İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi Yıl:15 Sayı:29 Bahar 2016/2 s.319-333

EXPERIMENTAL EVIDENCE ON DICTATOR AND ULTIMATUM GAMES FROM TURKISH AND PAKISTANI STUDENTS

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ABSTRACT

We conduct a web-based laboratory experiment in which first-year undergraduate students from a university in Istanbul play dictator and ultimatum games. Firstly, we analyze and try to explore the behavior of Turkish students. Then, we compare our results with the Saleem and Chaudhry (2011) results, which have exactly same experiment design, for the Pakistani students. We find evidence against the payoff maximization (self-regarding) hypothesis. Offers that give responder positive amounts in the dictator game are evidence of some degree of "altruism". Pure self-interest model would predict that player 1 would keep entire amount. On average mean offers by Turkish students are higher than the means offers by the Pakistanis in DG. In UG, mean offers are same in both cases and overall rejection rate are quite higher in Turkish case than in Pakistanis case when comparing 43 % with 31 %. It is evident that Turkish students are more altruistic than Pakistanis while female in both games are more fair than males.

Keywords: Experimental economics, dictator game, ultimatum game, altruism and fairness.
JEL Classification: C72, C73, C91, D01, D03

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1. INTRODUCTION

In economics, the behavior of an individual is modeled on the basis of some fundamental assumptions like rationality meaning to pursuing self-interest. The theory of Microeconomic is presented as a positive science, but it is also argued that the concept of rationality is a normative one. If the positivity of the microeconomics is valid as it is accepted, then there is a need to support it by the observations of individual behavior. Zaman and Karacuka (2012) argue that literature is free from such evidences because it does not exist in the real world. The assumption that human beings purse their own self-interest is too much simplification of what we observe the human actions in the world. Naturally, humans have tendency of both taking care of themselves in the form of love for accumulating wealth for them (*self-interest*) as well as sacrifice for others (*altruism*). The degree of sacrifice varies from society to society depending upon a lot of factors including norms and values. Recently, Edward Norton, an American actor and activist, launched a fundraising campaign on an online website for a Syrian scientist residing Turkey to settle down his family in USA. More than USD 465 K was contributed with in few days[1]. Sen (1977) argues in 'Rational Fools', which is a critique of the theory of economic rationality, remarked that real choices don't completely reflect the maximizing behavior in rational choice theory due to low predictive power.

Experimental economics provides a ground to test different hypotheses in economics and standard assumptions made about decision makers. In this study, we look for some behavioral insights in terms of trust and reciprocity, norms of fairness and altruism with the help of standard experiments presented in the literature across university students in Istanbul, and then we compare our results with Saleem and Chaudhry (2011). Altruistic values and norms explain how a person or party with more (bargaining) power may treat the other person or party having little or no influence on outcome. Things change substantially when the other party or person has significant power to respond over the injustices. Literature recognizes behavioral norms in these situations with the word 'fairness'. To observe the norms of fairness and altruism, some mechanisms have been developed, namely, the dictator game and the ultimatum game. These are briefly explained below.

Due to Guth et al. (1982), the ultimatum game (UG) has been introduced in the literature of experimental economics to observe the very struggle between self-interest, strategic behavior and fairness. The setup of the game is very simple. A subject called proposer decides on a fixed amount of money to divide between himself and the other individual called responder. The responder has right to accept or reject the proposal. If he accepts, the money or amount has to be divided as per the proposal; and in case he rejects, both parties get zero amounts. Rejections by the receiving or responding party on a significant proposed amount have attracted the attentions of economists and other social scientists because such rejections apparently look counter intuitive on rationality grounds. An extended or sequential

[1] The details can be found at https://cdn.crowdrise.com/thescientist

multi stage version of this game exists in the literature where the second party, the responder can either accept the original proposal or make a counter proposal, which is then either accepted or turn down by the original proposer. The second game, a variant of the first, called as the "dictator game (DG)" was introduced due to Forsythe et al. (1994) in which the second party, the responder has no right to accept or reject the proposal.

Ultimatum game has been extensively studied by the experimental economists to see how the outcome is affected by the two opposing notions, namely *self-interest* where the subjects only care about their own earnings and fairness. There are lots of studies in the experimental economics literature that tries to test or find the level of fairness and altruism among the societies with help of simple experiments by playing ultimatum and dictator games and some variants of these games. A limitation to the results of these studies is the possibility that experimental findings are an artifact of the use of hypothetical or small stakes. Cameron (1999) is deals with the effect of stakes on the outcome of the game. The results show that proposer behavior is unaffected by the increase in stakes even when the stakes of the game were raised to a level of three months' expenditures by Indonesian students. On the other hand, responders showed more willingness to accept the offers for a given percentage level when the stakes were higher.

