

Asset Legitimacy and Distributive Justice in the Dictator Game: An Experimental Analysis

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ABSTRACT

Distributive justice seems to guide behavior in reward allocation tasks in which subjects in a group jointly produce an endowment that is then allocated by a member of the group. It has been shown that allocators aim to preserve the proportionality between inputs (e.g., effort) and outputs (e.g., monetary rewards) of those in the group, even when this comes at a cost to themselves. We experimentally investigated whether justice considerations of this kind play a role in a double-blind dictator game when the assets to be allocated are generated exclusively through the effort of the decision maker. The experiment shows that distributive justice is an important source of motivation in highly demanding social environments in which reputational concerns and reciprocity are absent. This finding has been corroborated by an independent validity check and may have important implications for previous experimental findings and for the economics of charity. Copyright © 2010 John Wiley & Sons, Ltd.

KEY WORDS dictator game; asset legitimacy; other-regarding concerns; experiments

INTRODUCTION

The selfish maximization assumption of the standard economic paradigm has increasingly been challenged by experimental evidence. In particular, two simple bargaining games—the dictator game (Kahneman, Knetsch, & Thaler, 1986) and the ultimatum game (Güth, Schmittberger, & Schwarze, 1982)—have been extensively investigated. Experimental studies have explored alternative implementations of the games and non-conventional samples of participants (e.g., Henrich et al., 2005). Overall, systematic deviations from standard maximization of self-interest have been demonstrated in these games (for a review, see Camerer, 2003). Formal attempts to organize these deviations into a coherent framework have been proposed, and they are increasingly receiving attention in economics (e.g., Fehr & Schmidt, 1999).

The psychological literature has accumulated extensive evidence about the allocation of rewards among interacting subjects. The original paradigm for the experimental investigation of reward allocation can be found in Leventhal and Michaels (1969). Typically, a pair of individuals is asked to perform a task and they are rewarded based upon their performance. The reward is then divided by one of the two. Mikula (1974)

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showed that participants who were led to believe that they performed better than their partners tended to split rewards equally, while those believing that they have performed worse were more likely to divide rewards in proportion to inputs.

Miller and Komorita (1995) manipulated the functional relation between individual and group performance. They found that when the performance of a single member is critical for the success of the group, a disproportionate share of the group reward is given to the best performer, and equity is violated. This does not happen when the success of the group depends on the performance of all members. Konow (2000) employed a reward allocation task to assess the role of self-deception in the regulation of cognitive dissonance emerging from the contrast between the ideals of selfishness and fairness. He considered several experimental specifications and identified the existence of self-serving biases stemming from the conflict between self-oriented and other-oriented preferences.

Existing evidence suggests that the process generating rewards affects allocation choices. Consequently, it is important to assess the differences between our task and the prototypical reward allocation task. Methodologically, our study utilizes truthful information and monetary incentives. In terms of rewards, our task entails no interaction in the generation of the bargained-over assets: The reward to be allocated within the pair is determined solely by the effort of the individual allocating it and not through joint effort. In addition, the actual effort of the partner is never observed and can only be anticipated in terms of expectations. Our experiment should be considered a variation of the dictator game rather than as a reward allocation task. The dictators earn the endowment through cognitive effort and then divide the endowments between the partners. This lack of strategic uncertainty clarifies the relationship between intentions, actions, and payoff consequences.

In a recent investigation of distributive justice, Cappelen, Hole, Sørensen, and Tungodden (2007) noted the existence of a plurality of fairness ideals in a population of subjects playing a modified dictator game. In his seminal conceptualization of distributive justice,¹ Homans formulated the following principle: “A man in an exchange relation with another will expect that the rewards of each man be proportional to his costs—the greater the rewards, the greater the costs” (Homans, 1961, p.75). This principle suggests that distributive justice entails a proportional relation among inputs and outputs of all the individuals involved. Equity theory (Adams, 1963) predicts that subjects in an interaction will jointly aim to resolve any cost/reward imbalance among them. This general prediction provides the operational research hypothesis for our inquiry.

