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**Working Paper**

## On the context-dependency of inequality aversion: Experimental evidence and a stylized model

Jena Economic Research Papers, No. 2012,023

**Provided in Cooperation with:**

Max Planck Institute of Economics

*Suggested Citation:* Bäker, Agnes; Güth, Werner; Pull, Kerstin; Stadler, Manfred (2012) : On the context-dependency of inequality aversion: Experimental evidence and a stylized model, Jena Economic Research Papers, No. 2012,023, Friedrich Schiller University Jena and Max Planck Institute of Economics, Jena

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# 2012 – 023

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[www.jenecon.de](http://www.jenecon.de)

ISSN 1864-7057

The JENA ECONOMIC RESEARCH PAPERS is a joint publication of the Friedrich Schiller University and the Max Planck Institute of Economics, Jena, Germany. For editorial correspondence please contact [markus.pasche@uni-jena.de](mailto:markus.pasche@uni-jena.de).

Impressum:

Friedrich Schiller University Jena  
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D-07743 Jena  
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# On the Context-Dependency of Inequality Aversion – Experimental Evidence and a Stylized Model –

Agnes Bäker\*, Werner Güth\*\*, Kerstin Pull\* and Manfred Stadler\*\*\*

May 22, 2012

## Abstract

We consider three-person envy games with a proposer, a responder, and a dummy player. In this class of games, the proposer, rather than allocating a constant pie, chooses the pie size which the responder can then accept or reject while the dummy player can only refuse his own share. While the agreement payoffs for the responder and the dummy are exogenously given, the proposer acts as the residual claimant who - in case of responder acceptance - receives whatever is left after the two exogenously given agreement payoffs have been deducted from the pie. Consistent with earlier findings from three-person generosity games, we find inequality aversion to be strongly context-dependent and affected by the (in)equality of exogenously given agreement payoffs. Motivated by these findings, we present a stylized model on context-dependent inequality aversion that accounts for the observed effects.

Keywords: C72, C91, D63

JEL Classification: Experimental economics, envy game

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# 1 Introduction

Other regarding concerns are a major topic of research (see, e.g., Loewenstein, Thompson, and Bazerman 1989, Levine 1998, Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Charness and Rabin 2002 or Engelmann and Strobel 2004). The usual question is how much we are willing to forego in order to do good or harm to others, i.e., how we trade off own payoff against others' gains or losses (see, e.g., Klempt 2012 for new evidence on punishment in social dilemma games).

In *generosity games*, one can do good or harm to others without having to sacrifice one's own payoff. The main finding is that proposers are either equality or efficiency seeking with a clear dominance of the latter in the two-person generosity game (see Güth, Levati, and Ploner 2011).<sup>1</sup> The three-person generosity game, revealed a striking context dependency: While in the treatment with symmetric exogenous agreement payoffs most pie choices are equality seeking, in the treatment with unequal given agreement payoffs, efficiency seeking (i.e. choosing the largest possible pie) clearly dominates (see Güth *et al.* 2010).

In this paper, we analyze a similar class of games, the so-called *envy games* (see Ciognani *et al.* 2012). Envy games feature the proposer – rather than the responder or the dummy player – as the residual claimant: As in generosity games, the proposer chooses a pie size from a generic interval which the responder can then accept or reject whereas the dummy player can only refuse his own payoff. Other than in generosity games, in case of responder acceptance, the proposer payoff is given by the chosen pie size minus the exogenously given agreement payoffs for the responder and the dummy player.

A self-interested proposer will clearly gain from choosing a large pie – if the responder accepts. Both, fear of envious<sup>2</sup> or inequality averse responders as well as intrinsic preferences for equal outcomes might lead the proposer to choose a lower pie size. In order to disentangle whether fear of rejection or intrinsic equality concerns induce equality seeking pie choices (see Forsythe *et al.* 1994 for a similar approach), we also consider a dictator variant of the envy game (DEG) besides the ultimatum variant (UEG).

Inspired by the results of Güth *et al.* (2010) on 3-person-generosity games, we expect the extent of inequality aversion as displayed by proposer and responder to depend

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<sup>1</sup>On the role of efficiency or social welfare concerns as compared to concerns for equality in other simple distribution experiments see, e.g., Engelmann, and Strobel 2004, Loewenstein, Thompson, and Bazerman 1989 or Charness, and Rabin, 2002.

