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Dictator Game with Indivisibility of Money

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Abstract: We study a dictator game where the dictators first indicate their willingness to give in a decision form and then allocate 10 *yuan* cash to the receiver in an envelope. The dictators are informed that their giving has to be an integer in Treatment 1, and a round number of 5 in Treatment 2 after they fill in the form. The results show that (1) People are on average more generous when writing a number on paper than allocating real cash; (2) The difference between willingness to give and actual giving is statistically significant in the case of divisible money (Treatment 1), but not significant in the case of indivisible money (Treatment 2); and (3) A substantial fraction (25%) of individuals do not follow the rounding rule in Treatment 2. The deviation from the rounding rule can be partly explained by an augmented version of the ERC model by Bolton and Ockenfels (2000).

JEL Classification: C91, D03, E03, M59

Keywords: social preference, dictator game, rounding, divisibility of money

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Dictator Game with Indivisibility of Money

1. Introduction

We study a dictator game (Kahneman et al. 1986, Forsythe et al. 1994, Hoffman et al. 1996) where the dictator faces indivisibility of money. The basic treatment is the same as the traditional one: the dictator D sets an allocation of a stake of 10 *yuan* (unit of Chinese RMB) between herself and a receiver R. The variation is that, after D makes the initial allocation which is written down in a piece of paper, we inform her that due to lack of changes, not all allocations are feasible. The minimum change is a 5 yuan banknote. Therefore, the possible allocation for D is limited to a set $\{0, 5, 10\}$.

How will the dictator revise her allocation in this situation? Does she simply round the number to the nearest round number of 5 to her initial allocation, or is a persistent tendency for her to round up/down her initial offer? A natural prediction will be that she rounds it to the nearest round number of 5. Let W be her initially indicated willingness to give, and T be the transfer she makes facing the shortage of changes, this leads to

$$T = \begin{cases} 0 & if \quad W \in [0, 2.5) \\ 5 & if \quad W \in [2.5, 7.5) \\ 10 & if \quad W \in [7.5, 10] \end{cases}$$

If a subject is applying an alternative rule like rounding up instead, we will see amounts in (0, 5] rounded to 5, and (5, 10] rounded to 10. It is plausible to believe that this may happen to a few subjects, when they tend to apply more pro-social rounding rule when they are in a more pro-social environment, and particularly when they want to avert the consciousness of extreme selfish and demonstrate generosity.

Similarly, it is possible that a subject could apply a rounding down rule instead, we will see amounts in [0, 5) rounded to 0, and [5, 10) rounded to 5, when the subject tends to be more selfish during the real allocation.

In order to address the research question, we design two treatments. In both of the treatments the dictator first fills her willingness to give in a decision form, and then (1) in Treatment 1, she is given 10 banknotes of 1 yuan each, and asked to put as many banknotes as she wishes in the envelope that is directed to the receiver; and (2) in Treatment 2, she is only given 2 banknotes of 5 yuan each, and asked to put as many banknotes as she likes in the envelope that is directed to the receiver.

The reason for asking the subject to first fill in the form and then put the money into the envelope is twofold: First, without it, we may not clearly elicit the dictators' willingness to give when she allocates 2 notes of 5 yuan in Treatment 2, because "(attitude discrepant) behavior may change attitude" (Sears et al. 1985) . A subject with a willingness to give other than 0, 5 or 10 may indicate that her willingness to give is a number among 0, 5 and 10 in both cases to build the (self-)image of "being a consistent person". Second, previous dictator game was conducted in either ways, the dictators indicate their willingness to give on papers/computer screens (e.g. Forsythe et al. 1994, Bardsley, 200), or allocate the cash physically (e.g. Eckel and Grossman, 1996, Hoffman et al. 1996, Bolton et al. 1998 and Ben-Ner et al. 2004), but not both. A question would be whether the difference in the experimental design in this dimension is neutral to the results. The two-step design in our experiment serves as a good within subject design to test the neutrality of allocating money on paper versus by hand.