Researchers have examined the role of justice in simple bargaining settings. Ruffle (1998), for example, administered a general knowledge and skill-testing questionnaire to participants in a dictator game and found that recipient performance determines the size of the endowment that the dictator splits with the recipient. Ruffle concludes that dictators reward recipients who perform well and only moderately penalize recipients who perform poorly. Oxoby and Spraggon (2008) investigated the nature of “property rights” created by voluntary effort of the recipients and to what extent these rights are respected by dictators in the game. They argue that the property rights created by the recipient through effort exertion explain the proportionality between the performance by the recipient and the amount received from the dictator. More generally, studies by Eckel and Grossman (1996) and Brañas-Garza (2006) have demonstrated the importance of the representation of the counterpart by showing that increased deservedness of the counterpart improves offers in the dictator game.

Formal models of preferences characterized by equity concerns have been built by Bolton and Ockenfels (2000) and Fehr and Schmidt (1999). A common methodological trait of these models is the extension of the utility function of the agents to take into account other-regarding concerns. These models refer to social preferences to explain deviations from standard economic predictions in settings such as the dictator and ultimatum games. Other contributions have taken a more critical approach to anomalies observed in the laboratory. Hoffman, McCabe, Shachat, and Smith (1994) warn against potential misinterpretations of experimental results due to a lack of experimental controls in the laboratory. They show that the introduction

¹For a critical review of this concept, see Konow (2003).

of complete anonymity (i.e., anonymity towards the other players and the experimenter) in the ultimatum and the dictator games reduces the number of non-selfish choices. They conclude that deviations from the standard selfish predictions observed in weak anonymity conditions should not be interpreted as the revelation of other-regarding preferences, but rather as a strategic signal sent to the social environment in which a subject operates, consequently, these deviations have an inherent “expectational” nature.

Cherry, Frykblom, and Shogren (2002) investigated potential distortions in experimental bargaining games due to a lack of legitimacy of the assets in the bargaining. They argue that the common practice of providing players with windfall money lacks realism and may lead to bias in the interpretation of experimental results. They maintain that “assets in a bargain must be legitimate to produce rational behavior” (p. 1218) and this legitimacy should be earned through the provision of some kind of effort (e.g., answering a quiz). Cherry et al. (2002) show that when dictators earn their endowment, the share of wealth assigned to the recipients becomes almost negligible. Moreover, self-oriented behavior becomes absolutely predominant when both full anonymity and asset legitimacy are introduced into the experiment.

We investigated whether behavior in the dictator game is affected by the proportionality between, on the one hand, inputs (i.e., cognitive effort) and outputs (i.e., monetary rewards) of the dictator, and, on the other, inputs and outputs of the recipient. Following Cherry et al. (2002), we used experimental controls such as double-blind anonymity and asset legitimacy but manipulate the effort of the recipient. In the asset legitimacy procedure employed by Cherry et al. (2002), only dictators exerted some cognitive effort, while recipients were kept idle. Moreover, the dictator was aware of the asymmetry in effort when sharing the earned endowment. By contrast, in our procedure both the dictators and the recipients were asked to exert effort by answering a quiz, and participants were informed that only the dictators in the game would receive a reward for their effort. To provide both roles with the same incentives, the participants’ actual roles in the game were disclosed only after the quiz was completed.

Our study sheds light on the interaction between feelings of justice and other-regarding concerns. Casual empiricism suggests that solidarity towards a subject is more likely to emerge in situations in which the rewards of this subject are less than proportional to the effort exerted. Furthermore, other-regarding behavior seems to be fostered by the consideration that the absence of rewards is a consequence of events not under a subject’s own control.

A better understanding of the consequences of a disproportion between inputs and outputs of subjects in an interaction has important methodological implications. Indeed, inducing asset legitimacy by asking only one subject in a group to work alters the proportionality between inputs and outputs of interacting subjects. Consequently, in situations of this kind and without any further controls, it is impossible to disentangle the effects of asset legitimacy from those originating in equity concerns.

The evidence collected here clearly shows that a disproportion between effort and rewards in a pair of interacting participants impacts decisions in the dictator game. Substantial transfers are registered when both participants are independently involved in a cognitive task and only the dictator is rewarded for it. In contrast, low amounts are transferred when only the dictator performs the task and is rewarded for the effort exerted. An independent validity check provides further evidence of the existence of justice considerations in an interaction setting in which reputational concerns and reciprocity are absent and decisions involve non-windfall wealth.