<sup>2</sup>See Kirchsteiger 1994 on the role of envy in ultimatum games.

on the (in)equality of the two exogenously given agreement payoffs for the responder and the dummy: (un)equal exogenously given agreement payments should (weaken) strengthen inequality aversion of the proposer and the responder. While much of the preceding literature on inequality aversion aims at assessing the predictive power of the corresponding behavioral models by, e.g., Fehr and Schmidt (1999) or Bolton and Ockenfels (2000)<sup>3</sup>, we are not aware of any attempts in the literature to model inequality aversion in a way that accounts for a potential context-dependency.

To explore the potential context dependency of inequality aversion, we focus on five different UEG and DEG variants (see Table 1):

- three UEGs where either the two exogenously given agreement payoffs for the responder and the dummy player are equal or they favor one more than the other, and
- two DEGs: one with equal and one with unequal exogenously given agreement payoffs for the two dummy players.

	Who is exogenously favored?	
UEG	responder   dummy	no one
DEG	one of two dummies	no one

Table 1: The five games/experimental treatments

Following our experimental analysis, we present a stylized model that captures the observed context-dependency of inequality aversion. Our model is based on Bolton and Ockenfels (2000), but – besides introducing a third player – additionally allows for inequality aversion being affected by the (in)equality of exogenously given agreement payoffs. In spite of its simplicity, our model is found to justify our basic findings.

The remainder of the paper is organized as follows: In section 2, we introduce the games formally and describe the experimental protocol. In Section 3, we analyze the data and state our main results. Section 4 presents a highly stylized model that accounts for the observed effects. Section 5 concludes.

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<sup>3</sup>Tests of the explanatory power of these models are presented in Engelmann and Strobel (2004), Charness and Rabin (2002) or Loewenstein, Thompson, and Bazerman (1989).

## 2 Experimental Design

### 2.1 The Class of Games

Let  $X$  denote the proposer,  $Y$  the responder, and  $Z$  the dummy player in the ultimatum 3-person envy game (UEG). Further, let  $p$  be the pie size, i.e., the monetary amount which the three players can share. The decision process in the UEG is as follows:

- First  $X$  chooses  $p \in [\underline{p}, \bar{p}]$  where  $0 < \underline{p} < \bar{p}$  (for further restrictions on  $\underline{p}$  and  $\bar{p}$  see below).
- After learning the choice of  $p$ , responder  $Y$  can either accept it ( $\delta(p) = 1$ ) or reject it ( $\delta(p) = 0$ ).
- Only in case of  $\delta(p) = 1$ , dummy player  $Z$  can accept ( $\rho(p) = 1$ ) or reject ( $\rho(p) = 0$ ) his share what ends the game.

Let  $y$  and  $z$  denote the exogenously given positive agreement payoffs of  $Y$  and  $Z$ , respectively, satisfying  $\min\{y, z\} > \underline{p} - y - z \geq 0$  so that  $p = \underline{p}$  would give less to  $X$  than to  $Y$  and  $Z$  but still cause no loss for  $X$ . Furthermore,  $\bar{p} - y - z > \max\{y, z\}$  allows proposer  $X$  to earn more than the others. The payoffs depend on the choices and the exogenous payoff parameters as follows:

- $X$  earns  $\delta(p)(p - y - z)$ ,
- $Y$  earns  $\delta(p)y$ , and
- $Z$  earns  $\rho(p)\delta(p)z$ .

The three UEGs differ by imposing either  $y > z$ ,  $y = z$ , or  $y < z$ . The parameter restrictions guarantee that  $X$  can claim less, the same, or more than what the others get in case of  $\delta(p) = 1$  and  $\rho(p)\delta(p) = 1$ , respectively.

The two DEGs with payoff  $p - x - y$  for  $X$ , irrespective of  $\delta(p)$  and  $\rho(p)$  allow the two dummy players  $Y$  and  $Z$  to individually refuse their own share. Their earnings hence are  $\delta(p)y$  and  $\rho(p)z$ , respectively.

