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Werner Güth
Kerstin Pull
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Agnes Stribeck

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Max Planck Institute of Economics
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D-07745 Jena
www.econ.mpg.de

Equity versus Efficiency? - Evidence from Three-Person Generosity Experiments -

Werner Güth[*], Kerstin Pull[†], Manfred Stadler[‡], and Agnes Stribeck[§]

March 22, 2010

Abstract

In two-person generosity games the proposer's agreement payoff is exogenously given whereas that of the responder is endogenously determined by the proposer's choice of the pie size. Earlier results for two-person generosity games show that participants seem to care more for efficiency than for equity. In three-person generosity games equal agreement payoffs for two of the players are either exogenously excluded or imposed. We predict that the latter crowds out - or at least weakens - efficiency seeking. Our treatments rely on a 2x3 factorial design differing in whether the responder or the third (dummy) player is the residual claimant and whether the proposer's agreement payoff is larger, equal, or smaller than the other exogenously given agreement payoff.

Keywords: generosity game; equity; efficiency; experiment
JEL Classifications: C7, C91, D03, D3

[*]Max Planck Institute of Economics, 07745 Jena, Germany, phone: +49 3641 686 620, email: gueth@econ.mpg.de

[†]University of Tübingen, 72074 Tübingen, Germany, phone: +49 7071 29 78 186, email: kerstin.pull@uni-tuebingen.de

[‡]University of Tübingen, 72074 Tübingen, Germany, phone: +49 7071 29 72 122, email: manfred.stadler@uni-tuebingen.de

[§]University of Tübingen, 72074 Tübingen, Germany, phone: +49 7071 29 74 916, email: agnes.stribeck@uni-tuebingen.de

I Introduction

There is ample evidence from the laboratory as well as from the field that people are not only motivated by self-interest but that they also care for the payoffs of others. Whereas in most experimental games a player can only increase others' payoff by giving up something himself, in the so-called "generosity game" (Güth 2010) there is no trade-off between self-interest and other-regarding concerns. The proposer's agreement payoff is exogenously fixed and he decides only on the size of the "pie", i.e. on the monetary amount that is at stake. While the generosity game is still characterized by scarcity (there is a finite upper bound for the pie size), there is no trade-off between one's own and another player's agreement payoff. Rather the conflict is between being "generous" or efficiency seeking on the one hand (by choosing the largest possible pie) or equity seeking on the other (by choosing a pie size twice as large as one's own agreement payoff).

According to the experimental analysis of Güth, Levati and Ploner (2009) on two-person generosity games, both types of concerns, efficiency/generosity as well as equity seeking are observable in dictator and ultimatum game settings, but efficiency/generosity concerns are dominating. While it may be hard to think of direct analogies of the generosity game in real life situations, the range of practical applications still seems to be wide: for instance, people may give advice to others (in personal interactions or online communities) for a fixed fee (or no fee at all) without directly gaining from the amount the client gains.

While one may also explore generosity in the field by, e.g., econometric studies of charitable giving or other acts of solidarity, in what follows, we proceed to further elaborate on the experimental analysis of generosity, allowing us to investigate in more detail when and why people are generous. In so doing, however, we are aware that the experimental approach can at best only supplement field research.

Unlike the analysis of two-person generosity games with dictator and ultimatum game rules by Güth, Levati and Ploner (2009), we use a three-person set-up similar to the one Güth and Van Damme (1999) use for the ultimatum game with a fixed pie size. In our three-person set-up, the proposer (player X) chooses the size of the pie, the responder (player Y) then decides on either acceptance or rejection (with rejection leading to zero payoffs for all the three players) whereas the powerless dummy (player Z) can only accept or reject whatever is being offered to him (his decision does not influence the two others' payoffs).

The agreement payoffs of two players are given by the rules of the game so that the choice of the pie size determines only the payoff of one player. This "residual claimant" may either be the responder Y (Z-Game with the agreement payoffs of X and Z being given) or it may be the dummy player Z (Y-Game with the agreement payoffs of X and Y being given). We expect generosity concerns (also in the form of "strategic generosity") to be stronger in the Z- than in the Y-Game, and we further expect to observe crowding out of generosity concerns in those treatments where the two exogenously given agreement payoffs are equal: when proposers can propose equal payoffs for all three players, we expect efficiency seeking to be considerably weakened and dominated by equity concerns.