Seemingly irrational, the rejections in UG games are not actually counter intuitive if the responders take into account the inequity of the division of amount. Cross country evidence on these games across the globe, with variations in setting, shows that people playing this game deviate in a systematic way with the standard game theoretic predictions what is being predicted by the subgame perfection[2]. However, the exact results for one country cannot be directly generalized to another country. The power of local norms and values of the societies should be taken into account.

Our objective in the present study, as noted above, is to see the level of fairness and altruism along with self-interest, cited as rationality in the textbooks of economics, among the Turkish students at university level; and further, to make a comparative analysis with university level students from Pakistani community. Saleem and Chaudhry (2011) presents the results of lab experiments for ultimatum, and dictator games, carried out with economics students at a university in Lahore. Our experimenting environment has exact similarity with the one in Saleem and Chaudhry (2011) and this makes it possible to compare the results of the same experiment among two societies.

The rest of the paper is organized as follows. The next section describes the experimental deign and procedures, in detail. Section 3 presents the results of the dictator game and the ultimatum game experiments. Section 4 propose a comparison between Pakistani students and Turkish students and concludes.

[2] For details see for example Roth, et al (1991)

2. EXPERIMENTAL DESIGN AND PROCEDURES

The experiments were conducted at the Istanbul Commerce University with the web-based Veconlab software in a computer laboratory.[3] Participating students are first year undergraduate students who are enrolled to the Introduction to Economics II course. A demographic survey containing questions about gender, age, family income, major, number of siblings etc., was also completed by participants after the experiment. There was no real money stake.

The students were matched randomly and were not known with whom they were matched or paired. The pairing was fixed for all rounds of a game. All students play the games in the same computer lab simultaneously.

Dictator and Ultimatum games provide a good laboratory environment for testing game theoretic predictions. These are extremely simple games, and no case for players to understand the instructions and having questions was observed. Theoretical predictions of these games are also so clear which make it possible to test the hypothesis that people behave in a self-interested (payoff maximizing) manner.

The dictator game is a one stage or period game in which the first Player called proposer chooses an amount or share "D" out of an endowment of $10 for the other player. The other player called as responder, has no action in this set up, and the payoffs are $10 – D and D, respectively, for players 1 and 2 as shown in the Figure below. Clearly, since the second player has no move, game theory predicts that the payoff-maximizing player 1 would keep the entire endowment and set D = 0. But when these games are put toward ordinary individuals, the proposer (player 1) typically donates a positive amount, where the share given provides a measure of "altruism."

Ultimatum game is a two-stage game. In stage 1, player 1(the proposer) decides on an amount "D" out of a $10-endowment to send to player 2. In stage 2, player 2 observes player 1's offer and decides to accept or reject. If player 2 accepts, player 2 gets $D and player 1 keeps $10 – D. If player 2 rejects the offer, both players get $0. By backward induction, we solve the game by first at player 2's options in the second stage. For player 2, any strictly positive D should be accepted because it gives a higher payoff than rejecting. If D = 0, then player 2 should be indifferent between accepting and rejecting player 1's offer. If it is assumed that offers that make player 2 indifferent are accepted, then player 1 will maximize their own payoff by offering D = 0 and the offer will be accepted by player 2. If offers of D = 0 are expected to be rejected, player 1 should offer the smallest D such that D > 0, ensuring acceptance by player 2 and maximizing player 1's payoff.

[3] The games were played online using Charles Holt's Vecon Lab Experiment website http://veconlab.econ.virginia.edu/

According to non-cooperative game theory, the "rational" proposer would keep the entire endowment (or give the smallest positive amount), and the responder should accept. However, when these games are played among ordinary individuals, responders often reject positive offers that are perceived as too small. The highest share rejected can be interpreted as a measure of "fairness."

3. EXPERIMENT RESULTS

3.1 Results of dictator game

The results of the dictator game experiment are presented in Table 1a. The mean offer was 34 percent of the pie over all four rounds. Interestingly, there is a huge gap between mean offer of women (46 %) and mean offer of men (26%). There were also variations between rounds. In the first round, the mean offer is almost one third of the pie. They decrease and increase in the second and third rounds. Then, again, it was one almost one third of the whole pie.

