each type of games, which allows a description of heterogeneity in the population. While the authors do examine some heterogeneous effects, showing that people who are more generous to anonymous strangers are likely to be friends with other altruists, they mostly examine differences in average behavior across treatment groups, finding that people are more generous in public games.

Ligon and Schecter (2012) play dictator games between neighbors in rural Paraguay, varying both whether the respondent's choices were revealed to his game partner, and also varying whether the respondent knew and was able to choose who his game partner was. Ligon and Schechter use a within-subject design, with each respondent playing each type of game, and thus are able to speak to the distribution of behavior. Heterogeneity is not a main theme of the paper, but the authors briefly discuss demographic, financial, and social network correlates of behavior and motives for behavior in the games. They find that people are more generous when their decisions are public.

3 Experimental Setting and Design

The sample was drawn from five rural towns in southwestern Kenya's Nyanza Province. Two of the towns (Ugunja and Sega) are on the main paved road that runs from Mombasa to Uganda.

The other three towns (Ukwala, Sigomere, and Siaya) are on major dirt roads off the main paved road. Three of the towns (Ugunja, Siaya, and Ukwala) are former district headquarters.[9] Subjects were married (either formally or informally),[10] currently living with their spouse, over the age of 18, and available to participate in two interviews a week apart in September or October of 2011. Polygamous families were not eligible to participate.[11]

3.1 Experimental Design

To identify the sample, the survey team asked local administrators (village elders) to compile a list of all couples meeting the eligibility criteria in several villages within walking distance of the five towns.[12] The village elders were asked to record the names of both husband and wife, the occupations of both husband and wife, and a contact phone number if possible. Of the 786 couple records collected by the village elders, 82 percent included a contact phone number. Couples were then assigned a random number to determine the order in which they were contacted to be scheduled for an interview, stratified by town. Couples that listed a phone number were scheduled for interviews by phone if possible. Couples that did not have a phone number listed, or were unable to be contacted by phone, were contacted through the village elder. Tracking lists were distributed to the elders and they were asked to invite the selected couples to arrive for an interview on the selected day. In total, 53 percent of the 786 couples provided by the village elders participated in the study. 415 couples were interviewed at baseline, and 406 couples met all of the study criteria (monogamous, living together, both partners over the age of 18). Of these, 392 had complete game records.[13]

[9] A new constitution adopted in late 2010 created administrative units known as "counties" to take the place of the former "districts." All towns and districts in this study now fall into Siaya county. However, at the time of the study old district offices were still serving many of their old official roles, and the towns remained important centers of commerce and government.

[10] A couple is considered "married" if they are considered by the village elder to be a long-term romantic couple. The beginning of the "marriage" is defined as the time the couple moved in together.

[11] Polygamous families were excluded because the household bargaining structures between three or more adults are likely to be very different from the traditional model of a two adult household. In the 1999 Kenyan census, 12% of men and 20% of women over the age of 18 in the Nyanza Province reported that they were in polygamous marriages. By contrast, 54% of men and 53% of women over 18 said they were in single-spouse marriages.

[12] While a full census by the survey team would have been a preferable method of compiling the eligible couple list, budget constraints were limiting.

[13] Some individuals were excluded because one or more of the six spouse game decisions was missing or recorded incorrectly.

Couples arrived at the survey site together,[14] but completed their individual surveys separately. The survey began with a questionnaire about demographics, family finances, material wealth, expenditures, transfers, savings and loans, and decision making in the household. The survey was executed in Dhuluo, the most common native language in the study area.[15] Table 1 shows demographic and other summary statistics from the baseline survey. An English version of the survey can be found on my website[16] and the Dhuluo translation is available on request.

The interview continued with a series of dictator games. The games were played one-on-one with a trained field assistant reading from a script in the respondent's native language. The respondent was asked questions to confirm their understanding at every stage. An English version of the script can be found in the appendix. Each respondent played four dictator games in total, each over three stakes. Two of the games were between the respondent and his spouse, and the other two were selected from three other possible dictator games.[17] The order of the games was randomized.[18] In the Secret Spouse game, the respondent was told that his decisions would remain secret from his spouse and could be revealed only to the project leader. In the Public Spouse game, the respondent was told that his spouse would be told of his decisions. The respondent was given tokens (bottle caps) to divide between himself and his spouse. The respondent indicated his choice by placing the bottle caps in cups labeled "Self" and "Spouse" in Dhuluo. Each game was played over 5, 10, and 25 tokens. Tokens were worth 20 shillings (about $0.22) if kept and 30 shillings ($0.32) if given away. The value of the token was increased if given away to allow the easy observation of inefficiency in the household. To assist respondents in understanding the monetary consequences of their choices, the respondent was given a sheet showing the value of a number of tokens if given or kept. A copy of this sheet can be found in the appendix. After the respondent had made his choice, the field assistant repeated the choice and its monetary consequences to the respondent, and asked if that was the division he wanted. The respondent was allowed to change his choice as

[14] The study sites were a Town Council Hall, a boarding house for handicapped children, a polytechnic university, and a small resort.

[15] All subjects in the sample speak Dhuluo. The survey was forward and back translated by the study team.

[16] www.umich.edu/∼jesshoel

[17] Other games include the Secret Stranger game (the traditional dictator game in which a subject divides money between himself and an anonymous stranger), the Spouse Stranger game (in which the subject divides money between his spouse and an anonymous stranger), and the Stranger Stranger game (in which the subject divides money between two anonymous strangers). Results from these games are not discussed here.

[18] The spouse games were always played consecutively, with the starting game (secret or public) randomized. The order between the spouse games and the other two games selected was also randomized.

many times as he liked.

Respondents were informed that all of their choices in the games (12 in total) would be entered into a computer at the office and one would be chosen at random to come true. The computer would also pick random strangers for the stranger games. It was emphasized that because respondents could win any game for themselves, and could receive money from their own, their spouse's, or a stranger's game, they could be sure that their choices in the Secret Spouse game would remain secret. Winnings from the games were distributed one week later at the end of the follow-up interview.[19] Respondents were not informed of which game they or their spouse won unless one won a Public Spouse game. If a respondent or their spouse won a Public Spouse game, both were informed of the token amount, its division, and the amounts of money taken home by each. Respondents were not informed by the study team how much their spouse took home from the games in total; however, because respondents were required to attend with their spouses and likely returned to their home together, it is likely that respondents discussed their winnings with their spouse. Payouts from the games ranged from 0 to 1270 shillings. The average payout per respondent was 316 KSH. As a point of reference, the mean payout was 20% of baseline reported weekly male income, and 49% of weekly female income.

[19]The endline survey contained questions about expenditures, transfers, savings and loans, marital quality, and the respondent's responses to the study. An English copy of this survey can be found on my website. The Dhuluo translation is available on request.

4 Results

4.1 Efficiency

4.1.1 Average Behavior

Table 2 shows average play in the spouse games, broken out by game and gender.[20] Because tokens given to the spouse are worth 30 KSH while tokens kept for self are worth only 20 KSH, a respondent could maximize the total income for their household by giving all tokens to their spouse. Giving 40 percent of tokens results in an even distribution of final payments (i.e. 60% of tokens*20 KSH=120 KSH, 40 percent of tokens*30 KSH=120 KSH). The first column of Table 2 shows the percentage of tokens given to the spouse in each game. Average behavior is far from giving all tokens to the spouse. On average, subjects do not maximize household income and instead forgo some earnings to retain control over some of the pot.

Result 1: *On average, people do not maximize household income.*

The second column of Table 2 shows the distribution of final earnings between the subject and his spouse. This column is a simple transformation of the first column (if the respondent gives x% of tokens, he gives x*30/(x*30+(1-x)*20) percent of the total realized pot), and emphasizes that respondents are on average not maximizing household income.

Result 2: *On average, people give a bit more than half to their spouse in the public game.*

The third column of Table 2 quantifies how much money the subject foregoes by keeping some tokens for himself. The percentage of money left unclaimed is calculated as the percentage of tokens the individual kept for himself ((1-x)) multiplied by the price differential between giving and keeping (10 KSH) and scaled by the total amount of money possible from one token (30 KSH).

[20] Further breakouts by token amount and whether the secret game was played before or after the public can be found in the appendix in Table 9. Behavior across the stakes is quite stable. Men give 46-47 percent in the secret games regardless of token amount, and give 55-56 percent in the public games. The difference in average giving across the stakes is not statistically distinguishable from zero. Women give between 40-43 percent in the secret games, and give 47-50 percent in the public games. If there is any trend it is that women give less in the higher stakes games, but these differences are not statistically different from zero. Men give more in the game they play first, in both the secret and public games. The difference is marginally significant in the public game, but not in the secret game. Women also give more in the game they play first. The difference is not significant in the secret game, but is significant in the public game.

This is a measure of the extent of inefficiency in each choice. In the public game, men sacrifice an average of 15 percent of the total possible pot by choosing to keep some tokens for themselves. Women give up 17 percent on average in the public games. This is clear evidence of inefficiency in the household on average.

Result 3: *Respondents give up substantial sums of potential household income on average to maintain control over some income.*

The decision to keep some tokens in the public game is inefficient for three reasons. First, because decisions in the public game will be revealed to the spouse, there is no incentive to keep some money in the hopes of hiding it from the spouse. Second, income from the experiment is a one-off, idiosyncratic shock, so it is unlikely to change bargaining weights in the household. There is no incentive to keep money in the public game hoping to alter the bargaining weights theorized in the Collective model. Third, income from the games is a small fraction of monthly or yearly income, and most households transfer money between husband and wife frequently, especially from husband to wife. Therefore if the respondent passed all the tokens to his spouse expecting his spouse to give some money back to him outside the game, but was surprised when his spouse did not pass back some money after the games, he could simply alter his future transfers to even out the total distribution of money. Thus, a respondent in an efficient household should give all tokens to his spouse. That respondents leave potential experimental income unclaimed is evidence against efficiency in the household on average.

4.1.2 Distribution of Behavior

Figure 1 shows histograms of men's behavior in the games, showing the percentage of tokens given to his spouse broken out by game and token amount. Panels on the left show the public games, while panels on the right show the secret games. The first row shows the 5 token games, the second shows the 10 token games, and the last row shows the 25 token games.

These figures show that there is bunching in the middle of the distribution for all games, with mass points around 40, 50, and 60 percent of tokens given. Most men seem to be dividing money roughly evenly between themselves and their wives. These figures show that very few men maximize

household income by giving 100 percent of tokens to their wives. In the public game men give all tokens to their wives in 4.8 percent of observations. These figures also show that very few men maximize personal income by giving 0 percent of tokens to their wives. In the public game men keep all tokens for themselves in 0.7 percent of observations.

Figure 2 shows the analogous figures for women. Again we see bunching in the middle of the distribution, with strong mass points around 40, 50, and 60 percent. Women also rarely maximize household or their own income. In the public game women give all tokens to their husbands in 2.1 percent of observations and keep all tokens in 1.3 percent of public games.

Pooling choices across the three token amounts, Table 3 shows the percentage of observations in the public games fit into each efficiency category: extremely inefficient (giving 0-20 percent), very inefficient (giving 21-40 percent), mostly inefficient (giving 41-60 percent), mildly inefficient (giving 61-80 percent), and nearly efficient (giving 81-100 percent). These summary statistics confirm the patterns seen in the histograms. Very few people maximize household income.