Equity is typically important when groups of individuals jointly invest efforts whose proceeds then have to be distributed (see Homans, 1961). This is experimentally captured by so-called advance production protocols where participants first have to costly produce what they finally can share (see the reward allocation experiments by Mikula, 1973 and Shapiro, 1975, and the advance production experiments by Gantner, Güth, and Königstein, 2001; Hacket, 1993, and Königstein, 2000). Most reward allocation experiments, however, distribute "manna from heaven". What the parties can share is given to them as a gift without any attempt of inducing entitlement (Hoffman and Spitzer, 1985). Let us admit it frankly: We also allow participants to distribute "manna from heaven". Since it is far from obvious how to implement an advance production protocol for generosity bargaining games, entitlement could be induced via auctioning off player roles.[1]

We continue as follows: Section II introduces the experimental design with the class of games that we study, the main hypotheses and the experimental protocol. Section III first describes the structure of our experimental data and then elaborates on proposer as well as responder and dummy behavior. Section IV concludes.

II Experimental design

The class of games

Our extended three-person generosity game involves three players:

- Proposer X, whose exogenous agreement payoff is $x\,(>0)$, chooses the pie size p from some interval $\left[\underline{p}, \overline{p}\right]$ with $0 \leq \underline{p} < x < \overline{p}$.
- Responder Y accepts $(\delta(p) = 1)$ or rejects $(\delta(p) = 0)$ proposer X's choice of pie size p.
- Recipient Z can only reject what is assigned to him $(\rho(p) = 0)$ or not $(\rho(p) = 1)$, rendering Z a dummy player.

If played sequentially, the decision process thus consists of the following three stages where all former decisions are commonly known:

(i) X chooses $p \in \left[\underline{p}, \overline{p}\right]$.

[1] One could independently auction off the player positions (see Güth and Schwarze, 1983; Güth and Tietz, 1986) meaning that players earn only what they get in the game minus their role price as determined by the auction.

(ii) Y accepts $(\delta(p) = 1)$ or rejects $(\delta(p) = 0)$ with $\delta(p) = 0$ implying the end of the game with all three players earning nothing.

(iii) In case of $\delta(p) = 1$, dummy player Z can collect $(\rho(p) = 1)$ or refuse $(\rho(p) = 0)$ his share of p.

The payoff of player X is given by $\delta(p)\,x$. Regarding the payoffs of players Y and Z we distinguish two different settings:

- Y-games where Y earns $\delta(p)\,y$ with $y > 0$ and $\underline{p} \geq x + y$ yielding the payoff $\rho(p)\,\delta(p)\,(p - x - y)$ for Z and
- Z-games where Y earns $\delta(p)\,(p - x - z)$ with $z > 0$ and $\underline{p} \geq x + z$ yielding the payoff $\rho(p)\,\delta(p)\,z$ for Z.

Thus in Y-games, the residual claimant is the dummy Z whereas in Z-games the responder Y claims the residual. For both, the Y-game and the Z-game, we distinguish three constellations for the two exogenously given agreement payoffs where we impose $4k \leq \underline{p} < 7k < \overline{p}$ with $k > 0$ as a normalized (minimal) unit.

$x + y$	Y-games	subname	Z-games	$x + z$
	$x = 3k > y = k$	a	$x = 3k > z = k$	
$4k$	$x = 2k = y$	b	$x = 2k = z$	$4k$
	$x = k < y = 3k$	c	$x = k < z = 3k$	

Table 1: The three Y-, respectively Z-games based on the same interval $\left[\underline{p}, \overline{p}\right]$ with $4k \leq \underline{p} < 7k < \overline{p}$.

The benchmark solutions are based on commonly known priority of opportunism in the sense of own payoff maximization. This requires from player Z the choice of $\rho^*(p) = 1$ if $\delta(p)\,z > 0$ in Z-games and if $\delta(p)\,(p - x - y) > 0$ in Y-games respectively. Similarly, Y should choose $\delta^*(p) = 1$ due to $y > 0$

in Y-games and in case of $p - x - z > 0$ in Z-games. Only for $p = x + z$ in Z-games secondary concerns of responder Y would come into play, e.g. by suggesting $\delta(p) = 1$ when caring secondarily for efficiency or $\delta(p) = 0$ when secondarily caring for equity.

