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Is It Just Legitimacy of Endowments?
– *An Experimental Analysis of Unilateral Giving* –

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Abstract

Deviations from standard game theoretical predictions have been repeatedly observed in basic Dictator Games. Different interpretations have been provided to these deviations. On the one hand, empirical (among others, Forsythe *et al.*, 1994) and theoretical works (among others, Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999) have adopted the explanation based on other-regarding concerns. On the other hand, potential weaknesses in standard design of the game have been stressed. Evidence collected shows that when controlling for reputation considerations (Hoffman *et al.*, 1996) and for legitimacy of assets (Cherry *et al.*, 2002) behavior observed in the experiments is very close to that predicted by standard game theory. Results from our experiment suggest that the relevance of these two factors in explaining observed behavior may be overestimated by previous contributions. Relevant deviations from selfish equilibrium are registered in a condition of full-anonymity when assets to be shared are earned by the dictators and, simultaneously, recipients are allowed to work without being rewarded for their effort.

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1 Introduction

A large body of experimental economics literature has dealt with simple two-party bargaining situations. Among the most investigated settings there are the Ultimatum Game (Güth *et al.*, 1982) (UG) and the Dictator Game (Kahneman *et al.*, 1986) (DG). Both these games mimic a situation where an agent (the proposer) offers some part of a common amount of money to another agent (the recipient). The difference between the two games is that in the UG the recipient can refuse the offer made by the proposer (and in this case both them lose the money) while in the DG the recipient cannot refuse. In the Ultimatum game the subgame perfect solution is the smallest possible offer submitted by the proposer and acceptance of the offer on the part of the recipient. Similarly, in a Dictator Game, the standard solution is a zero amount sent by the dictator. However, evidence from experimental observations (for a review see, Camerer, 2003) is not in line with the standard rational selfish solution of these simple bargaining games. On average Proposers are willing to offer about 30–40% of their endowment and offers below 20% of the endowment are often rejected. In the Dictator Game Forsythe *et al.* (1994) found that dictators offer about 20% of the resources they control to their partners. When jointly considered evidence from the UG and the DG suggests that behavior in simple bargaining is not only driven by strategic concerns but also by fairness. Other-regarding concerns in the form of fairness are also the key feature of recent models of social preferences (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999). In particular, Bolton and Ockenfels (2000) claim that their model has a comparative advantage with respect to other models of social preferences¹ and when called to explain data from the dictator game which, according to the authors “is basic to an understanding of many other games”.

The work of Hoffman *et al.* (1994) challenges the fairness explanation provided to behavior observed in the Dictator Game. The paper shows that the introduction of full-anonymity in choices (i.e., anonymity towards other players and the experimenter) strongly decreases the amount given in a Dictator Game. From this the authors conclude that “other-regarding preferences may have an overwhelming social, what-do-others-know, component, and therefore should be *derived* formally from more elementary expectational considerations”. From a methodological point of view, the authors strongly suggest a strict adherence to double blind procedures in experiments in order to avoid a loss of control due to concerns for social evaluations. In the same spirit of the paper of Hoffman *et al.* is the work of Cherry *et al.* (2002). Main concern of the authors with previous experimental studies on bargaining is the fact that these works do not address

¹The authors explicitly compare predictions of their model with predictions made by models proposed by Rabin (1993) and Levine (1998).

the issue of wealth legitimacy. Indeed, it is a common practice in experimental games to provide players with windfall money. The authors notice that this practice is very poor in terms of realism and might affect external validity of experimental results. According to the authors “the assets in a bargaining must be legitimate to produce rational behavior”. In order for assets to be legitimate they should be earned through the provision of some effort. In the experiment proposed assets are earned by answering to a questionnaire. What emerges from the dictator game interaction is that other-regarding behavior strongly decreases in the population of Dictators when bargaining takes place over earned wealth and almost disappears when complete anonymity together with legitimacy of wealth is introduced in the experimental design.