Because the assumption of household income maximization is so resoundingly rejected in this study, the reader may be concerned that respondents did not understand the structure or consequences of the game. This hypothesis can be rejected for several reasons. First, the games scripts were developed in close collaboration with the enumerators. All of the enumerators were native Dhuluo speakers, and many grew up in towns demographically similar to those included in the study. With feedback the enumerators, the language used in the games scripts was greatly simplified both in vocabulary and in structure so that even relatively undereducated people could understand the games. Second, the enumerator explained many times that tokens given were worth more than tokens kept, and respondents were asked questions at every stage to check their understanding. If the respondent answered a check question incorrectly, the instructions were repeated until the respondent could answer the check correctly.[21] Third, respondents were given a sheet that showed the value of tokens given or kept so the respondent did not have to actually compute the multiplication for himself.[22] Fourth, after the respondent had placed the tokens in the cups to indicate his choice, the enumerator repeated back his decision both by stating the allocation of tokens and

[21] See the games scripts in the appendix.

[22] A copy of this sheet can also be found in the appendix.

stating the monetary consequences of his choice. Respondents were then given the opportunity to reallocate if they liked. Finally, inefficiency in games between spouses has been observed in other studies. Kebede et al. (2011), Mani (2010), and Iverson et al. (2011) are representative examples.

Result 4: *Very few people maximize household income. This is strong evidence against efficiency in the majority of households in this sample.*

4.1.3 Consistency of Behavior

As a robustness check, we can observe how consistent people are in the efficiency of their choices across the three stakes of the game. That is, it is possible for a person to play one token amount very efficiently and the two others less efficiently, and we might like for this person to be counted by their majority play. Table 4 shows counts and the percentage of the sample that played the games perfectly consistently (all 3 stakes in the same efficiency category), mostly consistently (2 stakes in one efficiency category, and the third stake in an adjacent category), and not consistently across the token amounts.

41 percent of men played all three token amounts with the same level of efficiency, while 37 percent of women played perfectly consistently. The next section of the table shows that many people played two stakes at one efficiency level and one stake at an adjacent efficiency level. If we classify these people by their majority play, then we are able to classify 88.3 percent of men and 89.3 percent of women.

When classified by their majority type, 1.8 percent of men play the games at the lowest level of efficiency in the public game. 23.7 percent give 21-40 percent of tokens, 44.9 percent give 41-60 percent of tokens, 13.5 percent give 61-80 percent, and 4.3 percent come close to the efficient choice. The distribution across efficiency types is similar for women, but shifted to the left. 3.8 percent of women give 0-20 percent, 37.0 percent give 21-40 percent, 41.8 percent give 41-60 percent, 5.4 percent give 61-80 percent, and only 1.3 percent come close to the efficient choice.

Result 5: *Most people are consistently inefficient, and consistent in the extent of inefficiency, across the three token amounts offered.*

4.1.4 Efficiency: Summary

Efficiency in household decisions is the defining characteristic of the Collective model, the most popular model in the current literature. The vast majority of respondents in this sample behave inefficiently, and are consistent in their inefficient choices, suggesting that the Collective model is inappropriate for this sample.

What is causing household to behave inefficiently? Imperfect information between spouses is commonly suggested as a mechanism that causes inefficiency between spouses. Next we move on to tests of the effect of asymmetric information between spouses.

4.2 Information

4.2.1 Average Behavior

Table 2 shows average behavior across information conditions in the spouse dictator games. In the first column, the average percentage of tokens given in each game is shown by gender and game, along with the standard deviation. On average, both genders give more in the public game than in the secret game. Men give on average 9.2 percentage points more in the public game, while women give 6.9 percentage points more.

Table 5 shows these results in a regression framework. The first column shows estimates of the model (without controls)

$$t_i = \mathrm{I}(male) + \mathrm{I}(secret) + \mathrm{I}(male) * \mathrm{I}(secret) + \mathrm{I}(10\_token) + \mathrm{I}(25\_token) + \mathrm{I}(secret\_first) + \mathrm{I}(secret) * \mathrm{I}(secret\_first) + \{controls\} + \epsilon_i$$

where t_i is the percentage of tokens given by individual i and I(.) is the indicator function. The coefficient of interest is that on I($secret$), but the regression also controls for gender, the stakes of the game, and whether the secret game was played before or after the public game. These results show that the difference in average giving between the secret game and public game is 8.5 percentage points, and this difference is highly significant. While men give 7.2 percentage points

more on average in both games, the difference between public and secret giving is the same across the genders.

We may expect giving in the dictator game to be correlated with observable characteristics, and perhaps the difference in giving could be explained by covariates. The second column shows this is not the case. The second column of Table 5 shows the same regression model with the addition of control variables, including age, education, number of children, age of youngest child, who is the primary financial decision maker, and own weekly total income. Including covariates changes the point estimate on I(*secret*) very little, and does not change the conclusion that on average, people give more in the public game. If we were to look only at averages, we would conclude that spouses in this sample respond to asymmetric information. We may further suggest that information problems are a driving cause of inefficiency in this sample.

Result 6: *On average, men and women give more in the public game than in the secret game.*

4.2.2 Distribution of Behavior

Table 2 clearly shows that on average people give more to their spouses when their decisions are public. However, averages sometimes obscure modal behavior. It is possible that while some people change their behavior between games, others may choose the same response in both games. To calculate the number of people who give more when their decisions are public, I calculate the linear difference between games as the percentage of tokens given in the Public Spouse game minus the percentage of tokens given in the Secret Spouse game. A positive linear difference then indicates that the respondent keeps more when their actions remain hidden.

Figure 3 shows the distribution of linear differences by gender and token amount. The left panels show distributions for men and the right panels show distributions for women. The first row shows differences in the 5 token games, the second shows the 10 token games, and the final row shows differences in the 25 token games. This figure makes clear that while the average difference between the public and secret games is positive and statistically different from zero, *most* people do not change their behavior between games.

Subjects who give more in the public game than in the secret game will be called "Opportunists," while those who give the same amount in both games will be called "Non-Responders." Figure 3 also reveals that some people give less in the secret game than the public game. I will call these people "Secret Benefactors."

Table 6 presents the percentage of observations that give more in the public game than in the secret game (Opportunists), the percentage who make identical decisions in the public and secret games (Non-Responders), and the percentage of observations that give *more* in the secret game than in the public game (Secret Benefactors). The table shows results for all token amounts pooled. In 49 percent of observations, men do not change their behavior between games, while in only 38 percent of observations do men behave opportunistically. In 13 percent of observations, men give more in the secret game than in the public game. Similar patterns hold for women. 50 percent of observations of women do not change their behavior between the public and secret games, while only 35 percent play opportunistically. 15 percent of female observations are Secret Benefactors. In the appendix, Table 10 shows similar statistics broken out for each token amount separately. Men and Women play the games similarly across the stakes, with a stable fraction of people playing as Opportunists, Non-Responders, and Secret Benefactors across the three stakes.

While it is simplest to categorize linear differences as strictly greater than, equal to, or less than zero, Figure 3 shows that there are some respondents that change their behavior by only 1 or 2 tokens between games. It's possible that these small changes are simply mistakes. The second panel of Table 6 shows the percent of the sample that can be considered Opportunistic, Non-Responderic, and Secret Benefactors after recoding small deviations. Specifically, if a respondent changes their behavior by ten percentage points or less between the public and secret games,[23] they are classified as Non-Responders. With this recoded classification, we see that 25 percent of men behave Opportunistically while 20 percent of women do so. Six percent of both men and women behave as Secret Benefactors.

[23] i.e. by only 1 token in the 5 or 10 token game, or by 1 or 2 tokens in the 25 token game

4.2.3 Consistency of Behavior

In addition to accounting for small deviations within games, we can also account for small deviations across games. That is, it is possible for a person to play one token amount as an Opportunist and the two others as a Non-Responder, and we might like for this person to be counted only as a Non-Responder. We might also wonder if those who give more in the secret game than the public game could have done so by mistake, and might have only made that mistake in one stake of the three offered. Table 7 shows counts and the percentage of the sample that played the games perfectly consistently, mostly consistently, and not consistently across the token amounts. 24 percent of men played all three token amounts as Opportunists, 35 percent played all three as Non-Responders, and 4 percent played all three as Secret Benefactors. The next section of the table shows that many people played two stakes as one type and one stake as a different type. If we classify these people by their majority play, then we classify 33 percent of men as Opportunists, 46 percent as Non-Responders, and 9 percent as Secret Benefactors. The final section shows individuals whose behavior is inconsistent with any type: for example, some people play two games as an Opportunist and one as a Secret Benefactor, while others play each game as a different type. 12 percent of men behave inconsistently. When I classify women by their majority play, 26 percent play as Opportunists, 49 percent play as Non-Responders, and 7 percent play as Secret Benefactors. 18 percent of women cannot be classified by their majority play.

Result 7: *There is statistically and substantively significant heterogeneity across people, with most behaving as Non-Responders, a sizable minority behaving as Opportunists, and a small number consistently giving more in secret.*

4.3 Correlation between Efficiency Type and Information

That there is heterogeneity in responses to asymmetric information, but no heterogeneity in whether individuals behave efficiently, suggests that imperfect information does not well explain inefficiency in this sample. To explore this hypothesis, I next examine the relationship between efficiency and information type measured using the games. Because giving in the public game is endogenous to a respondent's information type, these results should be interpreted as suggestive, not conclusive.

Table 8 shows the average percentage of tokens given in the public games broken out by information type and gender. Recall that giving all tokens in the spouse games is the efficient choice, thus higher levels of giving are associated with higher levels of efficiency. The table shows that average giving is *higher* for Opportunists than for Non-Responders, opposite to what we would expect if the information problem that caused the individual to act as an Opportunist also caused him to behave inefficiently. This is true for both men and women.

In addition to examining average levels of efficiency across information types, we can also explore the distribution. Panel a of Figure 4 shows the CDF of the percentage of tokens given in the 25 token Public Spouse game for men, broken out by information type. The plot shows that male Opportunists are more efficient in the 25 token public game than are Non-Responders, and Non-Responders are more generous than Secret Benefactors. In fact, the distribution for Opportunists first order stochastically dominates the distribution for Non-Responders, and Non-Responders first order stochastically dominate Secret Benefactors. Panel c of the same figure shows the CDF of efficiency type for men broken out by information type. Recall that a person's efficiency type is determined by their majority play in the public games, with individuals classified as "extremely inefficient," Type 1, if they give 20% or less in two of the three stakes of the Public Spouse games. An individual is "nearly efficient," Type 5, if they give 81-100% in two of three stakes. Panel c shows that just as Opportunists first order stochastically dominate Non-Responders when measured by their behavior in the 25 token game, Opportunists also first order stochastically dominate Non-Responders when measured by their majority play. Opportunist men behave more efficiently than Non-Responders, and Non-Responders are more efficient than Secret Benefactors.