Our results indicated two important findings: (i) the dictators on average put less money in the envelope than the amount as they indicated in the decision form, and the difference is significant at 5% level in treatment 1. This suggests people may be more selfish,

or less generous when they distribute the physical money that think about it as a number on the paper/in their mind; and (ii) a sizable share (more than 25%) of individuals take ceilings or floors rather than the standard rounding. However, the individual round-up and round-down behavior mute each other at the aggregate level. The deviation from standard rounding finds its explanation in an augmented version of the seminal ERC model by Bolton and Ockenfels (2000). We also investigated whether individual background variables like gender, age and monthly expenditure are associated with more round-up (round-down) behavior, and none of the variables is significant even at 10% level.

This experiment studies the difference between the experimental designs where subject choose in a continuous, or more "dense" decision space and where they choose between discrete outcomes. In the experimental economics literature, researchers sometimes apply either of the two designs to address the same research question, with the implicit assumption that they can be used interchangeably. For example, the simplification by Charness and Rabin (2002) on ultimatum game by Gueth et al. (1982). The assumption that people apply the standard rounding will be crucial in order to draw comparison between the results from the two types of studies. If people show persistent tendency to round up/down their decisions, the offer/contribution in the discrete choice design may be higher/lower than the continuous choice design due to the effect of design. Our result shows that there is no major concern about the assumption at least at the aggregate level. Bolton and Katok (1995) also conducted an experiment where in one of the treatments the dictator can only choose give 50% of the pie or nothing. But it is not possible for the dictator to give 100% of the pie in that experiment, and due to different focus of study, they did not test whether the divisibility of pie influences the level of giving.

If there is evidence that discrete design can persistently put the offer/contribution level higher/lower, this knowledge may be useful in practice of fund raising for charities in real life.

In this sense, this study is related to the experimental literature on methods of fund raising. For example, Harbaugh (1998a, b) find that if a donor is given an honorary label of "Patron" when his donation is above a threshold, this can lead to a lot of donation at or just above the threshold due to prestige seeking by the donors.

Finally, our study is related to the literature in macroeconomics on divisibility of money. Berentsen and Rocheteau (2002) show the divisibility of money matters for the efficiency of the exchange economy. Lee and Wallace (2006) study the optimal divisibility of money when it is costly to produce. To our knowledge, the closest related paper to our study in this field is Cannon and Cipriani (2006) on the non-neutrality of the introduction of Euro in Itally and Ireland on giving to churches. Among others, the adoption of new currency may influence donation in two ways (1) the exchange rate between Euro and the former currency may not be a round number, and people may apply different heuristics in rounding the exchange rate when they evaluation goods and expenditure; (2) in the new system, 1 Euro coin becomes the typical smallest indivisible change. In countries like Italy where the previous smallest indivisible change has a lower value than 1 Euro, the indivisibility of money increases, which leads to a smaller decision space just like in this paper. The authors find that giving to church increases in general in response to the adoption of Euro, but due to the nature of the natural experiment, it is difficult to rule out other factors e.g. the how GDP and income growth in Ireland at that moment. Our study shed light on how the divisibility of money matters for microeconomic decisions using controlled laboratory data.

The rest of the paper is organized as the following: Section 2 presents the experimental design, Section 3 reports the results, and finally, Section 4 concludes.

2. Experimental Design

The sessions were conducted at Nanjing Agricultural University, Nanjing, China. More than 300 college students were recruited, among whom 270 showed up and formed 135 observations (pairs of dictator-receiver).

The subjects play a dictator game, where the dictator allocates 10 yuan between herself and the receiver using integer numbers, and the receiver makes no decision. All dictators sit in one room while all receivers sit in the other room. As in Hoffman et al. (1996) and many other papers, the transfer of money is done via numbered envelopes to ensure anonymity. The dictator puts the transfer in the envelope with her subject number in the experiment, and the envelope is directed to the receiver in the other room with the same number. Two treatments are set up:

Treatment 1 (the baseline treatment): banknotes of 1 yuan are prepared, so that all the proposed allocations by the dictator are achievable. We take record of both the willingness to give indicated by the dictator on the decision form and their actual giving (the number of 1 yuan banknotes they put in the envelope). The advantage of taking double book keeping is to check the possibility that the subjects change their mind after they see the money, in particular, they become less generous than they were filling in the decision.