EXPERIMENTAL DESIGN

Participants and procedures

During the experiment, six independent experimental sessions were run: three in the baseline condition and three in the treatment condition. The experiment took place at the Faculty of Economics, University of Trento, Italy. A total of 204 undergraduate students from various disciplines participated in the experiment. During the recruiting phase, participants were randomly allocated to Room A and Room B. The two rooms were located on

different floors in the same building. This guaranteed that the two subject pools did not meet before the experiment. Hereafter, a subject in Room A is called Subject A, while a subject in Room B is called Subject B.

The experiment is composed of two distinct stages: the quiz and the dictator game. Subjects were informed of the second stage only after the conclusion of the first stage. A show-up fee of €4 was paid to each participant, independently of their performance in the experiment. Each session lasted for about 90 min.

Stages and treatments

In the first stage, participants were asked to answer 17 questions taken from a sample Graduate Management Admission Test (GMAT).² The quiz was computer-based, and an automatic correction algorithm for the multiple-choice questions was employed. For the open-ended questions, real-time correction was conducted by collaborators isolated from the participants. Answers to the quiz were sent to the collaborators through a computer network, and participants never interacted with those correcting the quiz.

There were two between-subject experimental conditions: baseline (*AsymmEff*) and treatment (*SymmEff*). The conditions differed in the symmetry of effort exerted by Subjects A and Subjects B. In the *AsymmEff* condition, only Subjects A took the quiz and were informed that Subjects B were not given the quiz. Subjects A who answered correctly at least 10 questions earned €30, while those that answered less than 10 questions earned €8. In the *SymmEff* condition, all participants were simultaneously given the quiz. However, only those assigned as Subjects A were informed about their results in the quiz and received their earnings. Subjects A and Subjects B received the same written instructions.³ In both experimental conditions, participants were randomly allocated to the rooms. In the *SymmEff* condition, participants were told whether they were Subjects A or Subjects B at the end of the first stage. Each room contained an envelope indicating whether the room was A or B. After the quiz was completed, the envelope was opened in front of the participants. This procedure was designed to provide the same incentives to all participants during the first stage. In addition, before the quiz a “witness” from each of the two rooms was randomly chosen among the participants and asked to move to the other room. At the end of the quiz, the witnesses were asked to return to their original rooms to report the actual involvement of the other group in the task. After having received the show-up fee and a payment of €8, the two witnesses were dismissed from the experiment.

In the second stage, a dictator game was played with Subjects A assigned the role of dictators and Subjects B assigned the role of recipient. One of the Subjects A was randomly selected as monitor and assisted the experimenter, including certifying the procedures followed. At the end of the experiment, the monitors received their actual earnings from the first stage.

In each session, the 16 Subjects A had to decide how much of their earnings to share with a Subject B. All the decisions in the dictator game were collected following as closely as possible the *Double Blind 1* experimental procedure reported by Hoffman, McCabe, and Smith (1996). The endowment of the participants was divided into €1 coins and deposited into small coin-cases.⁴ To express their choices, dictators had to move behind a large cardboard box and remove from their coin-case the number of coins they wanted to keep for themselves. Subsequently, coin-cases were deposited into a box by the dictator who was then free to leave the room and the experiment.⁵ After all the dictators had made their choices, the coin-cases were carried into Room B and each participant in this room was asked to choose a coin-case and keep its content.

²Participants were given an Italian translation of the quiz adopted by Cherry et al. (2002), which can be found in its original version in List and Cherry (2000).

³See Appendix for a translated version of the instructions.

⁴Two coin-cases were bound together with some tape so as to contain the maximum earning of 30 coins. A relevant feature of the cases is that they were uniform and opaque, so that it is impossible to observe the content of the case from the outside. For organizational reasons, white tape identified cases containing €30 and black tape identified cases containing €8.

⁵As in the original *Double Blind 1* procedure, two cases containing a worthless object (i.e., one for each level of endowment) were present in the second stage of the experiment to avoid the disclosure of individual choices in case of single-valued distributions of choices.