Panels b and d of Figure 4 show analogous plots for women, and we see very similar patterns. When we examine efficiency as measured in the 25 token public spouse game, the distribution of efficiency for Opportunist women first order stochastically dominates the distribution for Non-Responder women, and Non-Responder women very nearly first order stochastically dominate Secret Benefactor.[24] When measured by majority play, we again see that Opportunist women are more efficient than Non-Responders, and Non-Responders are nearly always more efficient than Secret Benefactor women.

[24]The CDFs for Non-Responder and Secret Benefactor women are overlapping at the upper tail.

Though the relationship should be interpreted with caution, it does not seem that those with information problems are behaving less efficiently. If anything, Opportunists, those who take advantage of asymmetric information and act more selfishly when their actions are unseen, behave *more* efficiently than do people who do not respond to asymmetric information. However, because giving in the public game is clearly endogenous to information type, we should also explore the relationship between information and efficiency using other data.

We can also examine data about information between spouses in the survey and compare it to efficiency levels in the games. The baseline survey contains a detailed expenditure module.[25] For 49 items, the respondent was asked if they purchased the item, how much they spent, who benefited from the purchase, and whether their spouse was aware of the purchase. From these responses, we can construct the fraction of the respondent's total expenditures that the respondent says his spouse knows about.[26] Panel a of Figure 5 shows the CDF of the fraction of expenditures men say their wives are aware of, broken out by their efficiency type in the public spouse games. Because there are so few men in efficiency category 1 (extremely inefficient, giving less than 21%) and efficiency category 5 (nearly efficient, giving 81-100%), they are not shown in the figure to reduce clutter in the plot. Panel a shows that men who are classified as mostly inefficient, giving 41-60% in 2 of 3 public spouse games, report that their wife is aware of a higher fraction of their expenditures than do more efficient men (those giving 61-80%). The difference between very inefficient men and mildly inefficient men is less clear.

Panel b of Figure 5 shows a similar plot for the percent of expenditures the respondent's wife says that he is aware of. That is, this is the CDF of the percentage of expenditures women say their husband is aware of, broken out by his efficiency type. The CDFs in this figure are nearly overlapping, suggesting that the respondent's knowledge of his wife's purchases is not related to his efficiency type.

Figure 6 shows analogous figures for women. Here we see a striking pattern. Women who behave very inefficiently in the public spouse games say that their husbands are aware of a *higher* fraction of their expenditures. This is the opposite relationship to what standard theories would

[25]The English version of my survey is on my website at umich.edu/∼jesshoel/surveys.html

[26]Education expenditures were excluded from the calculation because education expenditures are extremely lumpy, and generated extreme outliers.

predict, because we would expect that couples with better information will behave more efficiently. Further, the distribution for very inefficient women nearly first-order stochastically dominates the distribution for mostly inefficient women, while mostly inefficient women do first-order stochastically dominate mildly inefficient women. That is, the unexpected relationship between efficiency and information holds when we look at distributions across the order of efficiency types.

Panel b of Figure 6 shows the CDF of the percentage of expenditures men say their wives are aware of, broken out by her efficiency type. The relationship between information and efficiency here is not quite as stark, but the general patterns remain. Women who are very inefficient are married to men who say that she is aware of a higher fraction of his purchases.

In summary, the data show that most people behave inefficiently, but only some respond to asymmetric information. Though standard thinking about household decision-making models would suggest that those with better information will behave more efficiently, in this sample the exact opposite is true. Those that behave selfishly in secret and generously in public also behave more efficiently. Those that behave more inefficiently report better information in their household about expenditures. These results together suggest that information problems are not the driving cause of inefficiency in this study.

5 Conclusion

Households are heterogeneous. However, because of the nature of our tests of household models, and the variability of the data used to construct those tests, previous work has mostly examined only average household behavior. Testing for heterogeneity with laboratory games, however, is straightforward. Using dictator games played between married couples in the Nyanza Province of Kenya, I test for heterogeneity across households in which common assumptions of household models fit them best. Because I use a within-subject (panel data) design, I am able to say whether an individual adheres to each assumption, allowing me to examine both the average behavior in the sample as well as detail the distribution of behavior.

First, I find that 97% of choices do not maximize household income, and instead forgo an average

of 16% of potential income in order to maintain personal control over about half of the realized pot. This is strong evidence of inefficiency in the household, and is observed nearly universally in the sample. Households are nearly homogenous in that the Collective model does not describe their behavior well.

When inefficiency is discovered or suggested between married couples, theorists often start by assuming that either imperfect information or limited contracting is causing the inefficiency. When I test the perfect information assumption, I find that allowing for heterogeneity across the population is important: while the average statistic suggests that households suffer from information problems, in fact half of the sample does not respond to experimentally induced asymmetric information. This is an important reminder that when testing between two models of the household, heterogeneity in the population can cause the average statistic to hide what is true for most of the population.

Further, average statistics can lead us to accept simple explanations when more complex theories are necessary. If we examined only average behavior in this sample, we would conclude that households do respond to asymmetric information on average, thus information problems are a probable cause of the observed inefficiency. However, when we allow for heterogeneity in information responses, we come to a much different conclusion. First, though the vast majority of this sample is inefficient, fewer than 50% of people respond to experimentally induced asymmetric information. This fact alone suggests that information problems cannot be the sole cause of inefficiency in this sample. Second, though we would expect those with information problems to behave the least efficiently, in fact the opposite is true. Opportunists behave more efficiently in these games than do Non-Responders. Finally, because we may be concerned that the measurement of Opportunism is endogenous to the measurement of efficiency in the games, I compare efficiency measured in the games to measures of information between couples in survey data. The data show that men who behave more efficiently in the games do not report better information between themselves and their wives about their individual purchases. For women, this pattern is even stronger, and clearly shows that women who behave more inefficiently in the games report *better* information in their household.

If information problems are not the driving cause of inefficiency, what is? My data hint at a

specific form of limited contracting: sharing rules. The histograms shown in Figures 1 and 2 show mass points on 40, 50, and 60% of tokens given. Rather than maximizing total income from the games and reallocating to a contracted sharing arrangement later, individuals seem to have a strong preference for a fair allocation in each transaction. This is a form of limited contracting, and appears to be a driving force of inefficiency in these games. The next generation of models of the household should consider this specific friction, and also consider that different households may respond to information differently, with some perhaps even responding to asymmetric information in surprising ways.

These results also have implications for public policy. Government sponsored cash transfer programs often go to great lengths to ensure that money is delivered only to the wife, hoping that she will retain control over it, but also deliver the funds very publicly so her husband is sure to know about the existence, amount, and timing of the transfer. Standard models of household decision-making suggest that information will improve efficiency in household decisions. This study suggests that for half of households, information does not improve efficiency, and in some households, information actually decreases efficiency. To inform policy, the effect of information about cash transfers should be examined more rigorously in experiments designed to explore heterogeneity across households.

References

Alderman, H., Chiappori, P. A., Haddad, L., Hoddinott, J., & Kanbur, R. (1995) "Unitary versus Collective Models of the Household: Is it Time to Shift the Burden of Proof?" The World Bank Research Observer, 10(1): 1-19.

Ashraf, N. (2009) "Spousal Control and Intra-Household Decision Making: An Experiment in the Phillipines." American Economic Review, 99(4): 1245-1277.

Bergstrom, T. (1997) "A Survey of Theories of the Family." Handbook of Population and Family Economics.

Bloch, F. & Rao, V. (2002) "Terror as a Bargaining Instrument a Case Study of Dowry Violence in Rural India." American Economic Review, 92(4): 10291043.

Bobonis, G. (2009) "Is the Allocation of Resources within the Household Efficient? New Evidence from a Randomized Experiment." Journal of Political Economy, 117(3), 453503.

Blundell, R. & Stoker, T. (2005) "Heterogeneity and Aggregation." Journal of Economic Literature, 43(June): 347391.

Browning, M., Chiappori, P., & Weiss, Y. (2011) "Family economics." Manuscript.

Chen, J. (2013) "Identifying Non-Cooperative Behavior Among Spouses: Child Outcomes in Migrant-Sending Households." Journal of Development Economics, 100(1): 1-18.

Chiappori, P. (1988) "Rational household labor supply." Econometrica 56: 63-90.

Chiappori, P. (1992) "Collective labor supply and welfare." Journal of Political Economy 100: 437-467.

Chiappori, P., & Donni, O. (2009) "Non-unitary Models of Household Behavior : A Survey of the Literature." IZA DP Working Paper, (4603).

Duflo, E., and Udry, C. (2004) "Intrahousehold Resource Allocation in Cote d'Ivoire: Social Norms, Separate Accounts and Consumption Choices." National Bureau of Economic Research Working Paper 10498.

Kebede, B., Tarazona, M., Munro, A., & Verschoor, A. (2011) "Intra-household efficiency : An Experimental Study from Ethiopia." CSAE Working Paper Series, 129.

Leider, S., Mobius, M. M., Rosenblat, T., and Do, Q.-A. (2009) "Directed Altruism and Enforced Reciprocity in Social Networks." Quarterly Journal of Economics, 124(4): 1815-1851.

Lich-Tyler, S. (2001) "Negotiations and Love Songs : The Dynamics of Bargained Household Decisions." Working Paper.

Ligon, E. (2002) "Dynamic Bargaining in Households (with Application to Bangladesh)." Manuscript, University of California, Berkeley.

Ligon, E. & Schechter, L. (2012) "Motives for Sharing in Social Networks." Journal of Development Economics. In press.

Lundberg, S. & Pollak, R. (1993) "Separate Spheres Bargaining and the Marriage Market." Journal of Political Economy, 101(6): 988-1010.

Manser, M., & Brown, M. (1980) "Marriage and Household Decision-Making: A Bargaining Analysis." International Economic Review, 21(1): 3144.

Mani, A. (2010) "Mine, Yours or Ours? The Efficiency of Household Investment Decisions: An Experimental Approach." Working Paper.

McElroy, M. & Horney, M. (1981) "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand." International Economic Review, 22(2): 333349.

Robinson, J. (2012) "Limited Insurance within the Household: Evidence from a Field Experiment in Kenya." American Economic Journal: Applied Economics 4(4): 140164.

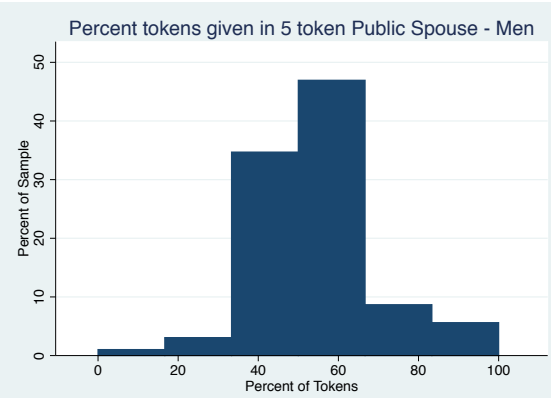
Schaner, S. (2012) "Do Opposites Detract? Intra-household Preference Heterogeneity and Inefficient Strategic Savings." Working Paper.

Udry, C. (1996) "Gender, Agricultural Production and the Theory of the Household." The Journal of Political Economy, 104(5): 1010-1046.

