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ON THE ROLE OF ENDOWMENT HETEROGENEITY AND AMBIGUITY FOR CONDITIONAL COOPERATION

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On the role of endowment heterogeneity and ambiguity for conditional cooperation

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Abstract

Conditional cooperation (CC) is one of the most persistent behaviors in charitable giving. The laboratory experiment presented in this paper is designed to explore two questions: First, whether heterogeneous endowments of donors affect conditional cooperative giving. Second, whether potential donors exploit ambiguity about other donors' endowments in a self-serving manner to justify lower giving. We find that heterogeneous endowments affect giving in a way that suggests individuals concern for equality of donors' earnings after giving. Furthermore, the results do not confirm the exploitation of ambiguity about other donors' endowments. Individuals do not bias beliefs about other donors' endowments in a self-serving manner to justify lower giving.

JEL Classification: C91, D63, H41

Keywords: public good, donation, conditional cooperation, social norms, ambiguity

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1. Introduction

There is prevalent evidence that individuals' preferences for voluntary contributions in public good games or charitable giving strongly depends on others giving. Generally, individuals are more prone to give when others give. This phenomenon is called conditional cooperation (CC). Behavior in line with CC is observed in several public good laboratory experiments (Fischbacher et al. 2001, Kocher et al. 2008, Fischbacher & Gächter 2010) as well as in several field experiments on charitable giving (Frey & Meyer 2004, Shang & Croson 2009). Even if CC is not the only observed behavior peculiarity, it seems to be the most prevalent and robust behavior in these settings.

This paper explores how heterogeneous / asymmetric endowments of donors affect conditional cooperative giving. More precisely, the presented laboratory experiment is designed to test whether individuals show any concern for "equality of earnings" of donors when making their donation to a charity. It is intuitively appealing that individuals follow the idea that donors ought to have the same amount of money in their pocket after donating, or, to put it differently, that those with a higher endowment should donate more. However, existing economic research on laboratory public goods does not find such preferences.[1] The findings of Cherry et al. (2005), Buckley & Croson (2006) and Sadrieh & Verbon (2006) conflict with the idea of equality of earnings. Instead, in their laboratory public good games individuals with low endowments contribute the same absolute amount as individuals with high endowments. This is surprising, as fairness concerns are a robust phenomenon in many economic experiments (e.g. dictator games) and are also frequently debated in real-life negotiations on public good contributions. For example, the "fair contribution" of a

[1] As explained by Andreoni (2006), contribution to a charity out of altruism can be considered as contribution to a public good.

country has been among the most contentious topics in international negotiations on climate change. Even if laboratory public good games surely cannot reflect such complex real live negotiations, it is remarkable that preferences for equality of earnings are missed completely in abstract laboratory public good environments. Therefore, the laboratory experiment presented in this paper makes a new, methodically different, attempt to measure concerns for equality of earnings. With this method, which will be presented in detail in our experiment description in chapter three, we indeed find significant evidence for individuals concern for equality of earnings. However, also in our study the extent of this concern is rather small.

Furthermore, this paper explores whether potential donors self-servingly exploit ambiguity about other donors' endowment. We scrutinize whether participants that know the donation of others, but not their endowment, overestimate the latter to justify lower donations of their own. Despite the fact that we use the same method as Haisley & Weber (2010) to explore whether estimations / beliefs are self-servingly biased, we do not find any evidence that individuals bias estimations / beliefs in a self-serving manner in our environment. Considering existing literature, this is somewhat surprising as most studies find clear evidence for self-serving beliefs (e.g. Dunning et al. 1989 and Haisley & Weber 2010). However, the most closely related paper from Dahl & Ransom (1999) also finds onlymixed evidence for self-servingly biased beliefs.

The remainder of the paper is as follows: The next chapter explains the main research question in more detail and thereby reviews the relevant literature. Chapter three describes the experiment. Chapter four derives the hypotheses. Chapter five presents the results. Finally, chapter six discusses the methodological differences to previous studies and why we find different results than previous studies.