Bolton, Katok, and Zwick (1998) observed that different wordings of the instructions may affect behavior in the dictator game. Specifically, they claimed that framing the game as a decision to put money into an envelope or, alternatively, as dividing a sum that has been allocated to the pair of players may produce distinct behavioral patterns. To improve the control on potential subtle effects due to alternative wordings of the instructions, one of the baseline conditions (*AsymmEff.bis*) employed the standard formulation used in dictator games (Forsythe, Horowitz, Savin & Sefton, 1994).⁶ In the standard baseline and treatment conditions, however, a formulation similar to that employed by Cherry et al. (2002) in their *Earnings + Double Blind* (EDB) condition was adopted.⁷ The main difference between the two wordings of the instructions was in the nominal entitlement of wealth allocated to the dictator.

BEHAVIORAL PREDICTIONS

The concepts of distributive justice and asset legitimacy provide alternative predictions about behavior in the game. Without sticking to a specific value function, it can be assumed that the well being of each player in the game increases as the player's own monetary payoff increases and decreases as the player's own effort increases. For players characterized by distributive justice concerns, the higher the difference between their own well being and the well-being of the other, the higher the sense of inequity experienced in the game.

Our experimental design implies inequity to be always greater in the *SymmEff* condition than in the *AsymmEff* condition. This is due to the fact that in the former condition the expected effort of the recipient is always positive. In contrast, in the latter condition the effort of the recipient is always nil. Given that the effort dimension cannot be manipulated in the dictator game, dictators can decrease their inequity-related psychological cost only by transferring part of their endowment to the counterpart. Thus, under the assumption of distributive justice concerns, higher transfers will be registered in the *SymmEff* condition than in the *AsymmEff* condition.

Unlike distributive justice, asset legitimacy does not imply inter-personal comparisons and may affect behavior only through the value attached to participant's own endowment. In both experimental conditions, bargaining assets are legitimized by the provision of cognitive effort. Thus, mere concern for the legitimacy of the endowment should not result in different behavioral patterns in the two experimental conditions.

It should be underlined that these behavioral predictions do not rest upon the disclosure of the actual performance of the counterpart. This approach presents some advantages in terms of potential confoundings in the experiment. Indeed, when assessing the impact of effort on a task, the observed performance can be taken as a direct proxy of relative exerted effort only as long as skills are homogeneously distributed in the population. When this is not the case, the relationship between effort and performance must be further specified. In addition, disclosing the actual performance of the counterpart would have made it more difficult to satisfy the complete anonymity procedure required by the experiment.

RESULTS

In the first stage, 44 out of 95 dictators were high earners from the quiz. Table 1 provides descriptive measures of dictator choices for high and low earners across the experimental conditions.⁸ In this table, data collected

⁶The wording (translated from Italian) was "The amount earned by Subject A has been provisionally allocated to each pair. Subject A can propose how much of this each person is going to receive."

⁷The wording (translated from Italian) was "Subject A is going to decide how much of her/his earnings she/he is going to receive and how much of her/his earnings Subject B is going to receive."

⁸An observation is missing in the *AsymmEff* condition because of a malfunction in the software managing the quiz stage. Given the presence of the two worthless coin-cases in each session, 14 independent dictator choices were collected from the 16 dictators in each session.

Table 1. Descriptive measures of dictators' offers

| | Low earners (€8) | | High earners (€30) | |
|----------|------------------|---------|--------------------|---------|
| | AsymmEff | SymmEff | AsymmEff | SymmEff |
| N | 22 | 23 | 19 | 19 |
| Mean | 0.409 | 1.435 | 1.053 | 3.421 |
| Med | 0.000 | 1.000 | 0.000 | 3.000 |
| Std.Dev. | 0.590 | 1.973 | 1.715 | 3.339 |

in the baseline conditions *AsymmEff* and *AsymmEff.bis* are pooled under the label *AsymmEff* since the two distributions do not statistically differ according to a two-sided Wilcoxon Rank Sum Test (WRST) (high earners, p -value = .585; low earners, p -value = .965). Thus, the use of alternative wordings had no impact on the choices of the participants.