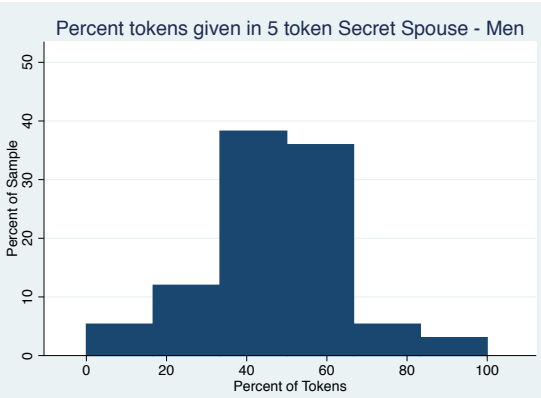
Figures

Figure 1: Histograms of Game Play: Men

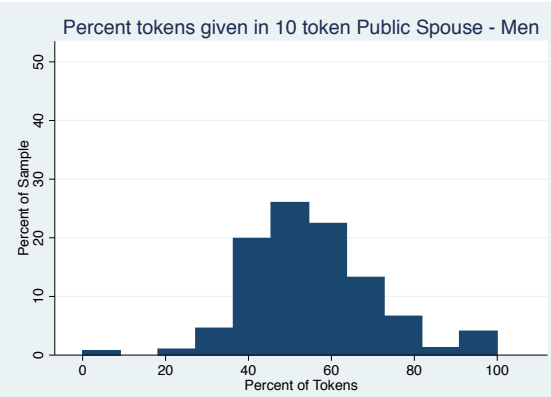
(a) 5 token Public Spouse



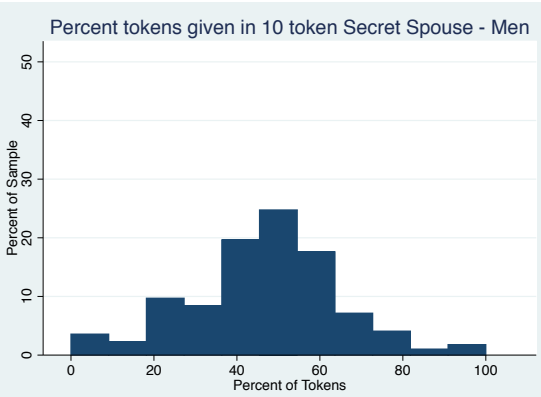
(b) 5 token Secret Spouse



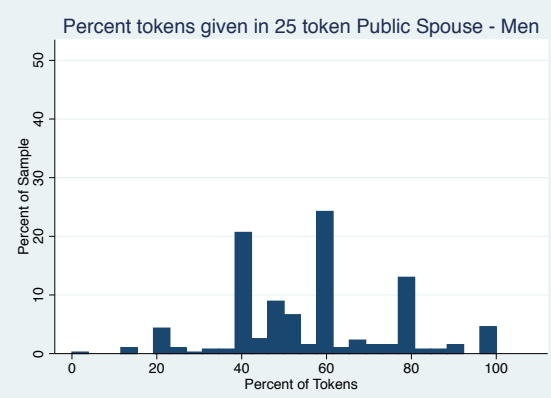
(c) 10 token Public Spouse



(d) 10 token Secret Spouse



(e) 25 token Public Spouse



(f) 25 token Secret Spouse

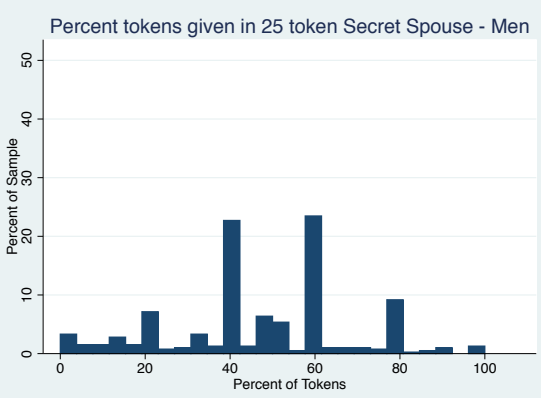
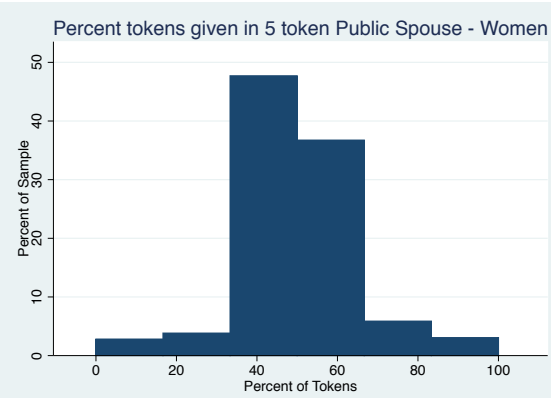
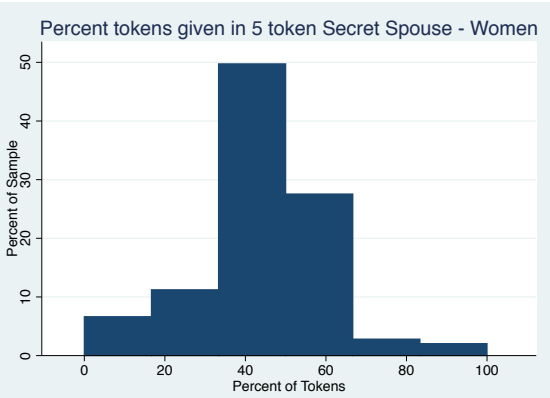


Figure 2: Histograms of Game Play: Women

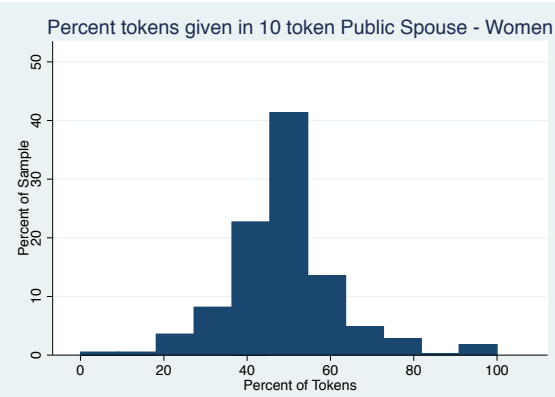
(a) 5 token Public Spouse



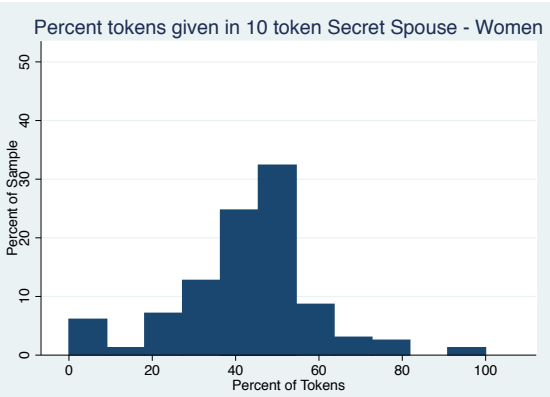
(b) 5 token Secret Spouse



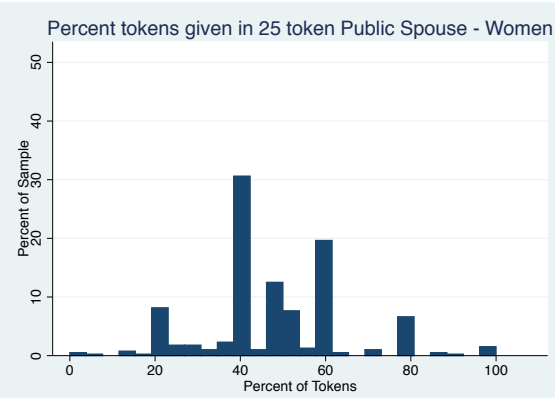
(c) 10 token Public Spouse



(d) 10 token Secret Spouse



(e) 25 token Public Spouse



(f) 25 token Secret Spouse

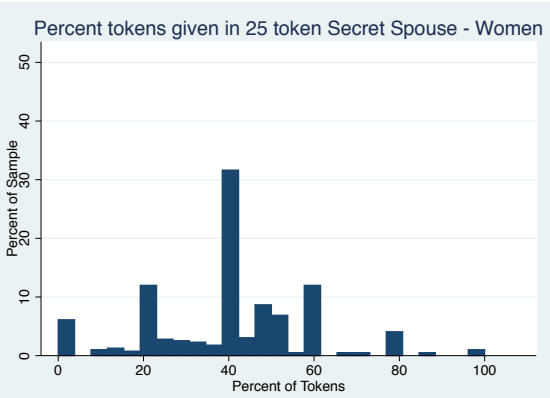
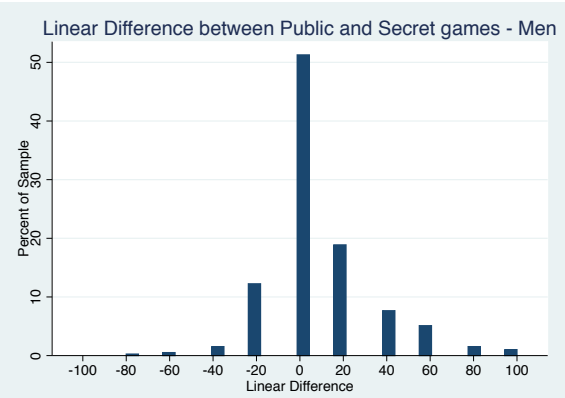
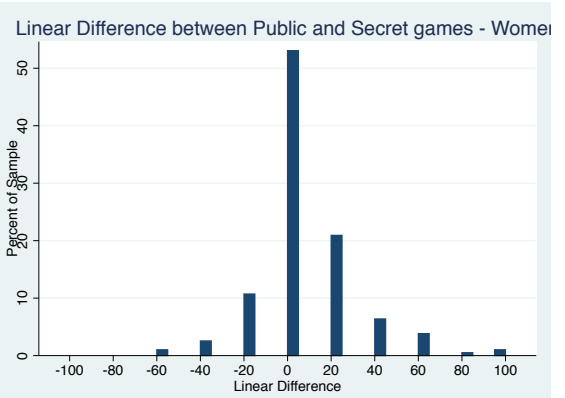