2. Relevant Literature

The first research question of this paper is how heterogeneous endowments of donors affect charitable giving. Thereby, we test whether individuals show any concern for "equality of earnings" of donors, when making their donation to a charity. There exists overwhelming literature about equity concerns in economic decision-making. From the methodological approach the papers by Reuben & Riedl (2011) and Nikiforakis et al. (forthcoming) are most closely related to our paper. Their studies scrutinize which normative rules individuals consider as *appropriate for others' behavior* in laboratory public good games and whether they enforce them by punishing deviators.[2] Our research considers whether individuals apply one of these rules, namely "equality of earnings", as *appropriate for their own behavior* when making their own decision with due regard to others' decisions. For example, individuals follow the rule of equality of earnings, when they donate less than donors with higher endowments, but more than donors with lower endowments. Such an internalized rule can be considers as a preference. For example, when donors follow the idea that all donors ought to have the same amount of money in their pocket after donating, they have a preference for equality of earnings. However, models concerned with inequity-averse preferences (e.g. Fehr & Schmidt 1999, Bolton & Ockenfels 2000) differ somewhat in their focus. These theories are concerned with decision situation where individuals can directly influence others' payment, e.g. in the dictator game the dictator can directly affect the receivers payment by giving him a certain amount of his endowment. As explained, for example by DellaVigna (2009), in the charitable giving context social preference theories focus on the interaction of donor and charity and not on the interaction between donors.

[2] For an excellent overview about possibly relevant norms in public good games, see Reuben & Ruben (2011).

Therefore, and due to the close relation to concepts scrutinized in the papers of Reuben & Riedl (2011) and Nikiforakis et al. (forthcoming), I stick with the term "concern for equality of earnings".[3] The meaning of this term is simple: Individuals' behavior follows the idea that individuals with a higher endowment should donate more, and vice versa, that individuals with a lower endowment belief they are "morally entitled" to donate less then individuals with a higher endowment.

Second, this paper explores whether potential donors self-servingly exploit ambiguity about other donors' endowment. The following example should clarify this thought: Assume a donor follows the above described 'equality of earnings' norm. Hence, she is interested in similar earnings for all donors after donations are done.[4] Furthermore, assume subjects only know the donations of others, but their endowment is not known. This is exactly the case in field experiments harnessing conditional cooperation to increase charitable giving (Frey & Meyer 2004, Alpizar et al. 2008, Shang & Croson 2009). If donors follow the 'equality of earnings' norm in this environment, they have to estimate other donors' endowment. Now, the basic question is whether donors self-servingly bias estimations about other donors' endowments. If so, in the given example donors overestimate others' endowment and manipulate their own "fair donation" downwardly in this way. This thought is in the spirit of Dana et al. (2007), who formulated on p.70: "Fair behavior is driven by comparisons against a standard, but that such a standard serves mainly as a constraint that individuals seek to circumvent rather than a goal that they seek to implement." Hence, individuals might 'outwardly' adhere to the concept of equality of earnings but 'secretly' try to circumvent the norm (via biased

[3] Previous literature of Buckley & Croson (2006) and Sadrieh & Verbon (2006) used social preference theories to analyze their results. In contrast to my experiment, they did not analyze a donation to a charity, but a classical public good game. Even if game structures are theoretically similar, in classical public good games interaction of contributors is more direct than in the charitable giving context. I will come back to this point in the final chapter.