Mean and median values of the distribution of choices show that the dictators offered more to the recipients in the *SymmEff* condition than in the *AsymmEff* condition. This result holds both for high earners and low earners. High earners gave on average 3.5% of their endowment in the *AsymmEff* condition, and 11.4% in the *SymmEff* condition. Low earners gave on average 5.1% of their endowment in the *AsymmEff* condition and 17.9% in the *SymmEff* condition.

Figure 1 depicts the empirical cumulative distribution function of offers in the two experimental conditions for high and low earnings. The cumulative distribution of choices in the *AsymmEff* condition is stochastically dominated by the cumulative distribution of choices in the *SymmEff* condition for both high and low earners. At a more detailed level, 47.8% of low earners gave nothing in the *SymmEff* condition and 63.6% gave nothing in the *AsymmEff* condition; 52.6% of high earners gave nothing in the *AsymmEff* condition, while only 21.1% gave nothing in the *SymmEff* condition.

Non-parametric tests provide strong support to the hypothesis that offers in the *SymmEff* condition are greater than offers in the *AsymmEff* condition both for low earners (WRST, one-sided, p -value = .035) and for high earners (WRST, one-sided, p -value = .006). Moreover, when pooling data irrespective of the earnings, the difference between the two experimental conditions becomes even sharper (WRST, one-sided, p -value = .001).

The estimation of a Tobit regression model with robust standard errors is reported in Table 2. The dependent variable is the ratio of wealth transferred to the recipient.⁹ The independent variables are a dummy for symmetry in effort, a dummy for high earnings, and an interaction term of the two dummy variables. As can be seen in Table 2, symmetry in effort has a positive and significant impact on the ratio of wealth transferred to the recipient. The other explanatory variables have no significant impact on the dependent variable. Thus, the regression analysis confirms the positive influence of symmetry in effort on offers in the game.

VALIDITY CHECK

In the *SymmEff* condition, the actual payment of the reward earned in the first stage is conditional upon a chance event (i.e., random assignment to condition A or B). This might weaken the sense of legitimacy

⁹The transformation was performed to avoid complications from differing upper limits in the distributions of offers in the two earnings conditions. After the transformation, the upper limit of the distribution of choices is equal to 1 and the lower limit is equal to 0 for both earnings conditions.