Treatment 2 (the treatment with indivisibility of money): the dictators will be informed after they filled in the decision form that only banknotes of 5 yuan are available, so that they can only give the amount of 0, 5 or 10 yuan to the receiver by putting 0, 1 or 2 notes of 5 yuan in the envelope. Similar to Treatment 1, both their initial indicated willingness to give and the

amount they actually give are recorded by the experimenter in order to study what kind of rounding rule the individuals apply when faced money indivisibility.

The number of observations is 43 for Treatment 1 and 92 for Treatment 2. We assign more subjects to Treatment 2 because of its higher relevance to the research question.

The experimental instruction was written in Chinese, and there is an English translation in the Appendix A.1.

3. Experimental Results

3.1. Summary Statistics

Table 1 shows the mean and standard error of the willingness to give and actual giving in Treatment 1 and 2. On average, both the dictator's willingness to give and the actual amount given are between 30% and 40% of the total stake. This result is not very different from the result from a typical dictator game (e.g. the mode of 30% of the stake in Forsythe et al. 1994). In both treatments, the average actual giving is smaller than the average willingness to give. We do not reject the null hypothesis that the mean of the willingness to give and the amount given are the same in treatment 2, but reject the hypothesis at 5% level in treatment 1 according to student t-test.

[Insert Table 1 here]

These results suggest that the subjects have a tendency to give less when they allocate real cash than on paper (13.3% in Treatment 1 and 2.7% in Treatment 2). We also observe that both the willingness to give and actual giving are on average higher in treatment 2 than in treatment 1 (difference significant at 5% level according to t-test). This difference, in

particular in terms of the willingness to give cannot be explained by the treatment design. The allocation of students to treatment 1 and 2 was completely random. This difference is therefore purely due to "luck". The finding in this section (in particular about Treatment 1) can be summarized by Result 1.

Result 1*: the experimental design with respect to letting subjects allocating money on paper versus by hand is not completely neutral to the experimental result. On average, people tend to give less in dictator game when they give money via their hands than writing a number on a piece of paper. The difference is statistically significant when money is divisible, but insignificant when money is indivisible.*

3.2. Detailed Comparison of Willingness to Give and Actual Giving

Table 2 shows the distribution of individuals with respect to willingness to give and actual giving. Among 43 subjects in Treatment 1, 34 (79.1%) gives the amount exactly as indicated in the decision form. 9 subjects (20.9%) gives a different amount than indicated. 7 subjects gives less and 2 gives more than the willingness to give indicated on the paper, this leads to a significantly lower average actual giving than the average willingness to give.

[Insert Table 2 here]

Among 92 subjects in Treatment 2, 68 of them (74.5%) give the amount which can be explained by the standard rounding rule referring to the number written on paper. In contrast, the rest 24 (25.5%) deviate from the standard rounding rule. In terms of the number of individuals who deviate, the non-standard rounding behavior in Treatment 2 is substantial. Among those who deviate, 13 subjects take the floor of the willingness to give and 11 take the ceiling. This suggests that there is no systematical bias of subjects' rounding behavior.

Consequently, the deviation from standard rounding is not an issue at least at the aggregate level. It also explains why the difference between willingness to give and the actual giving is not statistically significant.

[Insert Figure 1 here]

Figure 1 further illustrates the relationship between the indicated willingness to give and the actual giving in Treatment 2. As is seen from the figure, when the willingness to give increases in Treatment 2, the relation between indicated willingness to give and actual giving is not fully captured by the step-wise linear relationship indicated by the "rounding to the nearest round number of 5" rule. When the willingness to give is very small, many subjects with willingness to give of 1 or 2 give 5 in order to avert giving nothing, which may make the dictator guilty. When the willingness to give is larger, subjects with willingness to give of 8 gives 5 to avoid leaving herself with nothing. When the willingness to give is at moderate level, the deviation may happen in either direction

The patterns are summarized by Result 2.