If all three players are only concerned about their own monetary payoff, the solution requires  $\delta^*(p) = 1$ ,  $\rho^*(p) = 1$  for all  $p$  and  $p^* = \bar{p}$  implying the payoff vector  $(\bar{p} - x - z, y, z)$  – if  $Y$ 's behavior is anticipated by  $X$  in the UEGs. In the DEGs, the latter assumption is not needed.

## 2.2 Experimental Protocol

As we are interested in the “natural” attitudes of participants who confront a three-person envy game for the first time, we implemented a one-shot game. To let game inexperienced participants seriously consider their choice, we employed a pen-and-paper classroom experiment.<sup>4</sup> The classroom experiment was conducted at the University of Tübingen with participants of an introductory microeconomics course right at the beginning of the semester.

After reading the instructions carefully and privately answering questions (see the English translation of material in the appendix), participants filled out the control questionnaires and the decision forms. Only the decisions of students who correctly answered the control questions entered the empirical analysis. Rather than playing the game sequentially, we implemented it as a normal form game by employing the strategy method for players  $Y$  and  $Z$ . Setting  $\underline{p} = 12$  and  $\bar{p} = 22$ , we allowed only for integer pie choices  $p \in [\underline{p} = 12, \bar{p} = 22]$ . Thus,  $X$  had eleven possible pie choices  $p$ , and  $Y$  chose  $\delta(p) \in \{0, 1\}$  for each of these possible values of  $p$ .  $Z$  could only decide whether, in case of  $\delta(p) = 1$ , he accepted  $z$  or not by choosing  $\rho(p) \in \{0, 1\}$ .

## 3 Results

### 3.1 Structure of the Data

Of all students participating in the experiment, 266 answered all control questions correctly and were included in the data set. Table 2 displays the number of participants with correct answers to all control questions, separately for each role ( $X, Y, Z$ ) and all game variants.

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<sup>4</sup>Different colors were used for the instructions of the five different treatments in Table 1. After blocks of  $X$ -,  $Y$ -, and  $Z$ -participants were formed in the large lecture room, neighboring participants in the same block and the same role type ( $X, Y$ , or  $Z$ ) received the instructions, control questionnaires, and decision forms of different treatments to discourage any attempts to learn from others.

Game variant	X	Y	Z
UEG( $y = 9, z = 3$ )	19	26	12
UEG( $y = 6, z = 6$ )	20	30	9
UEG( $y = 3, z = 9$ )	22	27	10
DEG( $y = 9, z = 3$ )	25	14	6
DEG( $y = 6, z = 6$ )	23	14	9
$\Sigma$	109	111	46

Table 2: Number of participants in the different game variants and roles

### 3.2 Proposer Behavior

Let us first focus on the  $X$ -decisions: Figure 1a combines all UEG pie choices over all three UEG treatments, and Figure 1b combines all DEG pie choices over the two DEG treatments. In both, UEG and DEG, the by far most prominent pie choice is the maximal pie size  $p = 22$ . As could be expected, the share of proposers choosing the maximal pie size in UEG (48 percent) is substantially – and according to a Wilcoxon rank-sum test also significantly (5 percent significance level) – lower than the corresponding share in DEG (70 percent).

While choosing the maximum pie size may indicate efficiency seeking, in the envy game, it is highly self-serving at the same time. Proposers who choose less than the maximum pie size in DEG show signs of intrinsic inequality aversion, in UEG they are additionally motivated by fear of rejection and choose smaller pie sizes.

*Result 1:* Pie choices in UEG are systematically smaller than pie choices in DEG.