A different perspective on the relationship between effort and fairness is presented by Ruffle (1998). In the variation to the standard DG considered the size of the pie to be shared is determined by the performance of the Recipient in a general knowledge and skill-testing contest. What the author finds is that Dictators tend to reward Recipients who performed good but punish only modestly those who performed bad. According to the author this is due to the fact that some Dictators believe that effort should be rewarded even if it leads to a sub-optimal result. The contribution of Eckel and Grossman (1996) is also focused on the “deservingness” of recipients but the characteristics of the counterpart are exogenously defined with respect to the experiment. The authors found that even when double-blind anonymity is enforced the fact that the recipient is a “reputable charity” (i.e., American Red Cross) decreases the number of zero offers and determines an increase in the amount donated on average. On the relationship between characteristics of the counterpart and offers, Ben-Ner *et al.* (2004) register how differences in personality, cognitive ability and gender of the Dictator and the Recipient affect behavior in the game. For what concerns social distance Bohnet and Frey (1999) show that the higher the identification between the two parties in the game the higher the amount offered.

The brief literature review reported above highlights the different approaches undertaken when considering behavior in a simple unilateral giving context. Some authors regard the DG as a tool to investigate on the predictive robustness of game theory, while others prefer to rely on this simple interaction structure to investigate on the role played by factors in some way related to the social environment. Main difference between these two lines of interpretation regards the inclusion/exclusion from the experimental design of any element which could alter observed behaviors because of some social factor. In other words, main concern of those who are mainly interested in validating the forecasting power of standard game theory is to reproduce in the laboratory the ideal pure scheme of choice implicitly assumed by game theory. On the other hand, those who are interested to explore the socio-psychological mechanisms which fuel the observed behaviors have designed

experimental contexts able to take care for socio-psychological mechanisms. The contribution of Cherry *et al.* (2002) simultaneously focuses on the issue of anonymity, which is a major concern for those aiming at replicate a game-theory setting, and concerns of realism about the source of wealth. We undertake the same perspective but try to isolate possible effects induced by asymmetry of effort when providing legitimacy to endowment. Decisions in the experiment take place in a setting of strong anonymity and the experimental design explicitly addresses the impact of alternative representations of the counterpart with whom interacting as involved in a ponderous activity or not (i.e., symmetry of effort). In more details, the recipients may alternatively be involved in the same tiring task the dictator has been involved or may be kept idle. At the best of our knowledge, the relevance of a symmetric starting condition in terms of effort in the experiment has not been explicitly addressed by previous contributions on the Dictator Game. A lack of control about the impact of symmetric effort is likely to lead to a biased assessment of the relevance of assets legitimacy and anonymity in decision making.

2 Experimental Design

2.1 Procedures

The experiment has been based on a treatment-control design. Our control condition replicates the *double blind + earnings* condition as reported by Cherry *et al.* (2002). The factor under examination is *symmetry in effort*. In the baseline condition only the Dictator in each Dictator-Recipient couple works while in the treatment condition both the Dictator and the Recipient are involved in the same ponderous task. Six independent sessions were performed, with three sessions conducted under a baseline condition and three sessions conducted under a treatment condition. Three sessions took place on May, 17th 2006 and the other three on May, 24th 2006. The experiment took place at the Faculty of Economics of the University of Trento, Italy. In each session 35 subjects were recruited, 18 out the 29 subjects were told to gather in front of a room (Room A) while the remaining 17 subjects were told to gather at a different room (Room B). The two rooms are located at different floors and this implies that the two subject pools did not meet before the experiment. A Subject in Room A is identified in the paper as a Subject A while a subject in Room B is identified in the paper as a Subject B. The sample of participants was composed by students of different faculties of the University of Trento, Italy. Two different stages can be identified in the basic experimental setting. Subjects are informed about the second stage of the experiment only after the conclusion of the first stage.

In the first stage, when the treatment implemented requires it, subjects are asked to answer 17 questions taken from the sample section of the Grad-

uate Management Admission Test (GMAT)². Answering to more than 9 questions correctly will lead to an earning of 30 € while answering to less than 10 questions in a correct way will lead to a winning of 8 €³. The quiz is a web-based test and automatic correction has been designed for questions with single answer (i.e., questions from 1 to 10). For questions with a more articulated answering structure on-line correction was performed by some collaborators⁴. In the treatment condition, when both Subjects A and Subjects B are involved in the quiz, a monitor from each Room is randomly chosen. The two monitors move to the other room before the quiz starts and at the end of the quiz return to their original room to report the actual participation of the other group to the task. After this the two monitors receive the show-up and the minimum possible earning in the quiz (i.e., 8 €) and are asked to leave the experiment. The presence of the monitor aims at providing the same credibility reinforcement to the condition of symmetry in effort and to the double-blind condition.