This leaves X's choice of p indeterminate

- in the interval $p \in [\underline{p}, \overline{p}]$ in Y-games where due to $y > 0$ one has $\delta^*(p) = 1$ for all $p \in [\underline{p}, \overline{p}]$ and
- in the interval $p \in (x + z, \overline{p}]$ in Z-games where due to $p - x - z > 0$ one has $\delta^*(p) = 1$.

This indeterminateness can, however, be avoided by assuming

- either arbitrarily weak efficiency concerns[2] implying the unambiguous play prediction $p^* = \overline{p}$, $\delta^*(\overline{p}) = 1$ and $\rho^*(\overline{p}) = 1$
- or arbitrarily weak equity seeking[3] with the unambiguous play prediction $p^* = 6k$, $\delta^*(6k) = 1$, and $\rho^*(6k) = 1$ for the symmetric b-variants of Y-games ($x = 2k = y$) and Z-games ($x = 2k = z$) due to $\overline{p} \geq 6k$.

  For the asymmetric a- and c-variants of Y- and Z-games with $x \neq y$, partial inequity avoidance would suggest $p = 5k$ or $p = 7k$ to avoid unequal payoffs between X and Y, respectively X and Z. Furthermore, proposers in the asymmetric a- and c-variants may as well consider the average $\frac{x+y}{2}$, respectively $\frac{x+z}{2}$ of the exogenously given payoffs and choose $p = 6k$ as in the symmetric b-variants.

Proposition: The benchmark prediction, based on commonly known priority of opportunism and only secondary concerns for either efficiency or equity, suggests that

[2] Actually, we could rely on lexicographic preferences, primarily for own (monetary) earnings and only secondarily for efficiency.

[3] Meaning to prefer an equal payoff distribution over an unequal one when both yield the same payoff for the proposer.

- dummy Z, observing $\delta(p) = 1$, chooses $\rho^*(p) = 1$ in Z-games and, in case of $p > x + y$, in Y-games; of course, Z will reject($\rho^*(p) = 0$) if $\delta(p)(p - x - y)$ is negative in Y-games, and will be indifferent if his share is 0, i.e., in case of $\delta(p) z = 0$ or $\delta(p)(p - x - y) = 0$;

- responder Y chooses $\delta^*(p) = 1$ in Y-games and, in case of $p > x + z$, in Z-games; if $p = x + z$ in Z-games a secondary concern of Y for efficiency suggests $\delta^*(p) = 1$ whereas a secondary concern of Y for equity calls for $\delta^*(p) = 0$; of course if $p < x + z$ in Z-games, responder Y should reject ($\delta^*(p) = 0$);

- proposer X, due to $\overline{p} > x + y$ and $\overline{p} > x + z$, will select $\rho^* = \overline{p}$ when secondarily caring for efficiency and $p^* = 6k$ in case of the (b)-variants and some $p^* \in \{5k, 6k, 7k\}$ in the asymmetric a- and c-variants of Table 1.

Note that we do not need to assume that proposer X is aware of the other players' secondary concerns since all his predicted choices yield positive agreement payoffs for Y and Z and thus avoid intervention of their secondary choices.

The findings for two-person generosity experiments (see Güth, Levati and Ploner 2009) seem to suggest the choices $p = \overline{p}$ (efficiency seeking/generosity) and $p = 5k$ or $p = 7k$ (equity seeking). In what follows, we abstain from speculating what to predict when both concerns (efficiency and equity) coexist and rather ask which of the two concerns dominates the other in each game variant.

Experimental protocol

As we are mainly interested in the "natural" attitudes of participants who confront a three-person generosity game for the first time and only once rather than in experience effects, we decided to implement a one-shot game.

In such a one-shot game, still, inexperienced participants should seriously consider their choice. This is more likely when using pen and paper in a classroom experiment than in a computer laboratory.