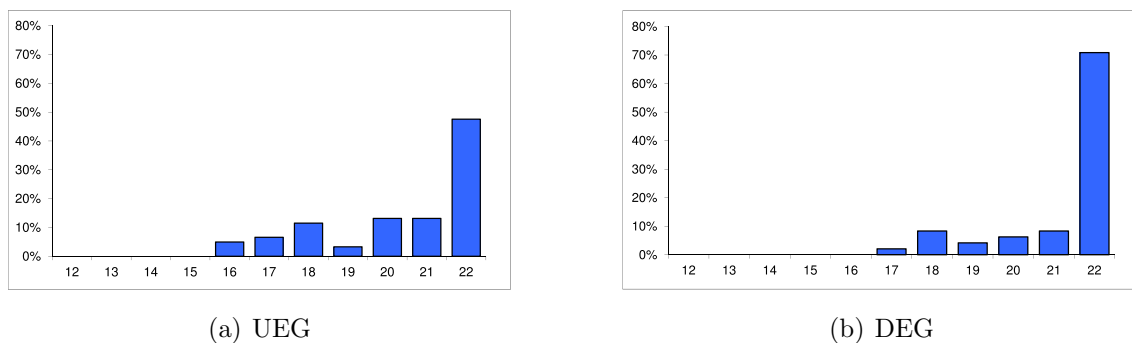
Figure 1: Pie choices of proposers  $X$  in (a) UEG and in (b) DEG, both pooled across game variants

Figure 2 shows the pie choices for the different UEG variants. In each of them, choosing the maximum pie size is the most prominent choice.



However, in the symmetric UEG with  $y = 6, z = 6$  (Figure 2b), equality-seeking is almost as prominent as efficiency-seeking. In this treatment, proposers either opt for equality by choosing  $p = 18$  (30 percent) or they choose  $\bar{p} = 22$  (35 percent). In the asymmetric UEG with  $y = 9$  and  $z = 3$  (Figure 2a), choosing the maximal pie size  $\bar{p} = 22$  is far more prominent (53 percent) than the 32 percent of proposers who choose  $p = 21$  and thus equalized their own payoff with that of the responder  $Y$ . In this treatment, no proposer tries to equalize with the dummy player  $Z$  by choosing  $p = 15$ , and no proposer chooses  $p = 18$ , the average of  $y$  and  $z$ . Similarly, in the asymmetric UEG with  $y = 3$  and  $z = 9$  (Figure 2c), most proposers choose the maximal pie size  $\bar{p} = 22$ , while  $p = 15$  (equality with responder  $Y$ ),  $p = 21$  (equality with the dummy  $Z$ ), or  $p = 18$  (equality with average of  $y$  and  $z$ ) are rarely chosen.

In total, pie choices in the asymmetric UEGs are on average higher than the ones in the symmetric UEG. There is a (at the five percent significance level) statistically significant difference between pie choices in the asymmetric UEGs and the symmetric UEG according to a Wilcoxon rank-sum test.

*Result 2:* In the symmetric UEG, pie choices are systematically smaller than pie choices in the asymmetric UEGs.

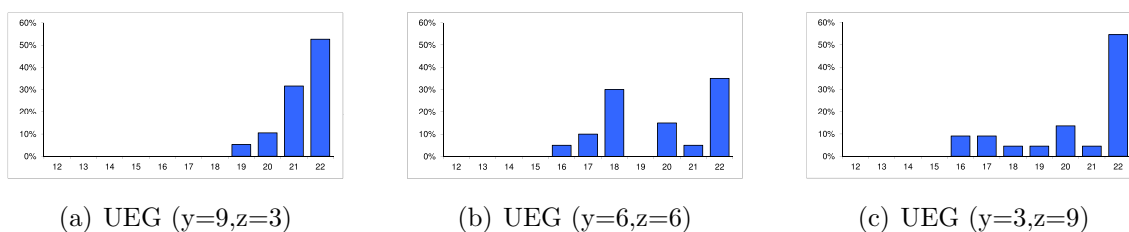


Figure 2: Pie choices of proposers  $X$  in UEG by treatment

Figure 3 displays the pie choices for the two DEG variants. In each of them choosing the maximum pie size is the by far most prominent choice.

In the symmetric DEG with  $y = 6$  and  $z = 6$  (Figure 3b) we find - besides the clear mode  $\bar{p} = 22$  (70 percent) - a non-negligible share (13 percent) of proposers to choose equality. Apparently, the possibility to equalize with *both* dummy players strengthens the intrinsic inequality aversion of proposers. In the asymmetric DEG (Figure 3a), most proposers choose  $p = 22$  and few  $p = 21$  achieving equality with the better off dummy. Nobody strives for equality with the less well off dummy by choosing  $p = 15$ .