Figure 3: Linear Difference between Public and Secret Games

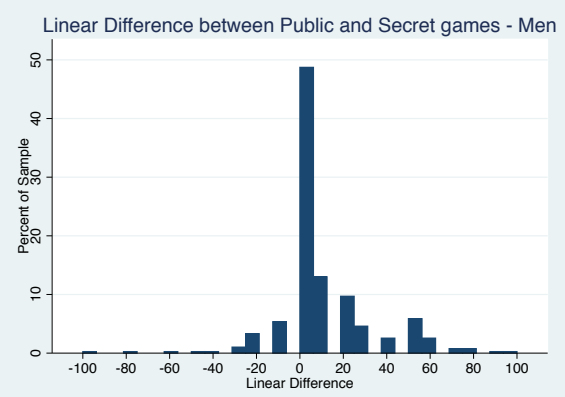
(a) 5 token Men



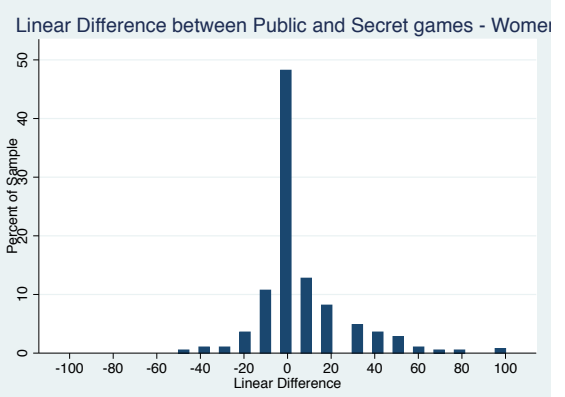
(b) 5 token Women



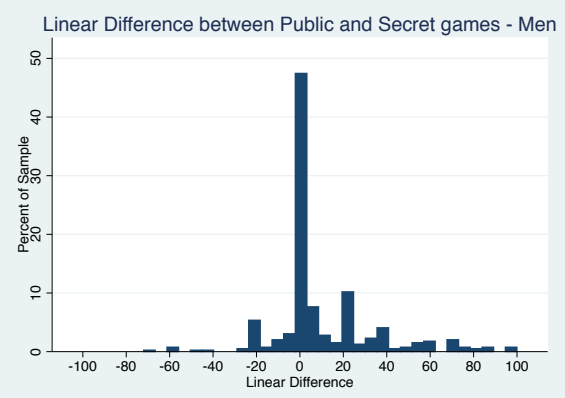
(c) 10 token Men



(d) 10 token Women



(e) 25 token Men



(f) 25 token Women

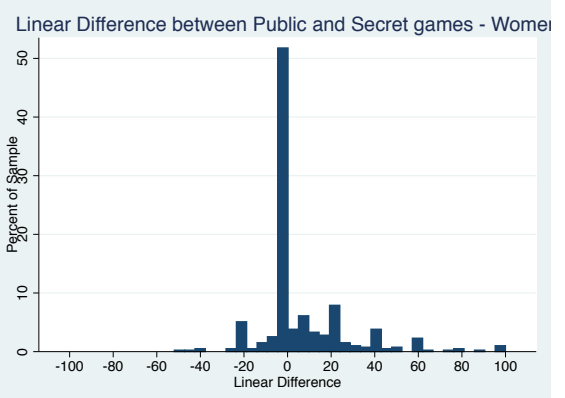
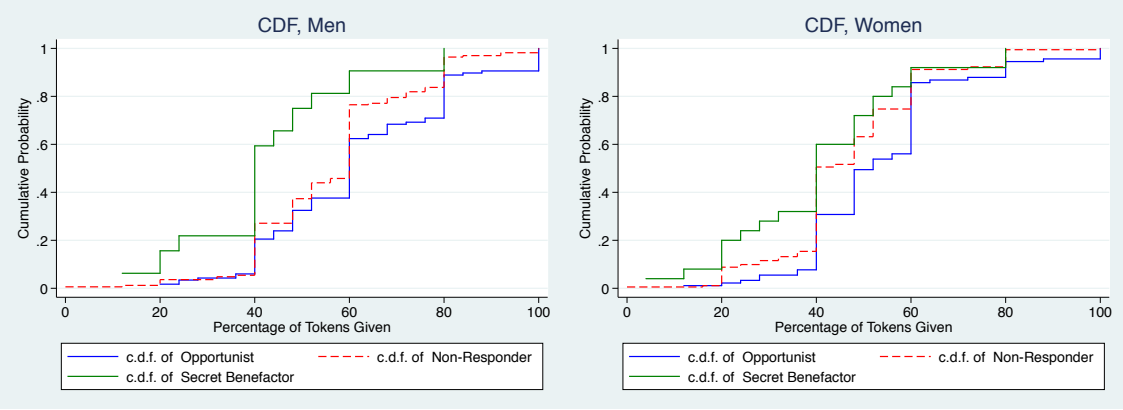


Figure 4: CDFs of Efficiency by Information Type

(a) 25 token Public game, Men

(b) 25 token Public game, Women



(c) Efficiency Type, Men

(d) Efficiency Type, Women

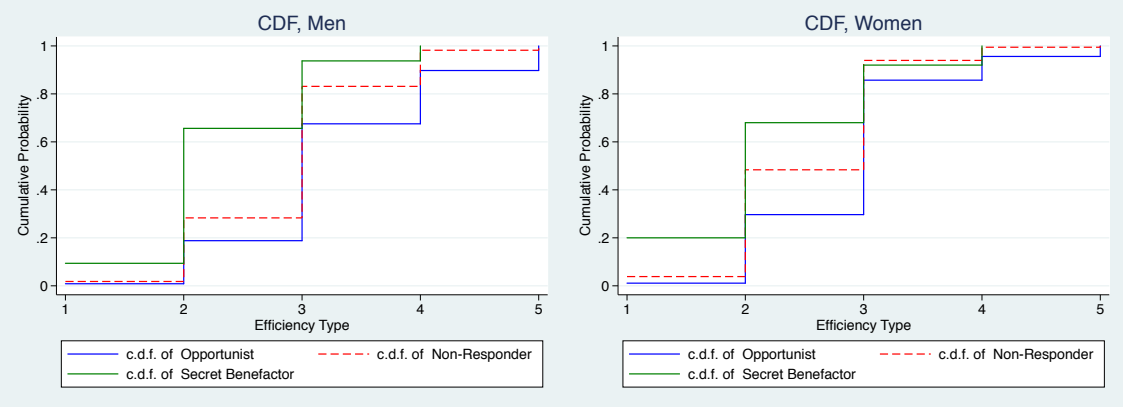
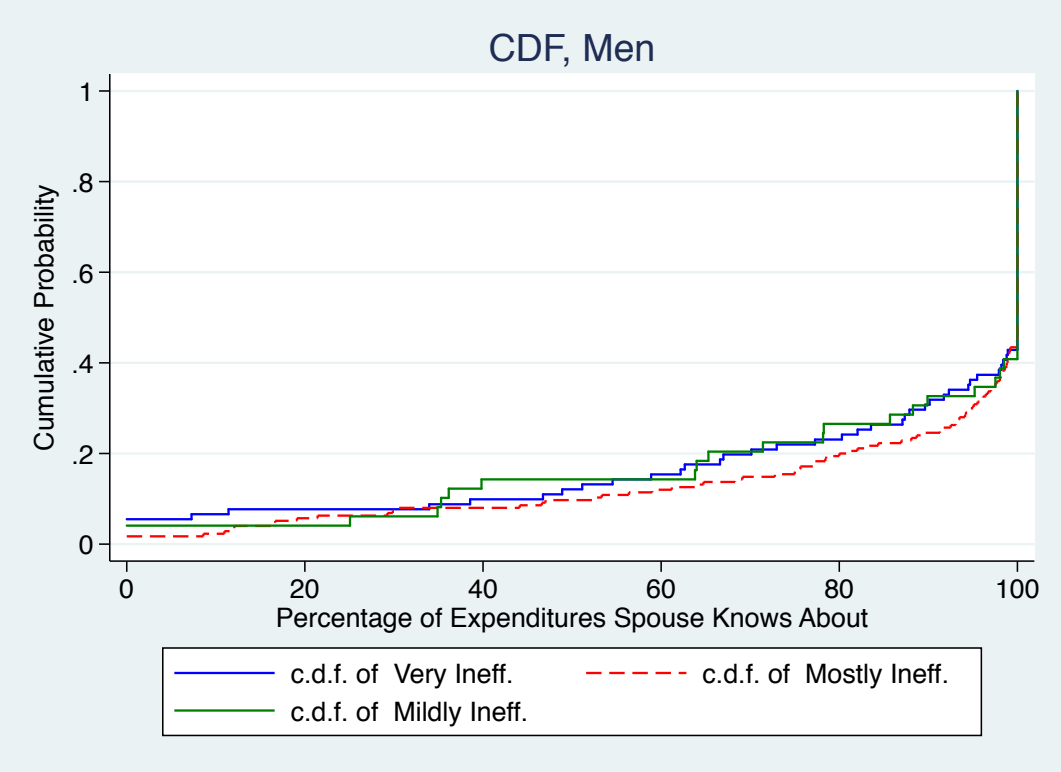