The experiments were run as classroom experiments at the Eberhard Karls Universität Tübingen with members of two courses: a large course on introductory economics (I) and a smaller course on organization economics on a more advanced level (A). Using different colors for the instructions of the six different games in Table 1 and forming blocks of X-, Y-, and Z-participants in the large lecture room, neighboring participants in the same block and thus with the same role type (X, Y, or Z) received the instructions, control questionnaires, and decision forms of different games to discourage any attempts to learn from others. After reading their instructions carefully and privately answering questions, the control questionnaires were filled out together with the decision forms. Only the decisions of those 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. We set $k = 3$, $\underline{p} = 4k = 12$, and $\overline{p} = 7k + 1 = 22$ and allowed only for integer pie sizes $p \in \left[\underline{p} = 12, \overline{p} = 22\right]$. Thus, X has eleven possible pie choices p, and Y chooses $\delta(p) \in \{0, 1\}$ for each of these possible values of p. In the Y-Game, Z chooses $\rho(p) \in \{0, 1\}$ for each of these possible values of p. In the Z-Game, Z's agreement payoff is pre-determined and, in case of $\delta(p) = 1$, he can only decide whether he wants to accept this predefined payoff or not (see the English translations of materials in the appendix).

General predictions, based on earlier findings (Güth, Levati, and Ploner, 2009), are

(i) a dominance of efficiency in the sense of $p = \overline{p} = 22$, and

(ii) a weaker mode of equity seeking via $p = 5k = 15$ or $p = 7k = 21$ if $x \neq 2k$ and via $p = 6k = 18$ if $x = 2k = 6$ (see Table 1). If proposers in the asymmetric game variants (a, c) were to consider the average $\frac{x+y}{2}$ or $\frac{x+z}{2}$ of the exogenously given payoffs, equity seeking would suggest the choice of $p = 6k$, irrespective of the game variant a, b, c or the game type (Y or Z).

Whereas according to (i), the residual claimant will receive considerably more than the average earnings of the two others, according to (ii) either all three players will receive the same (symmetric variant) or - in the asymmetric variants - the residual claimant will receive just what one of the two others gets or - alternatively - the average of what the two others get. We are interested whether and when efficiency seeking according to (i) is the dominant mode of behavior and whether and when (partial) equity seeking in the sense of (ii) can be observed.

Regarding crowding in or out, we expect the impossibility of general equity due to $x \neq 2k$ in the asymmetric variants to crowd out equity concerns and to strengthen efficiency seeking, i.e., we predict more frequent efficient plays $(p = \overline{p}, \delta(\overline{p}) = 1, \rho(\overline{p}) = 1)$ for the asymmetric variants $(x \neq 2k)$ than for the symmetric variants $(x = 2k)$. However, if $x = k$ (asymmetric variant c) it may be difficult for the proposer X to choose a pie size that leads to a situation where both his co-players receive a lot more than he does. Will this "sucker aversion" limit efficiency seeking those game variants where, in case of acceptance, the proposer earns at least as much as one of his co-players? Sucker aversion may hence induce proposer X to choose $p = 5k$ if $x = k$, rather than $p = 6k, 7k$, or $\overline{p}$.

Confronting a(n) (un)favored responder Y in the asymmetric variants of the Y-game $(y \neq 2k)$ may induce a proposer X to decide more carefully. One possibility of comforting the responder Y could be displaying generosity $(p = \overline{p})$ in the sense of "Look, how nice I am!". Another possibility could be triggering responder's (partial) equity seeking via choices of $p = 5k, 6k$, or $7k$. Comforting responder Y is much easier in Z-games where the responder gains from generosity. We therefore predict more efficiency seeking/generosity in Z-games, and no dominance of efficiency seeking/generosity in Y-games.

III Results

Structure of the data

We ran two pen-and-paper classroom experiments. Students were either in an introductory economics lecture (373 participants with 261 of them answering all control questions correctly) or attending an advanced course in organization economics (87 participants and 71 of them answering all control questions correctly). Only in the latter course, students were familiar with basic aspects of game theory; double participation was explicitly excluded.

Table 2 displays the number of participants with correct answers of all control questions for each role (X,Y,Z), in total ($\sum$), and separately for lecture I (Introductory course) and lecture A (Advanced course), for all game variants in total ($\sum$) and separately for each treatment (Ya, Yb and Yc, Za, Zb and Zc) in Table 1.

role:	X			Y			Z		
lecture:	I	A	$\sum$	I	A	$\sum$	I	A	$\sum$
Ya	21	4	25	12	4	16	13	4	17
Yb	18	3	21	15	5	20	13	5	18
Yc	21	4	25	15	3	18	10	4	14
Za	17	3	20	10	4	14	12	3	15
Zb	21	3	24	10	4	14	6	5	11
Zc	19	5	24	14	4	18	14	4	18
$\sum$	117	22	139	76	24	100	68	25	93

Table 2: Number of participants in the different lectures and treatments.