In sum, dictators, on average, choose slightly higher pie sizes in the asymmetric DEG. While a t-test suggests this difference to be statistically significant at the ten

percent significance level, an additionally performed Wilcoxon rank-sum test does not confirm this result ( $p\text{-value} > 10\%$ ).

*Result 3:* In the symmetric DEG, pie choices are slightly smaller than those in the asymmetric DEG.

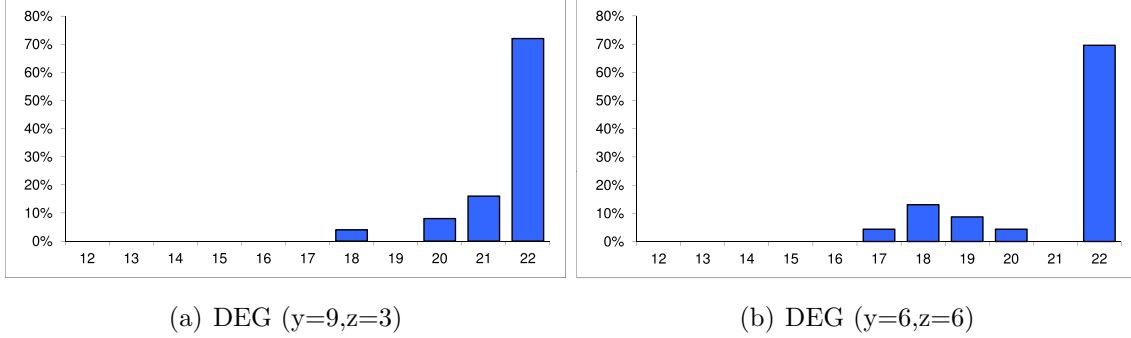


Figure 3: Pie choices of proposers X in DEG by treatment

### 3.3 Responder Behavior

Figure 4 displays the acceptance behavior of responders  $Y$  in the different UEG variants. Due to the strategy method, we have information on acceptance behavior concerning all possible pie sizes from all responders.

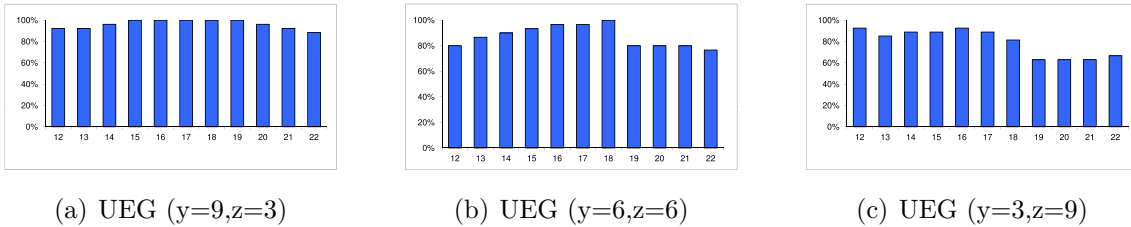


Figure 4: Acceptance rates for the eleven possible pie sizes  $p$ , separated by game variants

Comparing the different UEG variants, it is striking that acceptance rates increase in  $Y$ 's agreement payoff: For any pie size, acceptance is highest in the asymmetric UEG with  $y = 9$  and  $z = 3$  and lowest in the asymmetric UEG with  $y = 3$  and  $z = 9$  with the symmetric UEG lying in between.

In the symmetric UEG (Figure 4b), the highest acceptance rate (100 percent) is achieved for  $p = 18$ , equalizing all payoffs. All other pie choices run a risk of rejection. On the whole, acceptance rates for the different pie choices tend to display

an inverted U shape with a maximum at a  $p = 18$ , indicating inequality aversion of  $Y$ -participants.

In the asymmetric UEG with  $y = 9$  and  $z = 3$  (Figure 4a), “medium” pie choices ( $15 \leq p \leq 19$ ) are always accepted whereas lower pie choices ( $p \leq 14$ ) as well as higher ones ( $p \geq 20$ ) confront a risk of rejection. Interestingly, equality of  $X$  and  $Y$  ( $p = 21$ ) is not particularly valued (second lowest acceptance rate).  $Y$  rather seems to compare  $X$ ’s payoff with the average of  $y$  and  $z$ .