Figure 5: CDFs of Information in Survey by Efficiency Type, Men

(a) Expenditures Spouse Knows About



(b) Spouse Expenditures Respondent Knows About

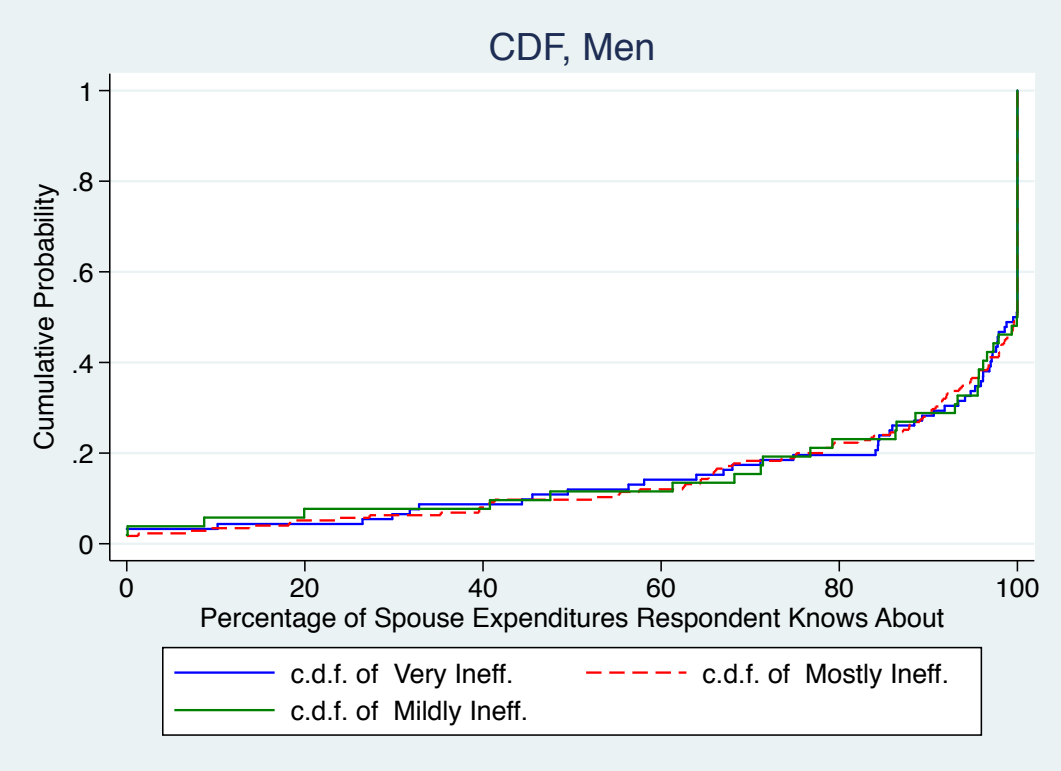
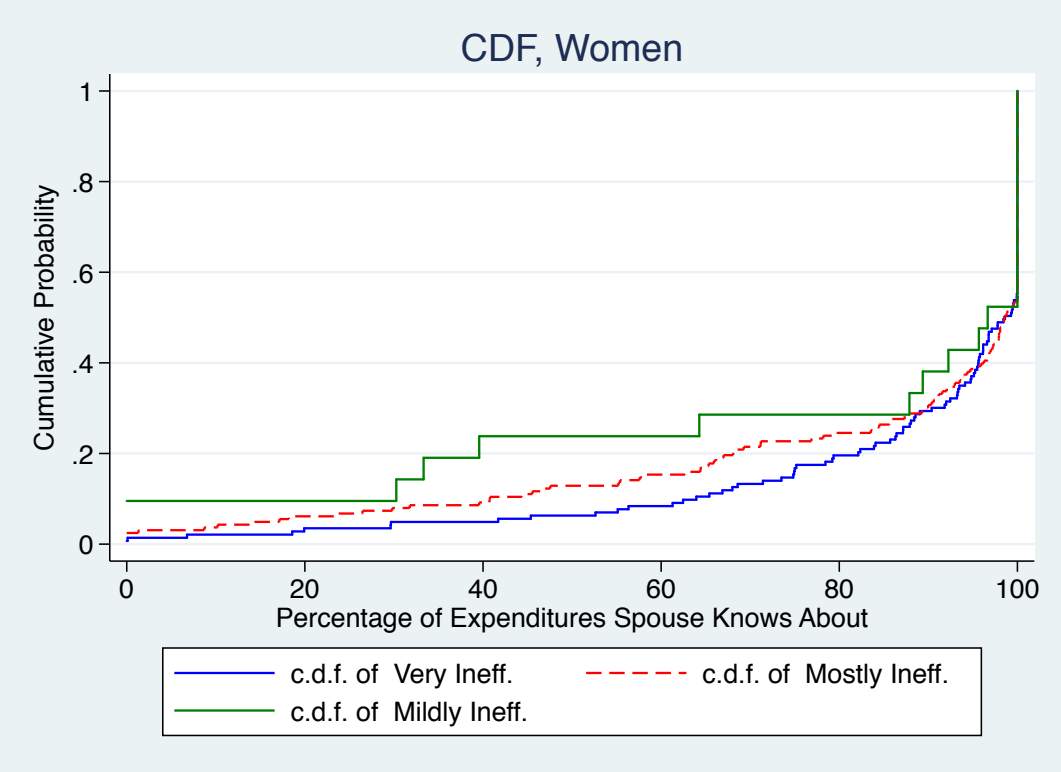
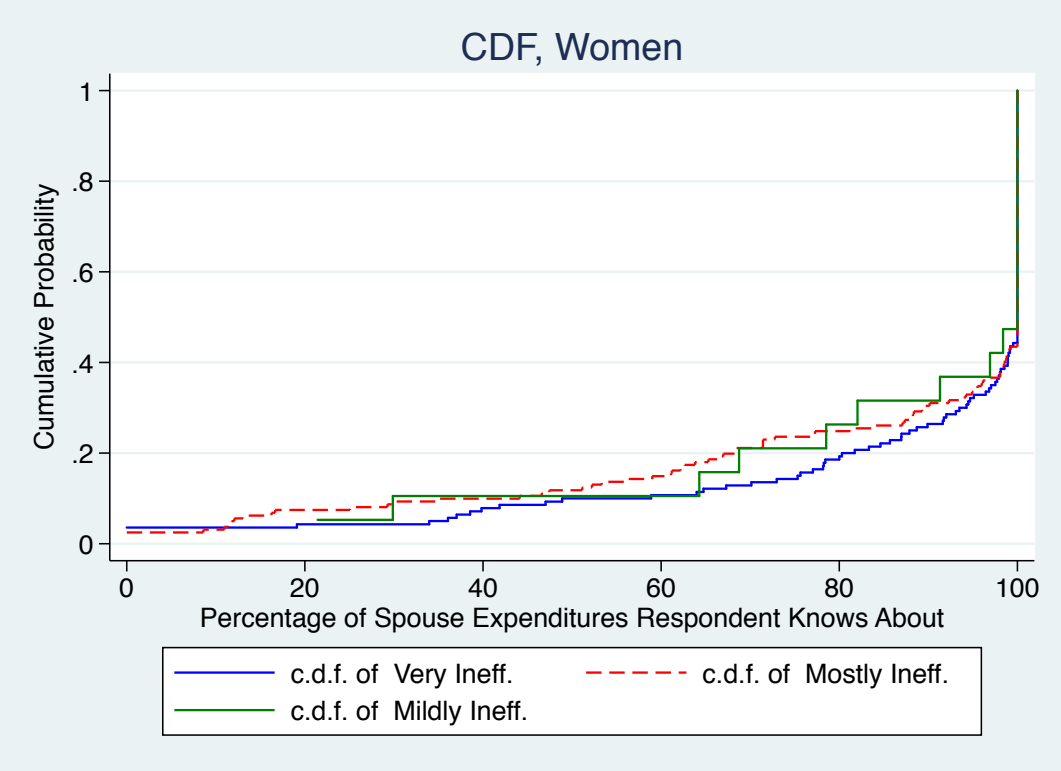


Figure 6: CDFs of Information in Survey by Efficiency Type, Women

(a) Expenditures Spouse Knows About



(b) Spouse Expenditures Respondent Knows About



Tables

Table 1: Summary Statistics

Variable	**Men**	**Women**
Age	46.04 (16.15)	36.62 (13.97)
Years of Education	7.95 (3.61)	6.46 (3.55)
Number Children	3.84 (2.57)	3.79 (2.36)
Age Youngest Child	7.42 (8.79)	7.25 (8.43)
"I am the primary financial decision maker"	0.47 (0.50)	0.30 (0.46)
"We make financial decisions together equally"	0.34 (0.47)	0.34 (0.47)
"My spouse is the primary financial decision maker"	0.15 (0.36)	0.33 (0.47)
Total Weekly Income	1570 (4778)	667.3 (2314)
Income from Work?, Indicator	0.53 (0.50)	0.33 (0.47)
Weekly Income from Work, No Zeros, KSH	1969 (4072)	1107 (3641)
Transfer from Spouse?, Indicator	0.05 (0.23)	0.41 (0.49)
Transfer from Spouse, No Zeros, KSH	561.0 (1469)	470.0 (1145)
Transfer to Spouse?, Indicator	0.46 (0.50)	0.05 (0.23)
Transfer to Spouse, No Zeros, KSH	470.8 (487.5)	290.7 (516.6)
Total Own Expenditures, No Education, KSH	1534 (1995)	1392 (1421)

Notes: Table shows means with standard deviations in parentheses. Data for taken from the baseline survey. Financial data covers income, transfers, and expenditures over the week before the baseline survey. See my website (umich.edu/∼jesshoel/surveys.html) for further details on the survey and definition of variables.

Table 2: Summary Statistics: Games

	Percentage of Tokens Given	Percentage of Money Given	Percentage of Money Left on the Table
Public Spouse: Men	55.87	65.51	14.71
	(18.26)	(24.66)	
Public Spouse: Women	48.66	58.71	17.11
	(16.64)	(24.98)	
Secret Spouse: Men	46.67	56.76	17.78
	(20.92)	(24.89)	
Secret Spouse: Women	41.77	51.83	19.41
	(18.93)	(24.32)	

Notes: The first column shows the mean percentage of tokens given. Call this value x. The second column shows the mean percentage of total realized income given to the spouse ($\frac{30x}{30x+20(1-x)}$). The third column shows the mean amount of money left unclaimed, scaled by the total potential pot ($\frac{10(1-x)}{30}$). Standard deviations are shown in parentheses.

Table 3: Summary Statistics: Efficiency

Percent of Tokens Given	**Percent of Observations**
Men	All
Extremely Inefficient: $x <= 20$	0.04
Very Inefficient: $20 < x <= 40$	0.28
Mostly Inefficient: $40 < x <= 60$	0.46
Moderately Inefficient: $60 < x <= 80$	0.16
Mildly Inefficient: $80 < x <= 100$	0.06
Women	All
Extremely Inefficient: $x <= 20$	0.07
Very Inefficient: $20 < x <= 40$	0.39
Mostly Inefficient: $40 < x <= 60$	0.45
Moderately Inefficient: $60 < x <= 80$	0.07
Mildly Inefficient: $80 < x <= 100$	0.02

Notes: Tokens given to the spouse are worth more than tokens kept for self, so the household income maximizing choice is to give 100% of the tokens to the spouse. The table shows the percentage of male and female observations that fit into different efficiency categories.

Table 4: Consistency: Efficiency

Percent of Tokens Given		Men		Women	
		Count	Percent of Sample	Count	Percent of Sample
Pefectly Consistent	$x <= 20$: 3 games	2	0.51	9	2.3
	$20 < x <= 40$: 3 games	51	13.01	58	14.8
	$40 < x <= 60$: 3 games	81	20.66	67	17.09
	$60 < x <= 80$: 3 games	15	3.83	7	1.79
	$80 < x <= 100$: 3 games	13	3.32	4	1.02
	Perfectly Consistent	162	41.33	145	37
Mostly Consistent	$x <= 20$: 2 games	5	1.28	6	1.53
	$20 < x <= 40$: 2 games	42	10.71	87	22.19
	$40 < x <= 60$: 2 games	95	24.23	97	24.74
	$60 < x <= 80$: 2 games	38	9.69	14	3.57
	$80 < x <= 100$: 2 games	4	1.02	1	0.26
	Mostly Consistent	184	46.93	205	52.29
Perfectly and Mostly Consistent	$x <= 20$	7	1.79	15	3.83
	$20 < x <= 40$	93	23.72	145	36.99
	$40 < x <= 60$	176	44.9	164	41.84
	$60 < x <= 80$	53	13.52	21	5.36
	$80 < x <= 100$	17	4.34	5	1.28
Classifiable		346	88.27	350	89.3
Not Consistent		46	11.73	42	10.7

Notes: Table shows how consistent people are in their efficiency behavior across the token amounts of the games. The first panel shows the number and fraction of people who play all three token amounts with the same efficiency behavior type. The second panel shows those who play the three games mostly consistently, by playing two of three games as one type. The third panel sums those who are perfectly and mostly consistent across the three stakes. The final panel shows the number and fraction of people who do not play the games consistently across the three stakes.

Table 5: Regression: Information

	Percentage of Tokens Give	(With Controls)
Secret Game	-8.544***	-8.837***
	(1.108)	(1.224)
Male	7.168***	7.187***
	(1.072)	(1.310)
Male * Secret Game	-2.236	-2.052
	(1.395)	(1.528)
Ten Token Game	-0.319	-0.378
	(0.430)	(0.469)
Twenty Five Token Game	-0.788*	-0.684
	(0.473)	(0.506)
Secret Game First	-2.098*	-2.297**
	(1.077)	(1.157)
Secret Game First * Secret Game	3.572**	3.699**
	(1.398)	(1.532)
Constant	50.00***	45.34***
	(0.911)	(2.557)
Observations	4,704	4,122
R^2	0.071	0.085

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

Notes: The regression includes pooled observations for men and women, public and secret games, 3 token amounts. Female, public game, five token, public game played first is the base category. Heteroskedasticity robust standard errors are shown in parentheses, clustered at the individual level. Controls include age, education, number of children, age of youngest child, who is the primary financial decision maker, and weekly total income.