In the second stage a dictator game is played. Before starting the game a supervisor is randomly picked from the pool of subjects in Room A. The remaining 16 subjects are assigned to the role of Dictators while the 16 Subjects sitting in Room B are assigned to the role of Recipient. This implies that for each session 16 choices are registered.

A show-up fee of 4 € is provided to each participant independently from her performance in the quiz stage. The support of the distribution of earnings spans over the range 4-34 €. The average duration of each session was 90 minutes.

2.2 Treatments

The experiment evaluates the impact of *symmetry in effort* on decisions of unilateral giving. In the baseline condition (i.e., Sy.0 in Section 3) only the subjects in Room A take part the quiz. In the treatment condition (i.e., Sy.1 in Section 3) both Subjects in Room A and Subjects in Room B are called to answer to the quiz. In order to provide adequate incentives to exert effort in the first stage of the experiment an envelope revealing the actual type of subjects in the room was open only after all subjects had completed the quiz. When subjects in the room are of type A they play as dictators and thus they receive the earned amount while in the opposite case (i.e., Room B) subjects play as recipients and do not get anything out of their performance in the quiz. Bolton *et al.* (1998) notice that different wording

²The quiz we adopted is an Italian translation of the quiz adopted by Cherry *et al.* (2002) which full text in English can be found in List and Cherry (2000).

³List and Cherry (2000) in a footnote report how different tasks than the quiz in pilot experiments deliver similar results in terms of choices in the dictator game.

⁴the support of Staff at the Computable and Experimental Economics Laboratory (CEEL) of the University of Trento is greatly acknowledged. In particular, Marco Tecilla is acknowledged for writing the software needed to manage the experiment.

employed in the instructions may affect outcome observed in the DG. In particular, they observe that framing the game as a decision to put money in an envelope or as dividing a sum that has been allocated to the couple may lead to different kinds of behavior. To improve control on possible subtle effects due to alternative wording in the instructions one of the baseline conditions was performed employing the standard expression used in standard dictator games (Forsythe *et al.*, 1994)⁵. Instead, in the standard baseline sessions an expression similar to that employed by Cherry *et al.* (2002) in their earnings + double blind condition is adopted⁶. The two sentences are characterized by a different meaning in terms of nominal entitlement of wealth that has to be split by the Dictator.

All the sessions were conducted under a strong anonymity condition following the *Double Blind 1* experimental procedure as reported by Hoffman *et al.* (1996)⁷. Given that the smallest banknote in the Euro zone amounts to 5 € we had to rely on 1 € coins to endow decision makers with enough degrees of freedom in the space of choices. To allocate endowments and collect decisions in an anonymous way instead of relying on envelopes we employed small film roll case (from here called also coin-cases). To contain 30 pieces of 1 € coins two cases were bounded using some tape. A relevant feature of these cases is that they are uniform and opaque. Thus, it is not possible to observe the content of a case from outside. In the baseline condition the following procedure has been followed in the second stage of the experiment. At a first stage one of the participants is randomly selected as the monitor and asked to certify the regularity of the procedures implemented. After this, subjects who earned 30 € are going to receive a case with 30 coins inside. Those who earned 8 € are going to receive a case with 8 pieces of 1 € coins inside. A white tape identifies cases containing 30 € while a black tape identifies cases containing 8 €. One of the subjects from the 30 € pool and one of the subjects from the 8 € sample are going to receive a case containing a worthless object. This will assure full anonymity also in the eventuality that all the dictators contemporaneously choose a corner solution for their decision task (i.e., either all choose to offer zero or the total endowment). Subjects are left 3 minutes to decide what kind of action undertake. Subjects are then asked to move behind a large cardboard box which assures their privacy. When behind the box they are allowed to remove from the case and store in their pockets the coins they are going to keep for themselves. After this operation has been performed the participants move towards the exit and deposit the case inside a box. The box has

⁵“The amount earned by Player A has been provisionally allocated to each pair. Player A can propose how much of this each person is going to receive”.