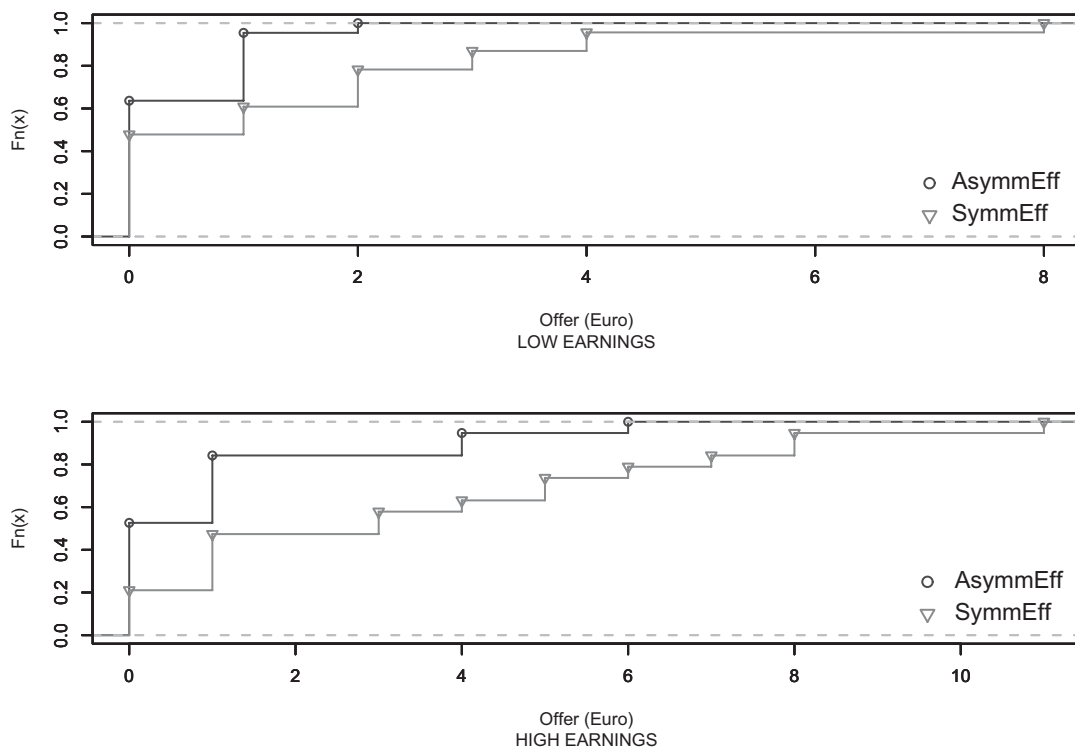


Figure 1. Cumulative distribution of dictators' offers

attached to earned assets because of the intervention of chance in the wealth acquisition process. Consequently, dictators may feel less “attached” to the earned amounts and transfer a larger proportion to the recipients. To control for this potential source of bias, we ran an independent validity check.¹⁰

Procedures

Participants in the validity check were exposed either to a control ($N=20$) or to a treatment condition ($N=20$). In both conditions, the dictators exerted a cognitive effort by answering 10 questions from the same

Table 2. Dictators' offers (ratio of wealth)—Tobit regression model (ll[0], ul[1], robust error estimation)

| Contribution | Coeff (Std. Err.) |
|----------------|----------------------|
| SymmEff | 0.201 (0.099)** |
| High earnings | 0.012 (0.071) |
| SE \times HE | −0.040 (0.108) |
| Obs | 83 (ll = 39; ul = 1) |

***(1%); **(5%); *(10%) significance level.

¹⁰We thank an anonymous referee for this suggestion.

quiz employed in the main experiment. Then, a potential reward was generated according to their performance: €12 for those correctly answering six or more questions and €3 for those correctly answering less. Importantly, the actual payment of the reward was experimentally manipulated: In the control condition the payment was dispensed with certainty (*sure payment*), while in the treatment condition it was dispensed with 50% probability (*probabilistic payment*). In both conditions, those receiving the reward had to decide how much of it to transfer to a recipient who did not exert any cognitive effort in the experiment. The choice had to be expressed before knowing the actual size of the reward for both earnings levels (i.e., strategy method). Finally, only the choice made in correspondence with the actual earnings was implemented.

The behavior observed in the validity check served as a guideline in the interpretation of choices collected in the main experiment. If higher transfers occurred in the probabilistic payment condition than in the sure payment condition, then higher transfers in *SymmEff* than in *AsymmEff* could be unambiguously attributed to justice considerations. In contrast, the absence of differences between the two conditions of the validity check would corroborate our interpretation of higher transfers in *SymmEff* as due to justice considerations.

From a methodological point of view, the original experiment and the validity check differed in several respects: anonymity level (complete vs. partial), financial stakes (higher in the main experiment), cognitive effort (higher in the main experiment), and method employed to collect dictators' choices (play vs. strategy method). However, it must be stressed that the aim of the check was not to replicate the original setting but to control for potential effects associated to a chance move in the definition of actual earnings.¹¹

Results

For low earnings, the average (median) offer relative to the endowment was 18.3% (0%) in the sure earnings condition ($N = 20$) and 10.0% (0%) in the probabilistic earnings condition ($N = 20$). For high earnings, the average (median) offer relative to the endowment was 16.7% (8.3%) in the sure earnings condition and 10.0% (4.2%) in the probabilistic earnings condition. These descriptive statistics show that central tendencies of the distributions of offers are slightly higher in the sure earnings condition than in the probabilistic earnings condition. However, non-parametric tests do not identify any significant difference between the two conditions, for high earnings (WRST, p -value = .565) or for low earnings (WRST, p -value = .543).