Table 6: Summary Statistics: Information

Raw	Percent
Men	
Opportunists	0.38
Non-Responders	0.49
Secret Benefactors	0.13
Women	
Opportunists	0.35
Non-Responders	0.5
Secret Benefactors	0.15
Recoded	
Men	
Opportunists	0.25
Non-Responders	0.7
Secret Benefactors	0.06
Women	
Opportunists	0.2
Non-Responders	0.74
Secret Benefactors	0.06

Notes: The first column shows the fraction of people who give more in the public game than secret game (Opportunists), the fraction that give the same in both games (Non-Responders), and the fraction that give less in the public game than secret game (Secret Benefactors). The second column shows the mean linear difference between the public game and secret game. The table shows information for all three token amounts pooled. The first panel shows a classification based on the simple difference. The second panel shows the classification after collapsing observations for which the difference between public and secret was less than or equal to ten percentage points to the Non-Responder category.

Table 7: Consistency: Information

		Men		Women	
		Count	Percent of Sample	Count	Percent of Sample
Pefectly Consistent	Opportunist: 3 games	93	23.72	60	15.31
	Non-Responder: 3 games	139	35.46	117	29.85
	Secret Benefactor: 3 games	15	3.83	13	3.32
	Perfectly Consistent	247	63.01	190	48.48
Mostly Consistent	Opportunist: 2 games	35	8.93	43	10.97
	Non-Responder: 2 games	43	10.97	77	19.64
	Secret Benefactor: 2 games	19	4.85	13	3.32
	Mostly Consistent	97	24.75	133	33.93
Perfectly and Mostly Consistent	Opportunist	128	32.65	103	26.28
	Non-Responder	182	46.43	194	49.49
	Secret Benefactor	34	8.67	26	6.63
Classifiable		344	87.75	323	82.4
Not Consistent		48	12.24	69	17.6

Notes: Table shows how consistent people are in their information response across the token amounts of the games. The first panel shows the number and fraction of people who play all three token amounts with the same behavior type. The second panel shows those who play the three games mostly consistently, by playing two games as one type and the third game as a nearby type. The third panel sums those who are perfectly and mostly consistent across the three stakes. The final panel shows the number and fraction of people who do not play the games consistently across the three stakes.

Table 8: Relationship between Efficiency Type and Information Type

	Average Percentage Given in Public Game	
Information Type	Men	Women
Opportunist	62.2	55.0
Non-Responder	55.6	47.8
Secret Benefactor	42.1	41.2

Notes: The table shows the average percentage of tokens given in the public spouse games (averaged across the three token amounts) broken out by information type.

A Game Scripts

Note: The games were implemented with respondents by a trained native Dholuo speaker in Dholuo in an individual interview. The scripts were written in English with input from the field assistants, then forward and back-translated twice into Dholuo. The scripts shown here are in English. Dholuo translations are available on request.

INTRODUCTION TO GAMES

Thank you for your participation in the survey. Now I would like to invite you to participate in some games. First, I will give you some instructions for the game. You should feel free to ask me to repeat something if you dont catch it at first. After the instructions, I will ask you a few questions to check your understanding. Its ok if you dont answer the questions correctly at first; I will just repeat the instructions of the game.

GENERAL GAME INSTRUCTIONS

1. In these games you will have a chance to win real money. Jessica, the leader of this project, has arranged for the money. The money you win has come from Jessicas school so that she can complete this project.

2. These games you will play with a partner. In some games your partner will be your husband/wife. But in some of the games your partner will be a stranger.

3. You will make two types of decisions [hold up two fingers]; 1) secret decisions and 2) public decisions. For the secret decision, I will not tell anyone about your choices except Jessica, the leader of this project. For the public decision you make I will tell only your partner and Jessica, but no one else in your village.

4. Today we will play several different games over different amounts of money. One of these games will come true.

5. We will enter all of your games into the computer in the office. The computer will randomly decide which game comes true. We will then combine your choices with the choices of your partners, and together they will determine how much money you win.

6. You will receive your money next week when we come back for a follow up interview.

Now I would like to ask you a few questions to check your understanding of the instructions. If you dont understand some part, I will just repeat the instruction and that will be fine.

Questions about General Game Instructions

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Where did the money come from? [Jessicas School; if wrong, repeat #1.]

2. Who will be your partner in these games? [My spouse or a stranger; if wrong, repeat #2.]

3. When your decision is secret, who will I tell about your choice? [No one except the leader of this project; if wrong, repeat #3.]

4. When your decision is public who will I tell about your choices? [My partner and the leader of this project only; if wrong, repeat #3.]

5. Will I ever tell your village elder about your choices? [No. If wrong, say "I will sometimes

tell your partner, but I will never tell anyone else in your village about your choices."]

6. Of the many games we play today, how many of your choices will come true? [One; if wrong, repeat #4.]

7. How will we pick which of your games come true? [The computer will pick randomly; if wrong, repeat #5.]

8. When will you receive your money from the game that comes true? [Next week; if wrong, repeat #6]

Great! Now that you understand the general rules of the games, lets talk about one game in specific.

SECRET STRANGER DECIDER GAME

(If the first:) Now lets play the first game. This game is called the Secret Stranger Decider Game.

(If not the first:) Now lets play a different game. This game is called the Secret Stranger Decider Game. The rules are a bit the same and a bit different from the last game.

Game Rules

1. Your partner is a stranger. I cant tell you who the stranger is and I will never tell the stranger who you are.

2. At the end of the week we will put the names of those who participated into the computer and will pick out one randomly to be your stranger partner.

3. Your choices in this game will be secret. I will not tell the stranger how you have played. I will also not tell anyone else in the village how you have played.

4. In this game I will give you bottle caps that represent real money.

5. You can keep all these bottle caps and money for yourself or you can give some or all to the stranger.

6. The bottle caps you keep are worth ksh20 for yourself. But if you give them to the stranger, they are worth ksh30 to the stranger. For example, if you keep 3 bottle caps, they are worth 60 shillings to you. If you give 3 bottle caps, they are worth 90 shillings to the stranger. You can use this sheet to help you understand the value of the bottle caps. This column shows how much the caps are worth if you keep them and this column shows how much the caps are worth if you give them.

7. Here are two labeled tins. This one is labeled SELF and this one is labeled STRANGER 1. Drop the bottle caps you would like to keep in the tin labeled SELF and the bottle caps you would like to give in the tin labeled STRANGER 1.

8. Because this game is secret, the stranger will not know if you give them money, and they will also not know if you do not give them money. Again I would like to ask you a few questions to check your understanding of the rules of the Secret Stranger Decider Game.

Questions for Secret Stranger Game

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Here are 5 bottle caps. If you keep them by putting them in the SELF tin (FO: Demonstrate), how much are they worth to you? [100ksh; if wrong, repeat #6]

2. If you give the 5 bottle caps by putting them in the STRANGER tin (FO: Demonstrate), how much are they worth to the stranger? [150ksh; if wrong, repeat #6]

3. Who is your partner for this game? [A stranger; if wrong, repeat #1]

4. Will I tell your partner what you decided? [No; if wrong, repeat #3]

5. Will I tell your husband/wife what you decided? [No; if wrong, repeat #3]

Ok! Now lets play the game! Here are 5 bottle caps. You can make your choice as you wish.

Ok. You have chosen to keep X bottle caps worth X to you and give X bottle caps worth X to the stranger. Is that correct?

If no, "Ok, here are the 5 bottle caps again. You can make your choice as you wish."

If yes, "Ok, lets continue. Here are 10 bottle caps. You can make your choice as you wish."

FO: Repeat for other values as needed.

SECRET SPOUSE DECIDER GAME

(If the first:) Now lets play the first game. This game is called the Secret Spouse Decider Game.

(If not the first:) Now lets play a different game. This game is called the Secret Spouse Decider Game. The rules are a bit the same and a bit different from the last game.

Game Rules

1. Your partner in this game is your spouse.

2. Your choices in this game will be secret. I will not tell your spouse how you have played. I will also not tell anyone else in the village how you have played.

3. In this game I will give you bottle caps that represent real money.

4. You can keep all these bottle caps and money for yourself or you can give some or all to your spouse.

5. The bottle caps you keep are worth ksh20 for yourself. But if you give them to your spouse, they are worth ksh30 to your spouse. For example, if you keep 2 bottle caps, they are worth 40 shillings to you. If you give 2 bottle caps, they are worth 60 shillings to your spouse. You can use this sheet to help you understand the value of the bottle caps. This column shows how much the caps are worth if you keep them and this column shows how much the caps are worth if you give them.

6. Here are two labeled tins. This one is labeled SELF and this one is labeled SPOUSE. Drop the bottle caps you would like to keep in the tin labeled SELF and the bottle caps you would like to give in the tin labeled SPOUSE.

7. Because this game is secret, your spouse will not know that the money comes from you. They will not know if you give them money, and they will also not know if you do not give them money.

Again I would like to ask you a few questions to check your understanding of the rules of the Secret Spouse Decider Game.

Questions for Secret Spouse Game

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Here are 7 bottle caps. If you keep them by putting them in the SELF tin (FO: Demonstrate), how much are they worth to you? [140ksh; if wrong, repeat #5]

2. If you give the 7 bottle caps by putting them in the SPOUSE tin (FO: Demonstrate), how much are they worth to your spouse? [210ksh; if wrong, repeat #5]

3. Who is your partner for this game? [Spouse; if wrong, repeat #1]

4. Will I tell your spouse what you decided? [No; if wrong, repeat #2]

5. Will I tell your village elder what you decided? [No; if wrong, repeat #2]

6. Will your spouse know how much you gave to them in this game? [No; if wrong, repeat #7]

Ok! Now lets play the game! Here are 5 bottle caps. You can make your choice as you wish.

Ok. You have chosen to keep X bottle caps worth X to you and give X bottle caps worth X to your spouse. Is that correct?

If no, "Ok, here are the 5 bottle caps again. You can make your choice as you wish."

If yes, "Ok, lets continue. Here are 10 bottle caps. You can make your choice as you wish."

FO: Repeat for other values as needed.

PUBLIC SPOUSE DECIDER GAME

(If the first:) Now lets play the first game. This game is called the Public Spouse Decider Game.

(If not the first:) Now lets play a different game. This game is called the Public Spouse Decider Game. The rules are a bit the same and a bit different from the last game.

Game Rules

1. Your partner in this game is your spouse.

2. Your choices in this game will be public. I will tell your spouse how you have played. But, I will not tell anyone else in the village how you have played.

3. In this game I will give you bottle caps that represent real money.

4. You can keep all these bottle caps and money for yourself or you can give some or all to your spouse.

5. The bottle caps you keep are worth ksh20 for yourself. But if you give them to your partner, they are worth ksh30 to your spouse. For example, if you keep 10 bottle caps, they are worth 200 shillings to you. If you give 10 bottle caps, they are worth 300 shillings to your spouse. You can use this sheet to help you understand the value of the bottle caps. This column shows how much the caps are worth if you keep them and this column shows how much the caps are worth if you give them.