Result 2*: When subjects face the indivisibility of money, most of them round their initial willingness to give to the nearest integer. For those who deviate from this rule, (1) when the willingness to give is very small/large, there is a tendency for the dictators to apply the round-up/down rule; (2) when the willingness to give is at moderate level, the deviation may happen in either direction. In general, finding (1) suggests that the subjects have a tendency to avoid extreme values.*

3.3.Rounding Behavior and Social Demographic Information

Why do some subjects round up their amount while others round down? Given the high fraction of subjects deviate from the standard rounding, it is not likely a result of pure

calculation error or failure in memorizing the previous choice. In order to explore the answer to this question, we define subjects' deviation from the standard rounding behavior as

$$Deviation = \text{Actual Amount Given by the Subject} - Round(\frac{\text{Willingness to Give}}{5}, 0) \times 5,$$

and regress this variable on the variables of age, gender and month living expenditure. Positive (negative) deviation means the dictator gives too much (little) than the amount implied by the standard rounding, or has a tendency to round numbers up (down). We try to see if the rounding up (down) behavior is associated (and therefore can be potentially explained) with any social background information. For example, if women tend to round up the amount they give due to stronger social preference as found in the previous literature (Croson and Gneezy, 2006), the gender coefficient for female should be positive. However, none of these variables are statistically significant even at 10% level. Therefore, the source of individual heterogeneity in rounding cannot be explained by the personal demographic background.

3.4. Models on Fairness and Social Preference

Starting from late 1990s, several models are introduced to explain human being's deviation from pure selfish behavior in games. Among these models, the Equity, Reciprocity and Competition (ERC) model by Bolton and Ockenfels (2000) and the Fairness, Cooperation and Competition model by Fehr and Schmidt (1999) are two most seminal models to describe the results of ultimatum bargaining game and dictator game.

We consider a variation of the Bolton-Ockenfel model for our experimental data, where the utility for individual i reads:

$$u_i = 10 - x_i - \alpha_i (x_i - 5)^2 \qquad (1)$$

where x_i is the amount giving to the receiver. The detailed derivation of this model from the original ERC model is shown in the Appendix. This utility function therefore consists of two parts: (1) the utility generated by the money she reserves for herself $(10 - x_i)$, and a "punishment" term for deviation from the situation where the money is divided equally, namely, $x_i = 5$. The further away x_i if from 5, the lower is the utility. α_i is the parameter for inequality aversion in this model. This utility function is maximized when

$$x_i^* = 5 - \frac{1}{2\alpha_i} \qquad (2)$$

If we assume that the subjects maximize their utility, so that x_i^* is the willingness to give they indicated in the decision form, the equation can be inversed to solve the individual parameter for inequality aversion.

$$\alpha_i = \frac{1}{2(5 - \text{willingness to give})}. \qquad (3)$$

Note that the original ERC model does not allow α_i to be negative, because the giving in a dictator game almost never exceeds half of the total stake in previous experiments. However, since there are several subjects in this experiment giving more than 5 yuan, we allow α_i to be negative. Negative parameter means the subjects prefer unequal divisions that are disadvantageous to herself, and it is an altruism in the literature. Given the model does not differentiate between advantageous and disadvantageous income inequalities, we have to

declare that the utility is undefined when $x_i < 5$ in the case of $\alpha_i < 0$. Otherwise the model will predict that the utility level is highest when $x_i = 10$ when the subject is actually giving more than 5.

Knowing this parameter makes it possible to calculate the utility level for each individual when they give 0, 5 and 10 respectively. The model can then compare and predict which of the three cases maximizes the utility when the subjects face indivisibility of money, The results are shown in Table 3:

[Insert Table 3]

The simulation shows that the optimal choice over 0, 5 and 10 predicted by the Bolton-Ockenfels model coincides with the result of standard rounding when $x_i^* \leq 5$, and goes to exactly the opposite direction when $x_i^* > 5$. This helps to explain the one rounding-up case when willingness to give is 6 and two rounding-down cases when willingness to give is 10 in Table 2, however, the behavior of the subjects who deviate from the standard rounding when the willingness to give is smaller than 5 remains to be explained.