DISCUSSION AND CONCLUSIONS

Reputational concerns and legitimacy of the endowment seem to play a crucial role in laboratory bargaining interactions. Hoffman, McCabe, Shachat, and Smith (1994) demonstrated that employing a double-blind procedure dramatically reduces deviations from standard economic predictions in bargaining games. Cherry et al. (2002) showed that when the bargained-over endowment is earned through the provision of cognitive effort, non-selfish behavior vanishes. Both these contributions point to the importance of accurate control practices when investigating behavior in the laboratory. We employed the experimental design proposed by Cherry et al. (2002) to study behavior in a modified dictator game and, thus, control both for reputational spillovers and asset legitimacy. Importantly, we also controlled for the proportionality between effort and rewards of subjects in the interaction. According to equity theory (Homans, 1961), this dimension plays an important role in a dictator game with earned wealth.

In qualitative terms, more zero offers are registered in our baseline treatment than in Forsythe, Horowitz, Savin, and Sefton (1994) and in the Hoffman et al. (1996)'s Double Blind 1 treatment. This finding seems to

¹¹A detailed description of the validity check is available from the authors.

confirm that asset legitimacy and anonymity lead to a reduction of other-regarding choices in the dictator game. At the same time, it must be noticed that the number of nil offers is considerably lower in our baseline condition than in the analogous Cherry et al.'s DBE treatment. Thus, baseline other-regarding concerns seem to be higher overall in our sample than in that of Cherry et al. (2002).

The behavior observed in the experiment conforms to the predictions of equity theory. Dictators donated more to recipients who worked without receiving any reward than to recipients who did not receive any reward but had no opportunity to work. Unlike previous studies (e.g., Leventhal & Michaels, 1969), the justice considerations investigated here do not originate from spillovers in the production of the bargained-over assets. In other terms, the assets that were allocated are defined only by the effort of the allocator and not by a joint effort of the two parties in the interaction. Despite this, allocators pursued fairness by "sacrificing" assets they earned with their effort. Our work contributes to the existing literature by showing that justice considerations may emerge even in highly demanding environments characterized by strong anonymity and asset legitimacy.

Our findings may have implications for the economics of charity and for the design of fund-raising policies (Landry, Lange, List, Price, & Krupp, 2006). As an example, stressing the fact that a recipient's condition of need originates from an exogenously imposed constraint (e.g., natural disaster or illness) may raise donations even when reputational and signaling mechanisms are inhibited. Moreover, stressing the fact that an individual is exerting some effort to exit a situation of need is likely to foster solidarity.

Although they both extend the experimental design of Cherry et al. (2002), our study differs from Oxoby & Spraggon (2008) in terms of research questions and interaction settings. In our experiment, the recipients do not have any property rights to the bargained-over assets that were legitimated by the dictator's effort. These differences in the interaction setting imply that reciprocity-based strategic considerations (Rabin, 1993) may play a relevant role in Oxoby and Spraggon's experiment, but do not in ours.

Konow's (2000) accountability principle provides insights into our results. According to this principle, fair allocation should be function of variables that people can control but not of variables that are out of their control. In our setting role allocation represents a variable that cannot be controlled by participants. In the *SymmEff* condition the only factor that can be controlled by all participants and is relevant for fair consideration is exerted effort. From this perspective, the positive difference between the amount sent to the recipient in the *SymmEff* condition and in the *AsymmEff* condition may be interpreted as compensation for an exogenously imposed penalty on an action that was under the control of the recipients. However, it should be underlined that participants in the *AsymmEff* condition were not allowed to work and this exogenous restriction did not trigger the same justice-driven initiative in the population of dictators.

Our work has important methodological implications for simple experimental games with legitimized assets. Specifically, the results of our experiment call for caution when assessing the relevance of asset legitimacy in the experiment of Cherry et al. (2002). Indeed, while accurately controlling for reputational and legitimacy issues, Cherry, Frykblom, and Shogren do not consider the asymmetry in effort of the parties in the interaction. As shown by our experiment, this may lead to overestimating the relevance of asset legitimacy when observing the emergence of self-centered behavior. This may be due, at least partly, to the status of the recipient and not to the nature of the bargained assets.