[4] E.g. If other subjects' endowment is 10€ and others' contribution is 4€, her own contribution is 2€ in case her own endowment is 8€. So, in the end every subjects earning is equal to 6€.

estimation). Several studies demonstrate self-serving interpretation of ambiguity. In the psychological study of Dunning et al. (1989) individuals self-servingly assess their own abilities in case of ambiguity. Haisley & Weber (2010) demonstrate in an economic context that individuals interpret ambiguous risks in a self-serving manner. Similarly, Babcock & Loewenstein (1997) report various economic examples where people skew beliefs to line up with selfish interests. However, the study most closely related to ours by Dahl & Ransom (1999) only finds mixed results for self-serving beliefs. They test whether income situation and religious affiliation influence tithing. A tithe is a religiously motivated voluntary contribution equal to 10 percent of income. While individuals' income level does not affect their view on what represent income, religious affiliation does. Those with stronger affiliation to the church have a much more comprehensive view on what counts as income.

3. Experimental Design and Procedures

The experiment consists of three treatments. The design can be considered as a 2 + 1 treatment design. The focus will be on the 2-treatments. The +1-treatment was executed previously and its unique objective has been to collect data necessary to conduct the other 2-treatments. All treatments took place in autumn 2010. Participants were undergraduates from the faculty of Management, Economics and Social Science of the University of Cologne. Experiments were conducted in classrooms at the beginning of a course.

In the +1-treatment participants have to make one decision. At the beginning of a course 50 undergraduates received an endowment of 6€ and had the opportunity to donate to the German Red Cross. Decisions had to be made individually and talking was not allowed. On average students donated 2.98€.

The other two treatments were also conducted at the beginning of an undergraduate course. Treatments were conducted in the same classroom, but participants of different treatments were spatially separated within the classroom. All participants had to make two decisions. First, they had to estimate the endowment of the +1-treatment participants. Second, they received an endowment of 6€ and had the opportunity to donate to the German Red Cross. For the estimation, participants got to know the amount students donated on average in the +1treatment and had to deduce the endowment of the +1-treatment participants. Estimations were incentivized. If the endowment estimation differed less than 50 cent from the actual value, the subject earned 40 cent. If the estimation value differed less than 10 cent from the actual value, the subject earned 80 cent.

The 2-treatments differ in the *point of time* at which students receive information about the donation opportunity. Either they received the information at the beginning of the experiment or after they made their estimation about the behavior of the +1-treatment participants.[5] The different points of time at which students received information about their opportunity to donate were implemented by separation of instruction into different envelopes. In the "simultaneous" treatment (N=38), the complete instructions of the experiment were simultaneously given to the participants in one envelope. As soon as the experiment started and participants opened the envelope they knew that they had to estimate behavior of the +1-treatment participants and had the opportunity to donate. To make sure that participants indeed read the whole instruction, it was mentioned several times in the beginning of the experiment to read the whole instruction contained in an envelope before making any decisions. In the "sequential" treatment (N=40) instructions were separated into two envelopes to guarantee that

[5] As we will explain in the chapter four in detail, this difference changes incentives to bias estimations about +1-treatment participants' endowments.

participants received information sequentially.[6] The first envelope contained the request to estimate the behavior of the +1-treatment participants. The second envelope contained information on the opportunity to donate to the German Red Cross. After participants finished their estimation, they were instructed to put their estimation into the first envelope and close this envelope. Participants in this treatment were not allowed to open the second envelope until all participants had closed the first one.

4. Hypotheses

First, we consider the hypothesis concerning the effect of endowment heterogeneity on conditional cooperation. In our experiment, participants receive information on other donors' average donation and have to deduce their endowment. Furthermore, they have the opportunity to donate afterwards. Now, the basic assumption we made in our hypothesis H1 is that correlations in the experiment-results indicate concerns for equality of earnings. More precisely, we assume that, for the given own endowment and given average donation amount of other donors, a negative correlation between estimation of others' endowment and own donation implies concerns for equality of earnings.

> **H1.** *Individuals have a concern for equality of donor-earnings when making their donation - the higher their estimation about others' endowment, the lower their own donation.*

We are aware of possible false consensus effects (Ross et al. 1977) as found, for example, in the laboratory experiment of Selten & Ockenfels (1998). In our experiment individuals might look at their own behavioral inclinations in order to estimate others' behavior / endowment. However, this does not diminish the implications of the negative

[6] The procedure of "sequential" and "simultaneous" treatments is taken from Haisley & Weber (2010).

correlation between endowment estimation and donation for individuals concern for equality of earnings.