Table 1a: Results of the Dictator Game

Subsample	Mean Allocation (Share of Endowment)	No. of observations
All	0.34	88
(women, men)	(0.46 , 0.26)	(36, 52)
Round 1	0.35	22
Round 2	0.28	22
Round 3	0.41	22
Round 4	0.32	22

Table 1b presents the frequency of offered fraction of the pie. The proposer gave nothing to the responder in 22.73 percent of the games. The corresponding percentage for women (11.11%) was less than the percentage for men (30.77%). This can be interpreted as women are more altruistic than men in these experiments

Table 1b: Results of the Dictator Game

Allocation (Share of Endowment)	All %	Women %	Men %
0.00	22.73	11.11	30.77
0.10	9.09	5.56	11.54
0.20	13.64	11.11	15.38
0.30	4.55	2.78	5.77
0.40	11.36	13.89	9.62
0.50	15.91	13.89	17.31
0.60	6.82	13.89	1.92
0.70	6.82	11.11	3.85
0.80	4.55	11.11	0.00
0.90	4.55	5.56	3.85
1.00	0.00	0.00	0.00
Observations	88	36	52

Figure 1 demonstrates the distribution of means. Dictators are more likely to give little. When we exclude zero offers, the mode offer is 50 percent in the DG.

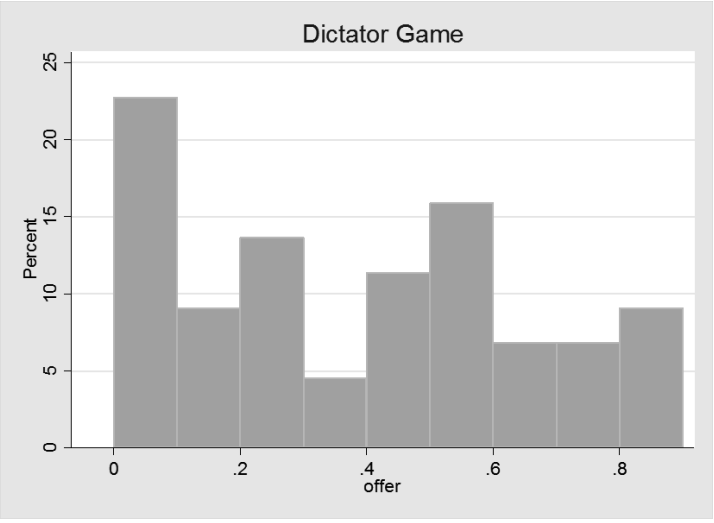


Figure 1 Distribution of Mean Offer, Dictator Game

3.2 Results of ultimatum game

The results of the ultimatum game are presented in the Table 2a and Table 2b. When the responder has an option to reject the offer, it rises to 41 percent of the pie. Also, the offer gap between the women and men in DG experiment was closed. Both women and men offered around 41 percent. Over all rounds, the rejection rate was 43%, but there were some variations in rejection rates across rounds. In the fifth round, the mean offer rate is more than half (54%) so the rejection rate is low (9%). In the following two rounds, the mean offer decreased, so the rejection rates increased. Then, they returned the average percentages at the final rounds.

As Table 2b demonstrates the percentage of zero offers are decreased to 4.55 percent in UG. Also, more than 20% of the proposer offered more than half of the pie. Figure 2 shows that the distribution of the mean offer in UG looks like normal.

Table 2a: Results of the Ultimatum Game

Subsample	Mean Allocation (Share of Endowment)	Rejection Rate	No.of observations
All	0.41	0.43	88
(women, men)	(0.42 , 0.41)	(0.39 , 0.46)	(36, 52)
Round 5	0.54	0.09	22
Round 6	0.38	0.45	22
Round 7	0.31	0.72	22
Round 8	0.43	0.45	22

Table 2b: Results of the Ultimatum Game

Allocation	All %	Women %	Men %
0.00	4.55	0.00	7.69
0.10	6.82	5.56	7.69
0.20	4.55	8.33	1.92
0.30	15.91	19.44	13.46
0.40	29.55	25.00	32.69

0.50	18.18	22.22	15.38
0.60	11.36	13.89	9.62
0.70	4.55	2.78	5.77
0.80	0.00	0.00	0.00
0.90	4.55	2.78	5.77
1.00	0.00	0.00	0.00
Observations	88	36	52