In the asymmetric UEG with  $y = 3$  and  $z = 9$  (Figure 4c), the picture looks quite different: no single pie choice - not even the most humble proposal of  $p = 12$  implying a zero-payoff for the  $X$ -proposer - is accepted by all of the responders. Rather, acceptance rates vary between 63 and 93 percent with the two “partial equality” seeking pie choices  $p = 15$  (equality with  $Y$ ) and  $p = 21$  (equality with  $Z$ ) not “sticking out” in terms of higher acceptance rates.

*Result 4:* In the symmetric UEG, acceptance rates display an inverted U-shape and are highest for  $p = 18$ . In the asymmetric UEG variants, rejection tendencies of  $Y$ -participants are less clear.

## 4 A Stylized Model on Context-Dependent Inequality Aversion

Based on Bolton and Ockenfels (2000), we present a highly stylized model that acknowledges the apparent context-dependency of inequality aversion. Besides introducing a third person into the framework developed by Bolton and Ockenfels (2000), our model accounts for the fact that unequal exogenous agreement payoffs apparently *weaken* inequality aversion while equal exogenous agreement payoffs *strengthen* it.

Based on quadratic utility functions, let the proposer’s utility be

$$U_x = (p - y - z) - ((\alpha_x - |y - z|)/2)(p - 2y - z)^2 \\ - ((\beta_x - |y - z|)/2)(p - y - 2z)^2 - (\gamma_x/2)(y - z)^2 ,$$

where  $\alpha_x \geq \beta_x > |y - z|$  is assumed to hold throughout.

The first term in the utility function ( $p - y - z = x$ ) captures the proposer’s self interest.  $\alpha_x$  indicates how the proposer values an inequality between his own payoff  $p - y - z$  and the payoff of the responder  $y$ , and  $\beta_x$  and  $\gamma_x$  indicate how the proposer

values an inequality between the payoff of the dummy  $z$  and his own payoff  $(p - y - z)$  and an inequality between the payoff of the dummy  $z$  and the payoff of the responder  $(y)$ , respectively.

The rationale for assuming  $\alpha_x \geq \beta_x$  is that  $\beta_x$  only captures intrinsic inequality aversion while – in case of UEG –  $\alpha_x$  additionally indicates the proposer's fear of rejection due to inequality averse or envious responders. Consequently, in DEG,  $\alpha_x = \beta_x$ .

With  $|y - z|$  we introduce a new term, appropriate to capture a potentially dampening effect of exogenously imposed inequality on (intrinsic as well as fear-of-rejection-driven) inequality aversion.

Maximizing the utility function with respect to the pie size  $p$  leads to

$$p^* = y + z + \frac{1 + (\alpha_x - |y - z|)y + (\beta_x - |y - z|)z}{(\alpha_x + \beta_x - 2|y - z|)}.$$

The partial effect of an increase in  $\alpha_x$  – as compared to  $\beta_x$  – is negative for  $y \geq z$  but ambiguous for  $y < z$  due to counteracting effects. As a result, in a pooled data set (across the different game variants concerning  $|y - z|$ ) one would predict lower pie choices in UEG (where  $\alpha_x > \beta_x$ ) than in DEG (where  $\alpha_x = \beta_x$ ). This provides a rationale for *Result 1*.

Further, the influence of unequal exogenous agreement payoffs  $y$  and  $z$  ( $y + z = 12$  is constant across all games) on pie choice  $p^*$  is clearly positive in the case of  $y > z$  but ambiguous in case of  $y < z$ . Consequently, from our stylized model, we expect inequality aversion (which induces the proposer to select a smaller pie) to be stronger in the symmetric UEG than in the asymmetric UEG with  $y > z$ . For the asymmetric UEG with  $y < z$  the predictions are not as clear-cut. The experimental evidence summarized in *Result 2*, however, suggests higher pie choices in both cases of asymmetry.

In DEG (where  $\alpha_x = \beta_x$ ), more inequality in the exogenous agreement payoffs (larger  $|y - z|$ ) clearly implies higher pie choices of the proposer compared to the symmetric DEG with  $y = z$ . This inequality effect closely coincides with *Result 3*.