To decide whether we can pool the data of the I- and A-lecture, we compared the aggregate distribution of pie choices by proposers X using a Wilcoxon rank-sum test and found no significant difference. Similar tests separately for the six different treatments rejected homogeneity only for game variants with $x = 3k$. Concerning responder behavior, we compared the share of monotonic responder strategies (if Y accepts p, he also accepts all pie choices larger than p) which is 86% (100%) in the introductory (advanced) course. The acceptance rate of the minimal pie is 62% (54%) in the introductory (advanced) lecture; for other pie sizes the acceptance rates usually differ less. Although the more advanced student participants are slightly better prepared to understand the instructions and to respond monotonically, the differences are minor and spurious what, in our view, justifies pooling the data of two courses with the possible exception of $x = 3k$ and proposer behavior. In what follows, we will mainly rely on pooled data and will mention the results for the introductory lecture only when the findings significantly differ between courses.

Proposer behavior

Let us first focus on the X-decisions: Figure 1, combining all pie choices, provides a clear intuition that most proposers X are

- either equity seeking by pie choice $p = 18$, corresponding to $p = 6k$ in Table 1,
- or efficiency minded, i.e., choose the maximal pie size $p = \overline{p} = 22$.

Furthermore, the latter mode of behavior apparently dominates the former, even more so when only considering the observations from the Introductory course I. According to a t-test, the difference in the pie choices between the lectures (I versus A), visualized by the two diagrams in Figure 1, is statistically significant at the 10% level with slightly higher pie choices in the advanced course hinting at efficiency seeking behavior being more prevalent for more advanced students. Note that given the small number of observations, this test can be only performed for the pooled data over all six treatments (a,b,c variants of the Y-, resp. Z-game).

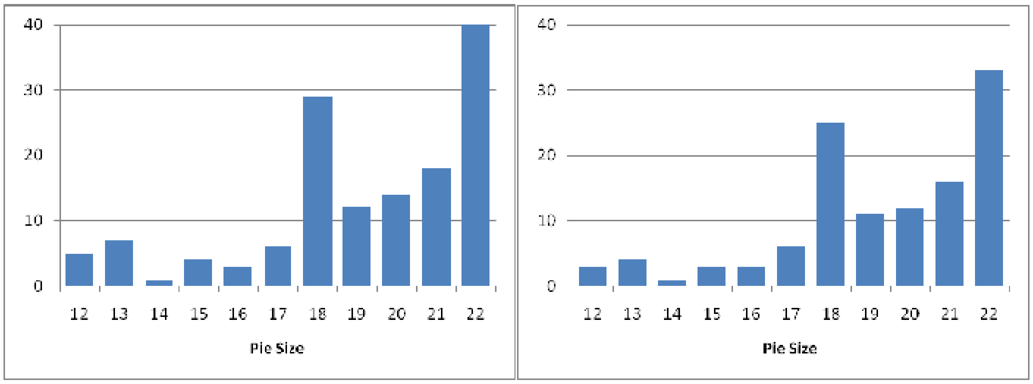

Figure 1: Pie choices of proposers X for all treatments pooled across courses I and A (left diagram) and for all treatments of the Introductory course I only (right diagram).

Concerning the different game variants, interestingly, efficiency seeking in the sense of choosing $p = 22$ is almost non-existent in the symmetric b-variants (treatment Yb as well as treatment Zb) where, by choosing $p = 18$, proposers X can implement perfect equality between all three players (see Figure 2). In our view, this provides new and particularly convincing evidence for equity theory: Even without a tradeoff in payoffs so that one can give at least locally more to one party without having to hurt others, one still prefers equality.