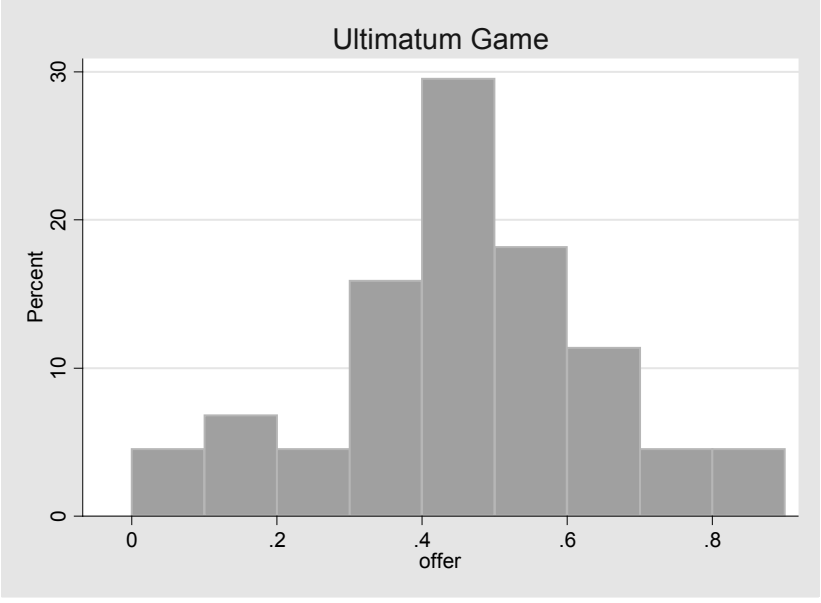


Figure 2 Distribution of Mean Offer, Ultimatum Game

It can be observed from Figure 3 that mean offers are fluctuating around 30 % across rounds. At round 5, which was the beginning of the UG game, the mean offer took its maximum value ass 54 percent, that is, the proposer offer more than half of the pie to the responder with the fear of rejection. Then, in the consecutive rounds, proposer tests the responder by offering less. But, after less offers rejection rates increased. Then, finally proposer offered more in the last round. Figure 4 presents the same result with an alternative way.