For the responder, we specify responder utility in an analogous way as

$$U_y = y - ((\alpha_y - |y - z|)/2)(p - 2y - z)^2 \\ - ((\beta_y - |y - z|)/2)(p - y - 2z)^2 - (\gamma_y/2)(y - z)^2$$

where  $\alpha_y \geq \beta_y > |y - z|$  is assumed to hold throughout. Here, a difference between  $\alpha_y$  and  $\beta_y$  captures feelings of envy by the responder.

Utility of the responder is maximal at pie size

$$p^{**} = \frac{2\alpha_y + \beta_y - 3|y - z|}{\alpha_y + \beta_y - 2|y - z|} y + \frac{\alpha_y + 2\beta_y - 3|y - z|}{\alpha_y + \beta_y - 2|y - z|} z .$$

In case of equal exogenous agreement payoffs  $y = z$ , this induces  $p^{**} = 3(y + z)/2$ . For the case of unequal exogenous agreement payoffs, it implies  $p^{**} > 3(y + z)/2$  in case of  $y > z$ . The effect in case of  $y < z$ , again, is ambiguous. Consequently, the model predicts that, in the symmetric UEG, acceptance rates have a peak at an intermediate pie size  $p^{**} = 18$ . However, if  $y > z$ , the peak will shift to the right whereas for  $y < z$  the peak may shift in both directions. *Result 4* strongly supports our supposition concerning the symmetric UEG.

## 5 Conclusion

Does inequality in exogenously imposed agreement payoffs affect whether we engage in other regarding concerns like efficiency and equality seeking and, if so, how do we solve the conflict between inefficiency and inequality aversion? The answers from our three-person dictator and ultimatum envy games are confirmative in both cases. Yes, we care for efficiency and more so in case of unavoidable inequality of agreement payoffs. And yes, we care for equality and more so if general equality is possible (equal agreement payoffs).

Further, the evidence of responder envy and how it reacts to exogenously imposed advantage ( $y > z$ ) or disadvantage ( $y < z$ ) provides ample evidence that referring to the class of experimental games as "envy games" captures their crucial dilemma. As shown by the DEG and UEG comparisons, envy can trigger mutually harmful rejections of which proposer participants seem to be quite aware.<sup>5</sup>

Our experimental data thus provide evidence for efficiency and equality seeking with both tendencies being coexisting but relatively weaker or stronger, depending on the context, specifically on whether the two exogenously imposed (agreement) payoffs are equal or not. To capture this, we propose a hopefully innovative adaption of inequality aversion which allows to justify our stylized findings.

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<sup>5</sup>An experiment of a two-person envy game without the  $Z$ -player (Cicognani et al. 2012) revealed envy which, however, did not prevent most  $X$ -participants from choosing the maximum pie size.

## Appendix

### Instructions for the UEG

Thank you for your participation in this experiment. You will interact with two other participants. We will not inform you about their identity. Due to time constraints it is not possible to give you the money that you can earn in this experiment today. But on presentation of your code-card you will receive it after next week's lecture.

For the statistical analysis of the decision-making process, it is essential that you make your decision independently of other participants. Therefore we ask you to refrain from contacting anyone; otherwise we have to exclude you from the experiment and the payoff.

How is your payoff determined? Three interacting participants - you and two other randomly selected participants - will each be randomly assigned one of three roles, namely X, Y, and Z. The tasks of these roles vary.

The participant in role X can choose an integer amount  $B$  between 12 and 22 ( $12 \leq B \leq 22$ ), which will be divided among X, Y, and Z if the participant in role Y accepts the chosen amount  $B$ . That implies that the participant in role Y has to decide for every possible amount  $B$  whether he accepts or not.

If the participant in role Y accepts the offer,

- the participant in role X receives a payoff of [a-variant: Euro  $B-9-3$ , b-variant: Euro  $B-6-6$ , c-variant: Euro  $B-3-9$ ]
- the participant in role Y receives a payoff of [a-variant: Euro 9, b-variant: Euro 6, c-variant: Euro 3]
- the participant in role Z receives a payoff of [a-variant: Euro 3, b-variant: Euro 6, c-variant: Euro 9] on the condition that the participant in role Z accepts his amount.