Ideally, one would like to also conduct simulation using the Fehr-Schimdt model. This is not feasible due to the structure of the model and our data. Consider the model specification:

$$u_i = y_i - \alpha_i \max(y_j - y_i, 0) - \beta_i \max(y_i - y_j, 0), \qquad (4)$$

where $y_i = 10 - x_i$ is the dictator's own payoff and $y_j = x_i$ is the amount given to the receiver. Due to the linear functional form of the model, it is not possible to find the exact solution of the implied α_i, β_i by solving $x_i^* = \arg\max_{x_i} \left(10 - x_i - \alpha_i \max(2x_i - 10, 0) - \beta_i \max(10 - 2x_i, 0)\right)$.

It is therefore not possible to use the willingness to pay to simulate the predicted choice between 0, 5 and 10 using this model.

3.5 Extended ERC model with "Premium of Cash in Presence" and "Boundary Aversion"

In order to fit the model to our experimental data, two extensions of the model are potentially desirable:

First, in order to capture the fact that people tend to reduce their giving when they allocate the money physically than on the paper, the utility for income for the dictator's own should be multiplied by a factor that is larger than 1, which represents the extra temptation to keep the money when seeing them physically.

Secondly, the quasi-S-shaped relationship between the actual giving and willingness to give resembles the relationship between the weight of probability and probability in the Prospect Theory (Kahneman and Tversky, 1979), where very low (high) probability are given higher (lower) weight than proportionally. One possible explanation for the unexplained round-up behavior by the subjects with willingness to give of 1 or 2 is: they give 5 when faced with indivisibility of money simply because they do not want to give nothing. A model aiming at explaining the behavior of this group of subjects should probably include terms associated with aversion to give "all" or "nothing". Taking these two factors into account, the extension model could be:

$$u_i = \begin{cases} \lambda_i(10-x_i) - \alpha_i(x_i-5)^2 - \gamma_i & if \quad x_i = 0 \\ \lambda_i(10-x_i) - \alpha_i(x_i-5)^2 & if \quad x_i \neq 0, x_i \neq 10, \\ \lambda_i(10-x_i) - \alpha_i(x_i-5)^2 - \delta_i & if \quad x_i = 10 \end{cases} \qquad (5)$$

where λ_i is an individual idiosyncratic factor that is equal 1 if the dictator divides the money on the paper, or a value greater or equal to 1 if the dictator divides the money in the physical form. Due to the limitation of the data, it is not possible to make accurate estimate the parameters in the extended model. Nevertheless, it is possible to find ranges of $\lambda_i, \gamma_i, \delta_i$ such that the prediction fits the data in Table 2 and 3.

For example, when $\lambda_i = 1$, if $\gamma_i > 1.88$, it will be optimal for an individual with willingness to give of 1 to give 5 instead of 0 since the utility of giving 5 ($u_i = 5$) is higher than giving 0 ($u_i = 6.88 - \gamma_i < 5$). When $\lambda_i = 1.5$, the utility of a dictator with willingness to give of 3 is $1.5 \times 10 - 0.25 \times 5^2 = 8.75$ if she gives 0 to the receiver, but $1.5 \times 5 - 0.25 \times 0^2 = 7.5$ is she gives 5. Her optimal choice will be giving 0 instead of 5.

4. Conclusion

This experiment studies how people's giving differs when they allocate the money on paper versus by hand, and with low versus high level of money indivisibility. From the results of the dictator game, we find that both design factors have non-neutral effect on the experimental result. People give significantly less when they allocate physical cash than money on the paper, and a substantial share of individuals do not apply the standard rounding rule when faced with indivisibility of money.

Our result has several implications to related studies and policy making:

First, the difference between the willingness to give and actual giving in treatment 1 asks for caution in the experimental design. In the previous literature, both decision on the paper and allocating cash physically are used for the dictator game. Our result suggests care

needs to be taken because this difference in the experimental design is not neutral to the results. Letting the subjects allocating the money by hand leads to more selfish behavior, and therefore less giving due to the design.

Second, given that there is no systematical way for agents to round up or down their willingness to give when the decision space is changed from a continuous one to a discrete one, the experimental results in similar experiments should be robust to changes of experimental design in this dimension, which can potentially allow for comparison of a broader range of experiments.