6. Here are two labeled tins. This one is labeled SELF and this one is labeled SPOUSE. Drop the bottle caps you would like to keep in the tin labeled SELF and the bottle caps you would like to give in the tin labeled SPOUSE.

Again I would like to ask you a few questions to check your understanding of the rules of the Public Spouse Decider Game.

Questions for Public Spouse Game

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Here are 9 bottle caps. If you keep them by putting them in the SELF tin (FO: Demonstrate), how much are they worth to you? [180ksh; if wrong, repeat #5]

2. If you give the 9 bottle caps by putting them in the SPOUSE tin (FO: Demonstrate), how much are they worth to your spouse? [270ksh; if wrong, repeat #5]

3. Who is your partner for this game? [Spouse; if wrong, repeat #1]

4. Will I tell your spouse what you decided? [Yes; if wrong, repeat #2]

5. Will I tell your village elder what you decided? [No; if wrong, repeat #2]

Ok! Now lets play the game! Here are 5 bottle caps. You can make your choice as you wish.

Ok. You have chosen to keep X bottle caps worth X to you and give X bottle caps worth X to your spouse. Is that correct?

If no, "Ok, here are the 5 bottle caps again. You can make your choice as you wish."

If yes, "Ok, lets continue. Here are 10 bottle caps. You can make your choice as you wish."

FO: Repeat for other values as needed.

SPOUSE STRANGER DECIDER GAME

(If the first:) Now lets play the first game. This game is called the Spouse Stranger Decider Game.

(If not the first:) Now lets play a different game. This game is called the Spouse Stranger Decider Game. The rules are a bit the same and a bit different from the last game.

Game Rules

1. In this game, you will make decisions for other people.

2. The person giving the money is your spouse. The person receiving the money is a stranger.

3. I cant tell you who the stranger is and I will never tell the stranger who you are.

4. At the end of the week we will put the names of those who participated into the computer and will pick out one randomly to be the stranger.

5. Your choices in this game will be secret. I will not tell your spouse how you have played. I will also not tell anyone else in the village how you have played.

6. In this game I will give you bottle caps that represent real money.

7. You can keep all these bottle caps and money for your spouse or you can give some or all to the stranger.

8. The bottle caps you keep are worth ksh20 for your spouse. But if you give them to the stranger, they are worth ksh30 to the stranger. For example, if you keep 4 bottle caps, they are worth 80 shillings to your spouse. If you give 4 bottle caps, they are worth 120 shillings to the stranger. You can use this sheet to help you understand the value of the bottle caps. This column shows how much the caps are worth if you keep them and this column shows how much the caps

are worth if you give them.

9. Here are two labeled tins. This one is labeled SPOUSE and this one is labeled STRANGER. Drop the bottle caps you would like to keep in the tin labeled SPOUSE and the bottle caps you would like to give in the tin labeled STRANGER.

10. Because this game is secret, your spouse and the stranger will not know you made the decision. They will not know if you give them money, and they will also not know if you do not give them money.

Again I would like to ask you a few questions to check your understanding of the rules of the Spouse Stranger Decider Game.

Questions for Spouse Stranger Game

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Here are 15 bottle caps. If you keep them for your spouse by putting them in the SPOUSE tin (FO: Demonstrate), how much are they worth to your spouse? [300ksh; if wrong, repeat #8]

2. If you give the 15 bottle caps by putting them in the STRANGER tin (FO: Demonstrate), how much are they worth to the stranger? [450ksh; if wrong, repeat #8]

3. Who are the players in this game? [Your spouse and a stranger; if wrong, repeat #2]

4. Will I tell your spouse what you decided? [No; if wrong, repeat #5]

5. Will I tell your village elder what you decided? [No; if wrong, repeat #5]

6. Will your spouse know how much you kept for them in this game? [No; if wrong, repeat #9]

Ok! Now lets play the game! Here are 5 bottle caps. You can make your choice as you wish.

Ok. You have chosen to keep X bottle caps worth X to your spouse and give X bottle caps worth X to the stranger. Is that correct?

If no, "Ok, here are the 5 bottle caps again. You can make your choice as you wish."

If yes, "Ok, lets continue. Here are 10 bottle caps. You can make your choice as you wish."

FO: Repeat for other values as needed.

STRANGER STRANGER DECIDER GAME

(If the first:) Now lets play the first game. This game is called the Stranger Stranger Decider Game.

(If not the first:) Now lets play a different game. This game is called the Stranger Stranger Decider Game. The rules are a bit the same and a bit different from the last game.

Game Rules

1. In this game, you will make decisions for other people.

2. The person giving the money is a stranger. The person receiving the money is also a stranger.

3. I cant tell you who the strangers are and I will never tell the strangers who you are.

4. At the end of the week we will put the names of those who participated into the computer and will pick out two randomly to be the strangers.

5. Your choices in this game will be secret. I will also not tell anyone else in the village how you have played, including the strangers, your spouse, or anyone else in your village.

6. In this game I will give you bottle caps that represent real money.

7. You can keep all these bottle caps and money for STRANGER 1or you can give some or all to STRANGER 2.

8. The bottle caps you keep are worth ksh20 for STRANGER 1. But if you give them to STRANGER 2, they are worth ksh30 to the STRANGER 2. For example, if you keep 8 bottle caps, they are worth 160 shillings to STRANGER 1. If you give 8 bottle caps, they are worth 240 shillings to STRANGER 2. You can use this sheet to help you understand the value of the bottle caps. This column shows how much the caps are worth if you keep them and this column shows how much the caps are worth if you give them.

9. Here are two labeled tins. This one is labeled STRANGER 1 and this one is labeled STRANGER 2. Drop the bottle caps you would like to keep in the tin labeled STRANGER 1 and the bottle caps you would like to give in the tin labeled STRANGER 2.

10. Because this game is secret, the strangers will not know how you decided. They will not know if you choose to give them money and they will not know if you dont give them money.

Again I would like to ask you a few questions to check your understanding of the rules of the Stranger Stranger Decider Game.

Questions for Stranger Stranger Game

FO Instructions: If the respondent answers correctly, say "Yes, thats right" then repeat the correct answer. If the respondent answers incorrectly, follow the instructions given on the line.

1. Here are 6 bottle caps. If you keep them for STRANGER 1 by putting them in the STRANGER 1 tin (FO: Demonstrate), how much are they worth to STRANGER 1? [120ksh; if wrong, repeat #8]

2. If you give the 6 bottle caps to STRANGER 2 by putting them in the STRANGER 2 in (FO: Demonstrate), how much are they worth to STRANGER 2? [180ksh; if wrong, repeat #8]

3. Who are the players in this game? [Two strangers; if wrong, repeat #2]

4. Will I tell the strangers what you decided? [No; if wrong, repeat #5]

5. Will I tell your village elder what you decided? [No; if wrong, repeat #5]

Ok! Now lets play the game! You can make your choice as you wish.

Ok. You have chosen to keep X bottle caps worth X to STRANGER 1and give X bottle caps worth X to STRANGER 2. Is that correct?

If no, "Ok, here are the [5] bottle caps again. You can make your choice as you wish."

If yes, "Ok, lets continue. Here are [10] bottle caps. You can make your choice as you wish."

FO: Repeat for other values as needed.

B Token Value Sheet

Figure 7: Token Value Sheet

KEEP	Tokens	GIVE
0 ksh	0	0 ksh
20 ksh	1	30 ksh
40 ksh	2	60 ksh
60 ksh	3	90 ksh
80 ksh	4	120 ksh
100 ksh	5	150 ksh
120 ksh	6	180 ksh
140 ksh	7	210 ksh
160 ksh	8	240 ksh
180 ksh	9	270 ksh
200 ksh	10	300 ksh
220 ksh	11	330 ksh
240 ksh	12	360 ksh
260 ksh	13	390 ksh
280 ksh	14	420 ksh
300 ksh	15	450 ksh
320 ksh	16	480 ksh
340 ksh	17	510 ksh
360 ksh	18	540 ksh
380 ksh	19	570 ksh
400 ksh	20	600 ksh
420 ksh	21	630 ksh
440 ksh	22	660 ksh
460 ksh	23	690 ksh
480 ksh	24	720 ksh
500 ksh	25	750 ksh

C Additional Tables

Table 9: Detailed Summary Statistics: Games

Percentage of Tokens Given	All	5 token	10 token	25 token	First	Last
Secret Spouse: Men	46.67	46.63	46.45	46.93	47.61	45.92
	(20.92)	(20.75)	(19.97)	(22.03)	(20.24)	(21.43)
Public Spouse: Men	55.87	55.20	55.84	56.55	56.69	54.83
	(18.26)	(18.08)	(17.05)	(19.58)	(18.04)	(18.5)
Secret Spouse: Women	41.77	42.96	42.14	40.19	42.44	41.18
	(18.93)	(19.28)	(18.12)	(19.3)	(19.48)	(18.44)
Public Spouse: Women	48.66	49.64	48.72	47.61	49.73	47.41
	(16.64)	(17.86)	(14.64)	(17.23)	(16.73)	(16.47)

Percentage of Money Given	All	5 token	10 token	25 token	First	Last
Secret Spouse: Men	56.76	56.72	56.54	57.02	57.68	56.02
	(24.89)	(24.89)	(24.87)	(24.91)	(24.94)	(24.83)
Public Spouse: Men	65.51	64.89	65.48	66.13	66.26	64.55
	(24.66)	(24.73)	(24.66)	(24.57)	(24.55)	(24.77)
Secret Spouse: Women	51.83	53.05	52.21	50.2	52.52	51.22
	(24.32)	(24.5)	(24.38)	(24.04)	(24.43)	(24.22)
Public Spouse: Women	58.71	59.65	58.76	57.68	59.74	57.49
	(24.98)	(25)	(24.98)	(24.94)	(25)	(24.93)

Money Left on the Table	All	5 token	10 token	25 token	First	Last
Secret Spouse: Men	17.78%	26.69 KSH	53.55 KSH	132.68 KSH	17.46%	18.03%
Public Spouse: Men	14.71%	22.40 KSH	44.16 KSH	108.63 KSH	14.44%	15.06%
Secret Spouse: Women	19.41%	28.52 KSH	57.86 KSH	149.53 KSH	19.19%	19.61%
Public Spouse: Women	17.11%	25.18 KSH	51.28 KSH	130.98 KSH	16.76%	17.53%

Table 10: Detailed Summary Statistics: Opportunism

Raw	Percent			
Men	All	5 token	10 token	25 token
Opportunistic	0.38	0.34	0.4	0.39
Non-Responder	0.49	0.51	0.49	0.47
Secret Benefactor	0.13	0.15	0.11	0.13
Women	All	5 token	10 token	25 token
Opportunistic	0.35	0.33	0.35	0.37
Non-Responder	0.5	0.53	0.48	0.49
Secret Benefactor	0.15	0.14	0.17	0.14

Recoded	Percent			
Men	All	5 token	10 token	25 token
Opportunistic	0.25	0.15	0.27	0.32
Same	0.7	0.82	0.67	0.59
SS	0.06	0.02	0.06	0.09
Women				
Opportunistic	0.2	0.12	0.22	0.27
Same	0.74	0.85	0.72	0.64
SS	0.06	0.04	0.06	0.09