To conclude, the evidence collected here testifies to the existence of genuine other-regarding concerns in highly demanding social environments and to the relevance of contextual elements in shaping concerns of this kind. This may help improve social-preferences models that have been proposed in the economics literature but do not explicitly consider alternative characterizations of the counterpart (e.g., Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999). While some recent efforts to formally capture contextual elements in allocation choices have been made (e.g., Konow, 2009), the evidence collected here should provide a stimulus for increasing the descriptive power of existing models.

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APPENDIX

The instructions have been translated from Italian.

Instructions Stage 1

Dear Participant,

You are going to complete a quiz of 17 questions that differ in their difficulty. Only one of the available answers is correct.

(SymmEff) *In the envelope in this room there could be a letter A or a letter B. If there is a letter A, those who answered at least 10 questions correctly will earn €30, while those who answered less than 10 questions correctly will earn €8. In addition to these earnings, which depend upon your performance, you will earn €4 for taking part in the experiment. If there is a letter B, you will receive only a payment of €4 for taking part in the experiment. The envelope will be opened only when all subjects have completed the quiz.*

(AsymmEff) *Those who answered at least 10 questions correctly will earn €30, while those who answered less than 10 questions correctly will earn €8. In addition to these earnings, which depend upon your performance, you will earn €4 for taking part in the experiment.*

You have 45 minutes to complete the quiz.

In case you finish early, please remain seated and do not speak with other participants.

Are there any questions?

Instructions Stage 2

In this experiment you will be matched with another person. One of you will be identified as subject A(B) and the other as subject B(A).

(AsymmEff, AsymmEff.bis) *Your assignment as subject A or subject B is random.*

(SymmEff) *Your assignment as subject A or subject B is random and it is determined by the contents of a sealed envelope in your room.*

Neither during nor after the experiment will you know the identity of your partner. The same applies to your partner.

Moreover, it will not be possible to associate your choices in the experiment with your identity.

In the room there are other participants in the experiment. None 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 subjects A is randomly chosen as Monitor. The Monitor conducts the experiment following the instructions provided by the Experimenter. The Experimenter supervises the experimental procedures conducted by the Monitor.
- The subject A has earned either €8 or €30 according to her/his performance in the previous session.
(AsymmEff, AsymmEff.bis) *The subject B has not had the opportunity to earn any money.*

(SymmEff) *The subject B has performed the same task as subject A. Subjects B, to whom the choices of subjects A refer, did not receive any reward for their effort.*

- The Monitor will distribute some containers to the participants. Those who earned €30 will receive a white container. Those who earned €8 will receive a black container. No other label is attached to the container. One of the subjects who earned €8 and one of the subjects who earned €30 are going to randomly receive a container containing a worthless object.

(AsymmEff, SymmEff) *Subject A is going to decide how much of her/his earnings she/he is going to receive and how much of her/his earnings Subject B is going to receive.*

(AsymmEff.bis) *The amount earned by subject A has been provisionally allocated to each pair. Subject A can propose how much of this each person is going to receive.*

- The participants will have 3 minutes to decide. After this, the Monitor will ask each subject to move, in turn, behind a large cardboard box. Subjects must then remove from the container the amount they want to keep for themselves and leave inside the container the amount the subject B is going to receive.
- Subject A will then close the container and move towards the exit. Participants must open the containers only behind the box and must carefully close them before leaving the box. Subjects A who receive the worthless container and publicly disclose this piece of information will not receive the participation fee.
- Subject A will autonomously deposit the container in a box near the exit and, after having received the participation fee, will leave the room. The position of the container in the box will not be observable by those in the room. Subjects who received the worthless object must follow the same procedure.
- The same procedure is repeated for each subject A in the room.
- The Monitor takes the box and, together with the Experimenter, brings it to the room of subjects B.
- The Monitor calls a subject B who chooses, without touching it, one of the containers on the desk.
- The Monitor opens the container and the content is registered on a form by the Experimenter. The content of the container is given to subject B together with the show-up fee.
- The same procedure is repeated for each subject B in the room.
- The Monitor gives the form with the results to the Experimenter and receives a reward according to his or her performance in the previous phase.

You have 3 minutes to think about your choice. At the end of the 3 minutes a bell will ring and you will be asked to choose. You are not allowed to talk to other participants during the experiment.

Are there any questions?

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