Second, we consider the hypothesis concerning the role of ambiguity about others' endowment. In our experiment, there are two different main treatments. In the simultaneous treatment, participants do know about the subsequent opportunity to donate while estimating other's endowment. In the sequential treatment, they do not know. Participants only have an incentive to upwardly bias their estimation in the simultaneous treatment, as it allows them to justify a lower giving in the subsequent donation decision. In the sequential treatment, there is no such incentive, simply because participants do not know about the subsequent donation opportunity (so there is no need to overestimate endowment for later justification of a low donation).

H2. *Individuals exploit ambiguity about other donors' endowments. Estimations about other's endowment will be higher in the simultaneous treatment than in the sequential treatment.*

5. Experimental Results

First, we find a significant negative correlation between estimation of other donors' endowments and own donation. Combining data of the 2-treatments, the coefficient of the Spearman nonparametric-test is -0.32 and highly significant ($p<0.01$). Even treatment-wise, we find a significant correlation coefficient of -0.32 for the sequential treatment ($p<0.05$), and a weakly significant correlation coefficient of -0.30 for the simultaneous treatment ($p<0.1$).

To substantiate our analysis, we additionally conduct regression analysis. We find significant negative linear correlation between estimation and donation. However, the regression coefficient of estimation is rather small. Furthermore, we find a significant

treatment effect, that we cannot explain, but as the treatment-wise Spearman nonparametric-test shows significant negative regression, we do not think that this diminishes the basic message: The negative correlation between estimation and donation is a clear indication for individuals' concern for equality of earnings.

TABLE 1. LINEAR CORRELATION BETWEEN ESTIMATION AND DONATION

	Random effects regression		Tobit regression	
Model	(1.1)	(1.2)	(1.3)	(1.4)
Estimation	-0.09**	-1.4**	-0.12**	-2.22**
	(0.04)	(0.64)	(0.06)	(0.97)
Treatment		-3.08**		-4.81**
		(1.26)		(1.92)
Treatment × Estimation		0.33**		-0.54**
		(0.16)		(0.25)
Constant	-4.22***	15.87***	4.86***	23.17***
	(0.41)	(4.87)	(0.60)	(7.47)
N	78	78	78	78
R^2 / *Pseudo* R^2	0.065	0.138	0.014	0.035

Notes: Random effects OLS Regressions with "donation" as dependent variable. */**/*** Significant at the 10/5/1 percent level. Standard errors in parentheses. Tobit models censor dependent variable on the left on 0 and on the right on 6.

Second, we do not find significant evidence for self-servingly exploitation of ambiguity about other donors' endowments. Comparing the distributions of estimations between "sequential" and "simultaneous" treatments reveals no significant difference. The p-value of two-sided Wilcoxon's rank-sum test is 0.1035.[7]

[7] One might argue that a one-sided p-value in case of an endowment estimation is weakly significant. However, a closer look at the data reveals that the results are driven by two outliers. Excluding these outliers leads to a p-value of 0.2014. Other results do not change significantly by exclusion of outliers.

6. Conclusion

First, our results suggest that individuals have a concern for equality of earnings. This result differs from previous studies by Cherry et al. (2005), Buckley & Croson (2006) and Sadrieh & Verbon (2006), but is intuitively appealing. A reason for our differing result might be our experimental method to measure equality concerns. For clarification, let us compare our setting with the experiment of Buckley & Croson (2006). In their laboratory public good game, in each (four player) group two players receive 25 tokens and the other two receive 50 tokens. But after each round individuals only receive information on average group giving. Hence, participants do not know what exactly the players with the same endowment or with the higher endowment earn. In contrast, in our two main treatments, participants hold a unique belief about average earnings of the +1-treatment participants. Individuals might be more inclined to include this (more unambiguous) information into their consideration for an appropriate donation. Alternatively, the framing might be the crucial difference. While cited literature considers classical laboratory public good games, our experiment uses a charitable giving context. Incentives might differ between contexts. For example, in laboratory public good games reciprocity concerns between players are a major incentive to contribute. Such concerns are most probably less relevant in our environment.