Third, since there is no evidence that people apply more pro-social rounding in a strategic environment related to social preference, the variation in the divisibility of money is therefore neutral in the giving by dictators, as our results indicate no significant difference between willingness to give and actual giving when the money is not divisible. The non-neutrality of adoption of new currency on charity giving in the previous study (e.g. Cannon and Cipriani, 2006) is not very likely to be mainly caused by the change of divisibility of money.

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Appendix

A.1 Experimental Instructions

To Dictators

Welcome to the experiment on decision making! Your earnings in this experiment will depend on your decisions. The number on the paper card that you received is your participant number in this experiment. You will need this number to fill in the decision form and receive payment. Please keep this card carefully. This experiment will not collect information about your personal identity.

There are two roles in the experiment, A and B. We use two rooms and the participants playing the same role are seated in the same room. This classroom is room A.

Students sitting in room A play role A. Each student playing role A receives an initial wealth of 10 yuan. A can choose to allocate the 10 yuan between a student playing role B in the way he/she likes. B does not need to make a decision.

As a student playing role A, please write down your card number in the first row and your decision in terms of the amount of money you want to give B in the second row. Please place the completed form in to the envelope and return to the organizer after you fill in the form.

Please fill in:

Your number in the experiment is _____.
As a student playing A, you decide to give B _____ (a number between 0 and 10) yuan.

If this is Treatment 1, the experimenter now distributes envelopes containing ten banknotes of 1 yuan each. The dictators can place the amount that they are willing to give to the receivers into the envelope and return both the form and the envelope to the experimenter.

If this is Treatment 2, the experimenter now distributes envelopes containing two banknotes of 5 yuan each, and informs the subjects that due to shortage of changes, only banknotes of 5

yuan are availabe. The dictators can place the amount that they are willing to give to the receivers into the envelope and return both the form and the envelope to the experimenter.

To Receivers

Welcome to the experiment on decision making! Your earnings in this experiment will depend on your decision and decision by others. The number on the paper card that you received is your participant number in this experiment. You will need this number to fill in the decision form and receive payment. Please keep this card carefully. This experiment will not collect information about your personal identity.

There are two roles in the experiment, A and B. We use two rooms and the participants playing the same role are seated in the same room. This classroom is room B.

Students sitting in room B play role B. Each student playing role A receives an initial wealth of 10 yuan. A can choose to allocate the 10 yuan between you and himself/herself in the way he/she likes. You do not need to make a decision.

To keep records, please fill in the following form. Please place the completed form in to the envelope and return to the organizer after you fill in the form.

Please fill in:

Your number in the experiment is _____.
As a student playing B, you received _____ yuan.

A.2 Derivation of the Simple ERC Model in This Paper

The original ERC model is written in the following way:

$$U_i = a_i c\sigma_i - b_i(\sigma_i - \frac{1}{2})^2,$$

where a and b are two parameters, c is the stake to be divided, and σ_i is the share of money the dictator reserves for herself. In our experiment, $c = 10$, $c\sigma_i = 10 - x_i$, $x_i - 5 = 10(1 - \sigma_i - \frac{1}{2}) = 10(\sigma_i - \frac{1}{2})$. Substituting these back to the equation,

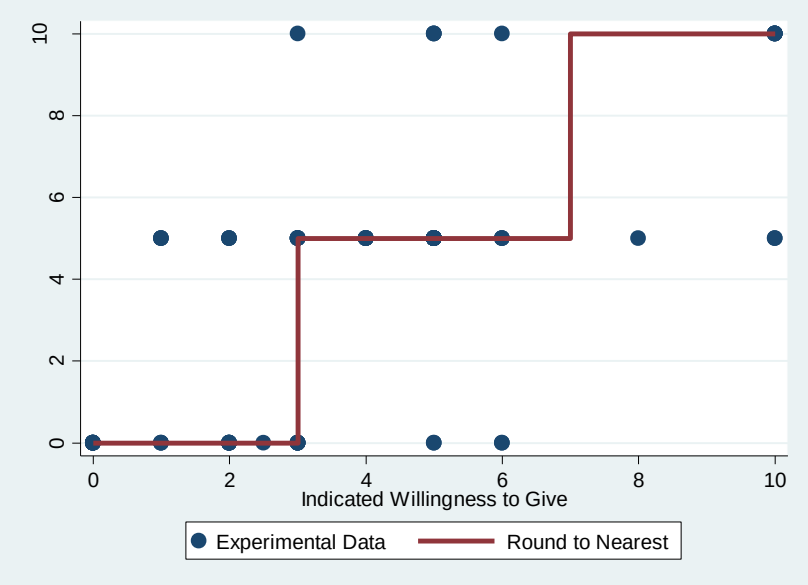
$$\begin{aligned} U_i &= ac\sigma_i - b(\sigma_i - \frac{1}{2})^2 \\ &= a\left(10 - x_i - \frac{b}{100a}(x_i - 5)^2\right) \end{aligned}$$