⁶“Subject A is going to decide how much of her earnings she is going to receive and how much of her earnings Player B is going to receive”.

⁷For details on the procedure followed in the baseline condition see enclosed instructions.

only a small hole on its top and thus does not allow to detect the position of the coins case from outside. Once all the dictators have performed this operation the experimenter and the monitor bring the box containing the coin cases to the room where subjects B are waiting. Boxes are randomly distributed on a table. Subjects B are asked in turn to select one of the coin boxes without touching it. The case selected is then opened by the monitor and the content is registered by the experimenter on a sheet of paper. The same operation is repeated for each participant. The same information is provided to each participant, independently from her type.

3 Results

3.1 Descriptive Statistics

On Table 1 descriptive measures⁸ of behavior observed under different conditions in the experiment are reported.

Table 1 about here

Data collected in the baseline condition were pooled irrespectively of the different wording employed (see section 2.2 for details). Indeed, no significant difference between the observations in correspondence to the two conditions was registered either relying on parametric and non-parametric tests⁹. With reference to Table 1¹⁰ what can be noticed is a tendency, evidenced both by the mean and the median of the distribution, to offer more in the treatment condition than in the baseline condition has been registered. This is true both for subjects who obtained high earnings in the quiz stage and for subjects who earned just 8 €. In the high earnings regime subjects give on average 3.5% of their endowment in the baseline condition and 11.4% in the treatment condition. In the low earnings condition subjects offer on average 5.1% of their endowment in the baseline and 17.9% in the treatment condition. The median value of the baseline distribution is 0 both for high and low stakes while the median of the treatment condition is higher in the high earnings regime (3 € vs. 1 €). The standard deviation in the high earnings condition is higher than that in the low earnings. This is partly due to the boundary imposed on choices by the two different budget constraints associated to the two earnings conditions. A measure of Recipient's beliefs

⁸Statistical analysis of experimental outcomes was performed relying on the system for statistical computation and graphics R (R Development Core Team, 2005)

⁹Wilcoxon rank sum test, p-value = 0.734; t-test, p-value = 0.898

¹⁰In the baseline condition (i.e., asymmetry in effort or, in more compact terms, Sy.0) 41 observations are available while in the treatment condition 42 observations are registered in the dataset. The difference is due to a problem in the software managing the quiz session. This lead to the missing observation in the second stage (i.e., Dictator Game)

is obtained by ranking choices of the recipients and considering the relationship between ranking and color of the case. If Recipients believed that those who receive more (i.e., white cases) would give more they should firstly choose all the white cases and then move to the black cases. Parametric and non-parametric tests¹¹ confirm that on average white cases are chosen earlier than black cases. As confirmed by descriptive statistics reported in Table 1 and by parametric and non-parametric tests¹² beliefs of the Recipients are correct on average as players in the high earnings condition tend to give more than the others.

3.2 Distribution Analysis

Figure 1 depicts the empirical cumulative distribution function (ECDF) of offers under different treatment conditions and earning conditions.

Figure 1 about here

The figure highlights how the baseline condition is statistically dominated by the treatment condition, both in the high stakes regime and in the low stakes regime. Focusing on offers in line with standard economic benchmark (i.e., offers equal to 0) it can be observed from Figure 1 that 47.83% of those who earned 8 € gave nothing in the treatment condition and 63.64 % gave nothing in the baseline condition. With reference to the high stakes condition, observations in the baseline are quite similar to those in the low stakes setting (i.e., 52.63% gives nothing) while only 21.05% of those who earned 30 € offers nothing to the partner in the treatment condition¹³.

Table 2 reports the number of offers equal to 0 and different than zero, irrespectively of the earning condition, in the baseline and in the treatment condition.

Table 2 about here

The ratio between zero and non-zero offers is equal to 1.412 in the baseline condition and equal to 0.555 in the treatment condition. A Fisher-exact test provides support to the statistical significance of the difference between the two ratios ($p - value = 0.049$)¹⁴.