Second, we do not find evidence for self-servingly biased estimations. Considering existing literature, our results are somewhat surprising, but do not completely deviate. For example, Dahl & Ransom (1999) also find only weak evidence for the exploitation of ambiguity. It might simply be the case, that self-serving biased beliefs are a less persistent phenomenon. Alternatively, the norm we expected individuals would bias is not strong enough. We test whether individuals circumvent the equality of earnings

norm. However, as our paper also shows, this norm, though identifiable, is not strongly pronounced. But if the norm is of minor importance, individuals do not have to exert effort to bend the norm; they can simply abandon it without high moral costs. Finally, estimation in our experiment might be over incentivized. Maybe for participants the chance to earn money with a precise estimation is more attractive than the opportunity to increase their earnings with a biased estimation.

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Appendix: Instructions

+1treatment

You have been invited to participate in an experiment in the economics of decision making/ decision-making study/ experiment. At all times during the experiment the experimenter will answer any questions you may have. However, we ask you to refrain from talking to or in any other way communicating with other participants until all material has been collected at the end of the experiment.

You will be able to earn money during this experiment. Your respective amount will be cashed out to you after the next lecture. We will identify you only by your identification number, which you will find in the upper right hand corner of this sheet. Nobody, neither your fellow students nor the experimenter, will be able to match a decision to a particular person.

You are now allocated 6 Euros and may give any part of this money to the German Red Cross. Correspondingly, your payout from this decision will amount to the 6 Euros minus your specified donation.

This is not a hypothetical decision! Your specified donation will actually be donated to the German Red Cross. The accumulated amount of all donations made during this experiment will afterwards be transferred/ remitted to the German Red Cross by us.

Donation:

My donation to the German Red Cross: (correct to two decimal places please)

Other 2 treatments

You have been invited to participate in an experiment in the economics of decision making/ decision-making study/ experiment. At all times during the experiment the experimenter will answer any questions you may have. However, we ask you to refrain from talking to or in any other way communicating with other participants until all material has been collected at the end of the experiment.

You will be able to earn money during this experiment. Your respective amount will be cashed out to you after the next lecture. We will identify you only by your identification number, which you will find in the upper right hand corner of this sheet. Nobody, neither your fellow students nor the experimenter, will be able to match a decision to a particular person.

Please read the instructions to *both* decisions before making any choices.

Decision 1:

During a previous experiment 50 students of the Faculty of Management, Economics and Social Sciences were allocated an amount of X Euros. The participants had the possibility to donate any part of this money to the German Red Cross. Their respective payout thus amounted to X Euros minus their donation.

The participants donated an amount of 2,98 Euros on average. You are now asked to estimate the amount X, which the participants were allocated from the experimenter. The better your estimate, the higher your payout. You will be given 80 Cent, if your estimate diverges less than 10 Cent from the actual amount X and 40 Cent if your estimate diverges less than 50 Cent from the actual amount X. There will be no

cashoutfor you from this part of the experiment, if your estimate diverges more than 50 Cent from the actual amount X.

Decision 2:

You are allocated an amount of 6 Euros and may give any part of this money to the German Red Cross. Correspondingly, your payout from this decision will amount to the 6 Euros minus your specified donation.

This is not a hypothetical decision! Your specified donation will actually be donated to the German Red Cross. The accumulated amount of all donations made during this experiment will afterwards be transferred/ remitted to the German Red Cross by us.

Estimate:

My estimate of the allocated amount X: (correct to two decimal places please)

Donation:

My donation to the German Red Cross: (correct to two decimal places please)