If the participant in role Z rejects his payoff, he loses the payoff. This has no effect on the payoffs of the participants in roles X and Y.

But if the participant in role Y rejects the offer, all three parties receive nothing.

These are the rules for the interaction of the participants in role X, Y, and Z. You will be informed shortly of your role.

First, we briefly recapitulate the rules again:

- X chooses an integer amount  $B$  with  $12 \leq B \leq 22$
- For every given amount  $B$ , Y has to decide whether he accepts the offer or not.
- Z has to decide whether he accepts his amount or not.
- If Y accepts the decision of X, and if Z also accepts his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro  $B-9-3$ , b-variant: Euro  $B-6-6$ , c-variant: Euro  $B-3-9$ ]
  - Y: [a-variant: Euro 9, b-variant: Euro 6, c-variant: Euro 3]
  - Z: [a-variant: Euro 3, b-variant: Euro 6, c-variant: Euro 9]
- If Y accepts the decision of X, but Z rejects his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro  $B-9-3$ , b-variant: Euro  $B-6-6$ , c-variant: Euro  $B-3-9$ ]
  - Y: [a-variant: Euro 9, b-variant: Euro 6, c-variant: Euro 3]
  - Z: Euro 0
- If Y rejects the decision of X, then X, Y, and Z receive nothing (Euro 0).

## Instructions for the DEG

Thank you for your participation in this experiment. You will interact with two other participants. We will not inform you about their identity. Due to time constraints it is not possible to give you the money that you can earn in this experiment today. But on presentation of your code-card you will receive it after next week's lecture.

For the statistical analysis of the decision-making process, it is essential that you make your decision independently of other participants. Therefore we ask you to refrain from contacting anyone; otherwise we have to exclude you from the experiment and the payoff.

How is your payoff determined? Three interacting participants - you and two other randomly selected participants - will each be randomly assigned one of three roles, namely X, Y, and Z. The tasks of these roles vary.

The participant in role X can choose an integer amount  $B$  between 12 and 22 ( $12 \leq B \leq 22$ ), which will be divided among X, Y, and Z.

For the amount  $B$  chosen by X

- the participant in role X receives a payoff of [a-variant: Euro B-9-3, b-variant: Euro B-6-6]
- the participant in role Y receives a payoff of [a-variant: Euro 9, b-variant: Euro 6] on the condition that the participant in role Y accepts his amount
- the participant in role Z receives a payoff of [a-variant: Euro 3, b-variant: Euro 6] on the condition that the participant in role Z accepts his amount.

If the participant in role Y rejects his payoff, he loses the payoff. This has no effect on the payoffs of the participants in roles X and Z. The same applies to the participant in role Z. If he rejects his payoff, he loses the payoff. This has no effect on the payoffs of the participants in roles X and Y.

These are the rules for the interaction of the participants in role X, Y, and Z. You will be informed shortly of your role.

First, we briefly recapitulate the rules again:

- X chooses an integer amount  $B$  with  $12 \leq B \leq 22$
- Y has to decide whether he accepts his amount or not
- Z has to decide whether he accepts his amount or not.
- If Y accepts his payoff, and if Z also accepts his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro B-9-3, b-variant: Euro B-6-6]
  - Y: [a-variant: Euro 9, b-variant: Euro 6]
  - Z: [a-variant: Euro 3, b-variant: Euro 6]
- If Y accepts his payoff, but Z rejects his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro B-9-3, b-variant: Euro B-6-6]
  - Y: [a-variant: Euro 9, b-variant: Euro 6]
  - Z: Euro 0
- If Y rejects his payoff, but Z accepts his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro B-9-3, b-variant: Euro B-6-6]



- Y: Euro 0
- Z: [a-variant: Euro 3, b-variant: Euro 6]
- If Y rejects his payoff, and Z also rejects his payoff, the payoffs for the following roles are
  - X: [a-variant: Euro B-9-3, b-variant: Euro B-6-6]
  - Y: Euro 0
  - Z: Euro 0

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