¹¹The average ranking for white cases is 7.136 while for black cases is 9.529. Concerning the statistic difference between the two distributions: Wilcoxon rank sum test, p-value = 0.011; t-test, p-value = 0.009

¹²Wilcoxon rank sum test, p-value = 0.037; t-test, p-value = 0.015

¹³It is interesting to notice, in qualitative terms, that zero offers in our baseline are higher than those reported by Forsythe *et al.* (1994) and by Hoffman *et al.* (1996) in the Double Blind 1 treatment, with both contributions not entailing asset legitimacy, but considerably lower than those collected in the double-blind with asset-legitimacy treatment of Cherry *et al.* (2002).

¹⁴It must be noticed that when the two earning conditions are separately considered the same test does not provide evidence of difference in the low stakes situation and only low support to the difference ($p - value = 0.091$) when high stakes are considered

The bimodal distribution of zero and non-zero offers provides only a partial representation of behavior in the interaction strategy considered. When focusing on the actual distribution of offers in the interaction setting, parametric (i.e., t-test) and non-parametric (i.e., Mann-Whitney test) tests of the hypothesis that, on average, offers in Sy.1 are greater than offers in Sy.0 provide support to the hypothesis that a statistically significant difference between the two distributions of choices is registered¹⁵.

4 Conclusions

Evidence collected in the experiment suggests that symmetry in effort positively affects choices in the Dictator Game. Higher offers are registered when both the dictator and the recipients in a couple are involved in the same task than when only the dictator works. Such an effect is registered even if a full-anonymity condition is employed across all sessions. This result, while interesting *per sé* deserves a brief discussion in the perspective of previous contributions. In their work on the relation between asset legitimacy and other-regarding behavior, Cherry *et al.* (2002) notice that “Asset origin combined with isolation closed a long-standing gap between standard game theory and observation. When assets are legitimized with effort and strategic concerns are controlled with isolation, altruism was the exception and self-interest was the rule”[p. 1221]. The evidence collected in our experiment questions the validity of this strong statement and highlights a lack of control in the experimental setting presented by Cherry *et al.*. Asset legitimacy may play an important role in unilateral giving but its impact may be overestimated by an experimental design which does not account for another very relevant issue implicitly embodied in the standard DG which is the “social reference point” assumed by the dictators as a benchmark for evaluating the degree of fairness of their decisions. The gap Cherry *et al.* refer to may have been closed not only by control on strategic concerns and legitimacy of assets but also by the asymmetry in effort performed by participants in their experiment. Dictators in the Cherry *et al.*’s setting knew that their recipients “had not the opportunity to earn money” and therefore they knew that the recipients did not do anything else than gathering in a room to wait for anonymous offers. As the introduction has highlighted, different social factors are likely to affect offers in the DG. Different characterizations of the interaction and of the counterpart seem to intervene in the definition of the dictators’ relative social position. In the Cherry *et al.*’s setting the social reference point suggested as a benchmark for the dictators

¹⁵t-test, p-value=0.001 ; Mann-Whitney test, p-value=0.001. The differences are statistically significant also when the same hypothesis is separately tested on observations from the low earnings condition (t-test, p-value=0.005 ; Mann-Whitney test, p-value=0.006) and on observations from the high earnings condition (t-test, p-value= 0.012; Mann-Whitney test, p-value=0.035)

to evaluate the degree of fairness of their choices is the effort variable: a dictator worked and thus earned while the counterpart did not work and thus did not earn. It follows that in this perspective legitimacy is twofold: assets are legitimate because they are supported by effort provision but, at the same time, self-oriented behavior is legitimate by asymmetry in effort. It is worth noticing that the impact of asymmetry in the status of the two players in a DG has been already evidenced by Hoffman *et al.* (1994). When the role and the pairing in the DG is defined according to a ranking based on some skill measure, the dictators, who are higher in the ranking than the recipients, tend to offer a lower amount than in a random assignment setting.