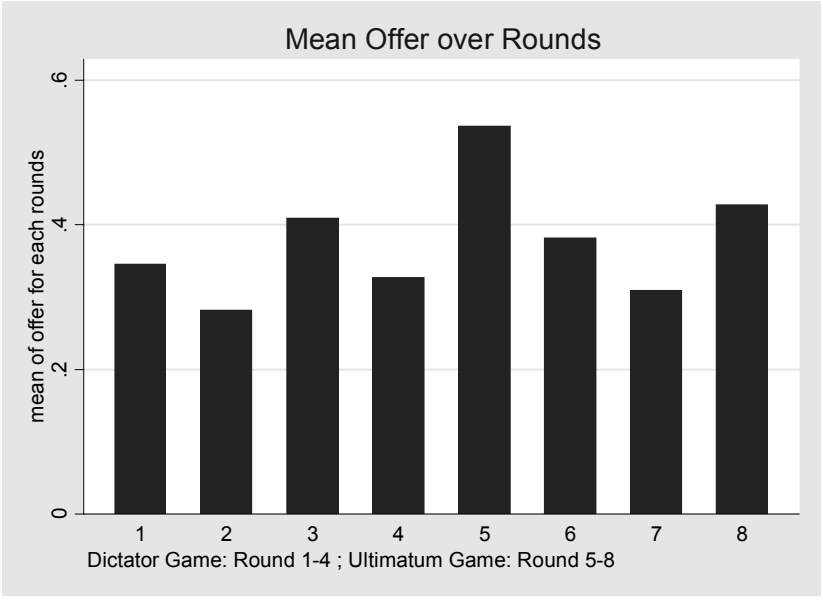


Figure 3 Mean Offers across Rounds

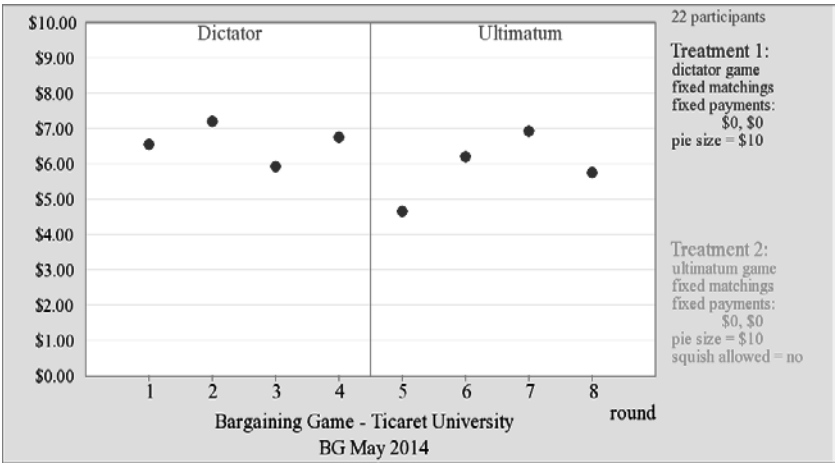


Figure 4 Dictator and Ultimatum Game, Mean Shares

Figure 4 shows that women were more generous than man. In all rounds, except round 8, mean offer of women are higher than men.

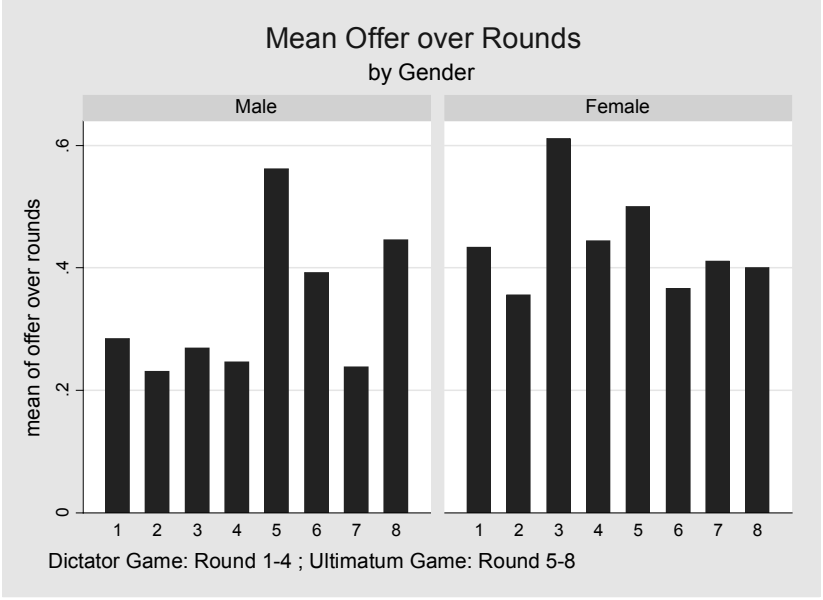


Figure 5 Mean offers by Gender

4. DISCUSSION

When we compare the results for Pakistani and Turkish students, we can see that among the results of DG, on average mean offers by Turkish students are higher than the means offers by the Pakistanis, while mean offers decline steadily in the successive rounds in both cases.[4] The percentage of students offering zero shares is higher among the Pakistani students than the Turkish students which show that on average Turkish students are more altruistic than Pakistanis while female in both cases are more altruistic than the males.

The results from UG are somewhat surprising in the sense that mean offers are same in both cases and overall rejection rate are quite higher in Turkish case than in Pakistanis case when comparing 43 % with 31 %. And when we compare the males and female, it is evident that in both cases Females have more fair behavior than males. One thing is surprising in case of Pakistani students that some percentage of students in both games offers 100 percent share to the other party, we are not sure whether it is due to non-seriousness of the students or they represents really a generous, fair and altruistic behavior.

[4] The tables representing the mean offers for Pakistani students are presented in the appendix, which are taken from Saleem and Chaudhry (2011) as already mentioned.

Offers that give responder positive amounts in the dictator game are evidence of some degree of "altruism". Pure self-interest model would predict that player 1 would keep entire amount.

In ultimatum game, median/mode offers were in 40% range. Mean offers in the 31 to 54 % range. Low offers are rejected, and then it is rational to offer more. But rejecting positive offers, such as 20%, is not consistent with payoff maximizing behavior. Hence, behavior may be consistent with Nash equilibrium but not consistent with subgame perfect equilibrium. We clearly observe from the experiment that offers in the ultimatum game appear to have some mix of strategic play such as fear of rejection and punishment, and some degree of altruism/fairness.

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APPENDICES

Appendix A: Instructions of the Game

Dictator Game

Instructions (ID =), Page 1 of 3

- **Rounds and Matchings**: The experiment consists of a number of **rounds**. Note: You will be matched with the **same** person in all rounds.
- **Decisions:** One of you will be designated as a **Proposer** (decision-maker) who will begin the round by deciding on a division of an amount of money, **$10.00**. The other person, designated as **responder**, is told how the money is divided between the two people and has no choice to make.