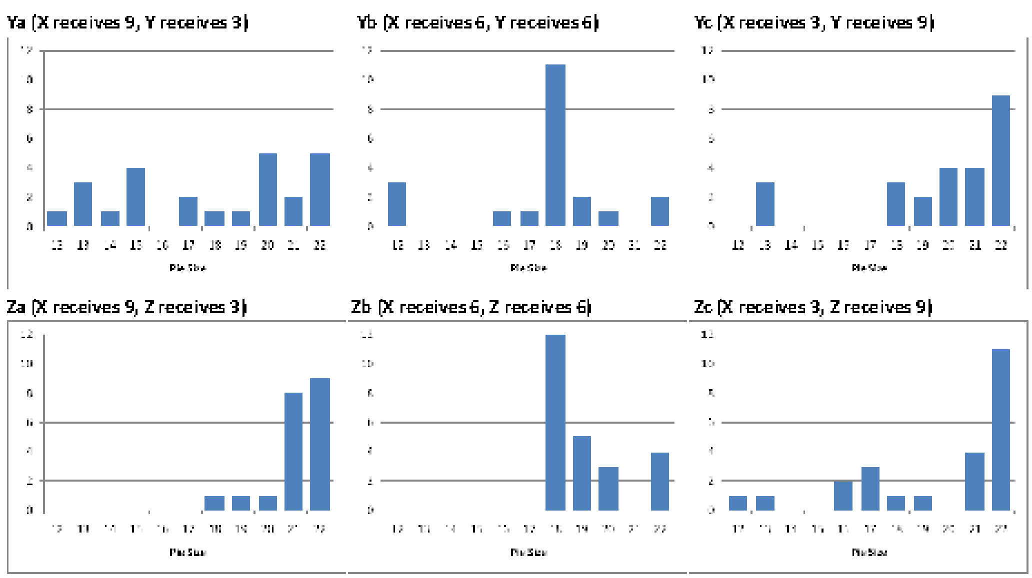

Figure 2: Pie choices of proposers X by treatments pooled across lectures I and A.

Comparing the X-choices for the symmetric b-variants with those for the asymmetric a- and c-variants, separately for Y- and Z-games confirms the obvious intuition statistically at a 10(5)% significance level (t-test): The chosen pie size p was always higher in the a- and c-variants than in the b-variants in Y-games (Z-games). When performing the same t-tests only for the data from the Introductory course, the significance levels further increase from 10% to 5% for Y-games and from 5% to 1% for Z-games, confirming higher (efficiency seeking) pie choices for the a- and c-variants as compared with the b-variants that promote equity seeking.

Generosity towards player Y (who is the residual claimant in the Z-game and who is equipped with considerable veto power) is stronger than generosity towards the dummy player Z (who is the residual claimant in the Y-game). More specifically, for the a- and b-variants, a t-test shows that the Z-game triggers at the 1%-significance level higher pie choices than the Y-game.[4] Only for the c-variants where X-participants may be influenced by "sucker aversion" the difference between the two games is not statistically significant.

Acceptance behavior

Having applied the strategy method, we can test for monotonicity of acceptance behavior. We start with responder Y. Over all treatments, 89 of altogether 100 Y-responders reveal monotonicity, i.e., if they accept p, they also accept all pie sizes larger than p. 47 (61%) of them even accept the smallest possible pie size of $p = 12$. In Y-games, where X's choice does not affect Y's agreement payoff, 87% of Y-responders (47 out of 54) reveal monotonic acceptance behavior with 83% of them accepting even the smallest possible pie choice. For the Z-game, where Y represents the residual claimant, 91% of Y-responders (42 out of 46) are monotonic in their acceptance behavior; here, however, only 36% of these accept the smallest pie ($p = 12$). For all

[4]The results are similar if we separately look at the data from the Introductory I-lecture and the advanced A-course, only the statistical significance is reduced (but is still significant on the 10%-level).

standard significance levels the acceptability of the smallest pie choice $p = \underline{p}$ is smaller in the Z-game than in the Y-Game.[5]

Y-Responders are all in all more sensitive to the proposer's choice of p in Z-games where this decision matters for their own agreement payoff, and they are are more yielding in Y-games where y is exogenously given. We observe the lowest acceptance rate of responders in the (Z,b)-treatment for pie choices $p < 18$, i.e. in situations where proposers intentionally prevent equal agreement payoffs. The differences of responder behavior in the a-, b-, and c-variants of Y- and Z-games are graphically illustrated in Figure 3.