Therefore, the model in our paper is a monotonic transformation of the original ERC model:

$$\begin{aligned} u_i &= a_i U_i \\ &= a_i\left(10 - x_i - \frac{b_i}{100a_i}(x_i - 5)^2\right), \end{aligned}$$

where $\alpha = \frac{b_i}{100a_i}$.

Figure 1: The Scatter of the Indicated Willingness to Give and Actual Payment in Treatment 2.



Note: While each point in the graph is of the same size, they may be associated to very different numbers of observations.

Table 1: Mean and Variance of the Amount Given in Treatment 1 and 2.

	Treatment 1		Treatment 2	
	Willingness to Give	Actual Amount Given	Willingness to Give	Actual Amount Given
Mean	3.30	2.86*	3.97	3.86
Standard Error	0.30	0.32	0.27	0.34

Note: * denotes a significant level of 5%.

Table 2: Distribution of Willingness to Give and the Actual Giving in Treatment 1 and 2.

Willingness to Give (WTG)												
Treatment 1												
Actual Giving	0	1	2	2.5	3	4	5	6	7	8	10	Total
0	6		1		1	1	2					11
1		2										2
2		1	4									5
3					4				1			5
4						4	1					5
5		1					13					14
6								1				1
Total	6	4	5	0	5	5	16	1	1			43
Actual<WTG			1		1	1	3		1			7
Actual=WTG	6	2	4		4	4	13	1				34
Actual>WTG		2										2
Treatment 2												
Actual Giving	0	1	2	2.5	3	4	5	6	7	8	10	Total
0	10	3	8	1	6		2	2				32
5		3	3		6	8	23	3		1	2	49
10					1		3	1			6	11
Total	10	6	11	1	13	8	28	6		1	8	92
Round Down					6		2	2		1	2	13
Round to Nearest	10	3	8	1	6	8	23	3			6	68
Round Up		3	3		1		3	1				11

Note: The numbers in the cells are the number of subjects choosing the respective amount. “Round to Nearest” means the dictator just takes the nearest round number of 5 to her willingness to give. “Round up (down)” means that the dictator takes the nearest round number of 5 that is larger (smaller) than her willingness to give.

Table 3: Predicted Results for the Bolton-Ockenfels Model

Willingness to Give	Implied α	Utility x=0	Utility x=5	Utility x=10	Optimal Choice among 0, 5 and 10
0	0.10	7.50	5.00	-2.50	0
1	0.13	6.88	5.00	-3.13	0
2	0.17	5.83	5.00	-4.17	0
3	0.25	3.75	5.00	-6.25	5
4	0.50	-2.50	5.00	-12.50	5
5	$+\infty$	$-\infty$	5.00	$-\infty$	5
6	-0.50	NA	5.00	12.50	10
7	-0.25	NA	5.00	6.25	10
8	-0.17	NA	5.00	4.17	5
9	-0.13	NA	5.00	3.13	5
10	-0.10	NA	5.00	2.50	5

Note: The implied parameter for inequality aversion, utility levels and predicted choice facing indivisibility of money predicted by the Bolton-Ockenfels model. 5 cells in the lower part of the third column are marked as "NA" because the inequality aversion parameter in this case is only defined for disadvantageous allocation (x>5) to the dictator.

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