Instructions (ID = , Proposer) Page 2 of 3

- **Role:** You have been randomly assigned to be a **Proposer** (or initial decision-maker) in this process, and you will decide on amounts of money for each of you that sum to **$10.00**.
  OR **Role:** You have been randomly assigned to be a **Responder** in this process. The other person (proposer/decision-maker) will begin by deciding on amounts of money for each of you that sum to **$10.00**.
- **Earnings:** Then each person earns their part of the division.

Instructions Summary (ID = , Proposer)

- Please remember that you will be matched with the **same** person in all rounds.
- The proposer (decision-maker) in each pair decides on a division of the **$10.00**; this decision determines earnings for the round.
- There will be a number of rounds, and you are always matched with the same person.

Ultimatum Game

Instructions (ID =), Page 1 of 3

- **Rounds and Matchings**: The experiment consists of a number of **rounds**. Note: You will be matched with the **same** person in all rounds.
- **Decisions:** One of you will be designated as a **Proposer** (initial decision-maker) who will begin the round by proposing a division of an amount of money, **$10.00**. The other person, designated as **responder**, is told of the proposed division and must either accept it or not.

Instructions (ID = , Proposer) Page 2 of 3

- **Role:** You have been randomly assigned to be a **Proposer** (or initial decision-maker) in this process, and you will begin by suggesting amounts of money for each of you that sum to **$10.00**.
  OR **Role:** You have been randomly assigned to be a **Responder** in this process. The other person (proposer) will begin by suggesting amounts of money for each of you that sum to **$10.00**.
- **Earnings:** If the responder accepts the proposed division, then each person earns their part of the proposed division. If the responder rejects, both earn **$0.00**.

Instructions Summary (ID = , Proposer)

- Please remember that you will be matched with the **same** person in all rounds.
- The proposer (initial decision-maker) in each pair suggests a division of the **$10.00**; this proposal determines earnings for the round if it is accepted. A rejection produces earnings of **$0.00** for each person. If the proposal is rejected, earnings are **$0.00** for both proposer and responder.
- There will be a number of rounds, and you are always matched with the same person.

Appendix B: Demographic Survey Questions

Upon request from the authors.

Appendix C: The Results of Saleem and Chaudhry (2011): Pakistani Students

Table 3a: Results of the Dictator Game

Subsample	Mean Allocation (Share of Endowment)	No. of observations
All	0.20	238
Women, men	0.21, 0.19	134, 104
Round 1	0.32	54
Round 2	0.18	54
Round 3	0.12	54
Round 4	0.17	54
Section 1	0.16	75
Section 2	0.21	76
Section 3	0.21	52
Section 4	0.24	35

Table 3b: Results of the Dictator Game (cont'd)

Allocation (Share of Endowment)	All	Women	Men
0.0	47.06%	42%	54%
0.1	10.92	9.7	12.5
0.2	8.82	13.4	2.9
0.3	5.04	4.5	5.8
0.4	5.88	8.2	2.9
0.5	15.13	15.7	14.4
0.6	2.10	1.5	2.9
0.7	0.84	0.8	1.0
0.8	0.84	0.8	1.0
0.9	1.26	2.2	0.0
1.0	2.10	1.5	2.9
Observations	238	134	104

Table 4a: Results of the Ultimatum Game

Subsample	Mean Allocation (Share)	Rejection Rate	No. of observations
All	0.41	0.31	245
Women, men	0.43, 0.38	0.29, 0.33	136, 109
Round 1	0.41	0.26	54
Round 2	0.42	0.33	53
Round 3	0.43	0.33	51
Round 4	0.35	0.37	51
Section 1	0.38	0.28	69
Section 2	0.40	0.28	89
Section 3	0.44	0.42	52
Section 4	0.45	0.26	35

Table 4b: Results of the Ultimatum Game (cont'd)

Allocation	All	Women	Men
0.0	9%	4.4%	14.5%
0.1	2.5	1.5	3.7
0.2	4.5	3.7	5.5
0.3	9.0	7.4	11.0
0.4	21.2	27.9	12.8
0.5	46.5	48.5	44.0
0.6	3.3	3.7	2.8
0.7	1.2	1.5	0.9
0.8	0.8	0.0	1.8
0.9	0.0	0.0	0.0
1.0	2.0	1.5	2.8
Observations	245	132	107