Concerning the relevance of pseudo-reputation effects in simple bargaining situations it should be noticed that in our experiment all the sessions were performed under a full anonymity condition which mimics the one introduced by Hoffman *et al.* (1994). Observing results from their experiment the authors conclude that deviations from standard predictions are mainly to be searched in a lack of control about social concerns. The increase in offers registered in our treatment condition can hardly be reconciled with a conclusion of this kind. What emerges from our experiment is that Double-blind procedures may provide an important control in laboratory settings but that the source of deviations from standard predictions cannot exclusively be found in some sort of reputation effect. Finally, it is worth underlining that the offers registered in our baseline condition are much lower than those observed in the homologous treatment of Cherry *et al.* (2002). The difference between the two set of observations deserves further attention to assess the impact of experimental procedures and participant pool.

To summarize it can be noticed that, as already pointed out by previous contributions, effort of the counterpart matters when defining what she deserves in a setting like the Dictator Game. In general, evidence here presented suggests that characteristics of the recipient are relevant when interpreting outcomes from simple bargaining situations and that this aspect deserves further attention, both in a positive and in a normative perspective.

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A Figures and Tables

Table 1: Descriptive measures

Earnings	<i>N</i>		Mean		Median		Std dev	
	Sy.0	Sy.1	Sy.0	Sy.1	Sy.0	Sy.1	Sy.0	Sy.1
High	19.000	19.000	1.053	3.421	0.000	3.000	1.715	3.339
Low	22.000	23.000	0.409	1.435	0.000	1.000	0.590	1.973

Table 2: Count of Zero/Non Zero Offers per Treatment

	Sy.0	Sy.1
Zero	24	15
Non Zero	17	27

B Instructions (Translation from Italian)

In this experiment you are going to be matched with another person. Within the couple you will be identified as Subject ... and the other person is identified as Subject The fact that you are a Subject A or a Subject B is randomly defined.

Neither during the experiment nor after the experiment you will know the identity of the person you are matched with. The same applies for the person you are matched with. Moreover, it will not be possible to associate your choices in the experiment with your identity.

In the room there are other participants to the experiment. Nobody of them will be paired with you. Their choices will have no impact on your situation and your choices will not affect their situation.

The experiment is structured as follows:

- One individual among participants of type A has been randomly chosen as Monitor. The Monitor will supervise procedures in the experiment and will follow instructions provided by the Experimenter. The Experimenter will supervise the experimental procedures that will be conducted by the Monitor.
- Player A has alternatively earned 8 € or 30 € according to her performance in the previous session
- * (Sy.0) Player B has not had the opportunity to earn any money
- * (Sy.1) Player B has performed the same task Player B was involved in. The attribution to role A or role B is purely random. Players B to whom the choices of Players A refer did not receive any reward for their effort.
- The Monitor will distribute some cases to the participants. Those who earned 30 € will receive a white case. Those who earned 8 € will receive a black case. No other label is attached to the case. One of the Players who earned 8 € and one of the Players who earned 30 € is going to randomly receive a case containing a worthless object.
- * (Sy.0) Subject A is going to decide how much of her earnings she is going to receive and how much of her earnings Player B is going to receive
- * (Sy.0.bis) The amount earned by Player A has been provisionally allocated to each pair. Player A can propose how much of this each person is going to receive

- Participants will have 3 minutes to decide. After this, the Monitor will call each subject in turn to move behind a large cardboard box. Here Players have to remove from the case they received the amount they want to keep for themselves and leave in the case the amount Player B is going to receive
- Player A will close the case and will move towards the exit. The cases must be open only once behind the box and must be closed carefully when leaving the box. Players A who will receive the worthless and publicly reveal the content of the case will not receive the participation fee
- Player A will autonomously the case in a box near the exit and, after having received the participation fee, will leave the room. The position of the case in the box will not be observable by people in the room. Players who received the worthless object must follow the same procedure
- The same procedure is repeated for each Player A in the room
- The Monitor takes the box and, together with the Experimenter, brings it to Room B
- The Monitor calls a Player B. She has to choose, without touching it, one of the cases on the desk.
- The Monitor opens the case and the content is registered by the Experimenter on a form. The content of the case is given to Player B
- The same procedure is repeated for each Player B in the room
- The Monitor receives her reward and the experiment ends

A bell will ring at the end of the 3 minutes you are left to choose. It is not allowed to speak with the other participants during the experiment.

Are there any questions?