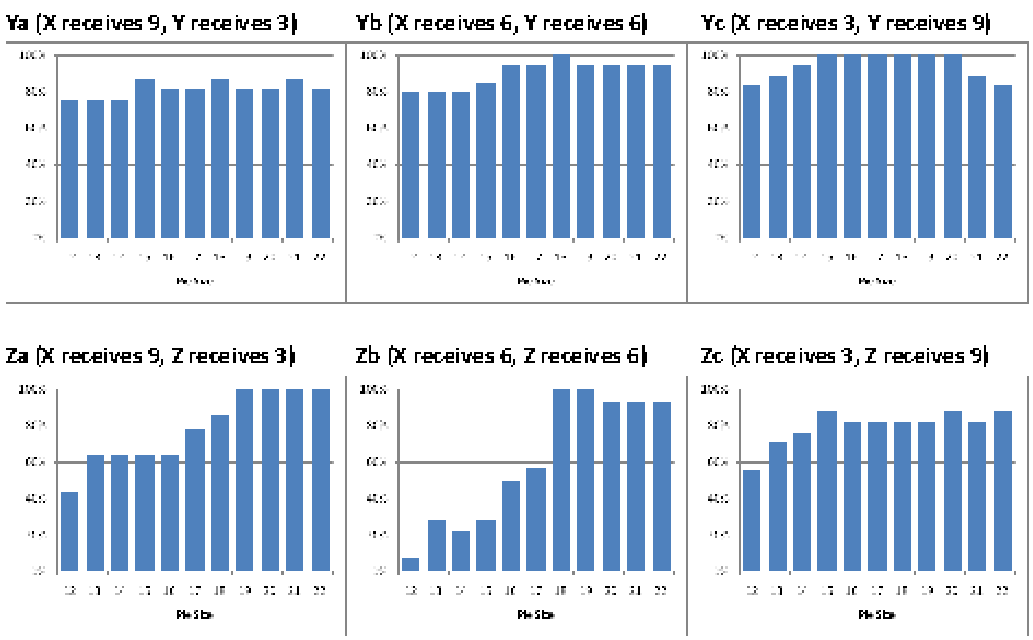

Figure 3: Responder acceptance rates for the eleven possible pie sizes p, separated by treatments but pooled across lectures I and A.

For the acceptance behavior of the dummy player Z, who can only reject his own payoff but whose decision does not affect the other players' payoffs, we observe the following: In Z-games (where z is either 3, 6 or 9), no Z-player

[5] Again, the results do not change much if we separately look at the data from the Introductory I-lecture and the Advanced A-course.

ever rejected. In Y-games, 15 of 49 players would rather take nothing than only "1". But the more is being offered the higher the acceptance rate[6] (see Figure 4) where, interestingly, the major "jump" occurs from $p = \underline{p}$ to $p = \underline{p} + 1$.

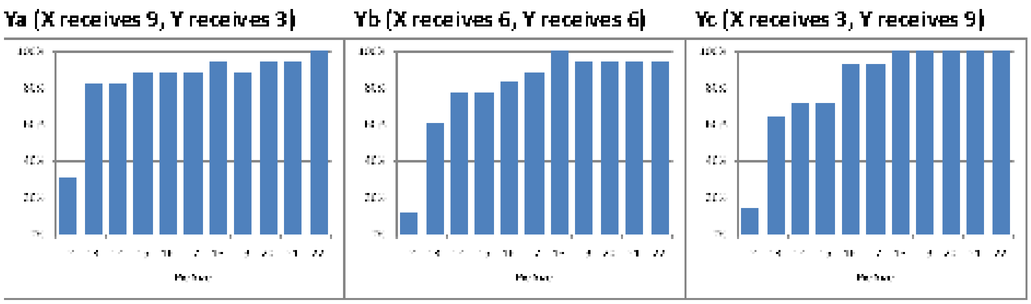

Figure 4: Dummy acceptance rates by variants of Y-games pooled across lectures I and A.

IV Conclusions

The experimental literature provides convincing evidence that people care for both, equality in the sense of equity theory and efficiency in the sense that one is willing to make one party better off as long as this does not hurt the others. The generosity game inspires both concerns and allows to explore which of the two concerns dominates the other. In the two-person generosity game, for instance, the dominant tendency is to choose the maximal pie size although there is a minor mode of equal payoffs (see Güth, Levati, and Ploner, 2009).

Here we have introduced a three-person generosity game including a proposer, a responder and a dummy player and combining in one game aspects of ultimatum and dictator games (see already Güth, and Van Damme, 1998). Our

[6]Only one of 49 Z-participants, and actually one of the introductory course, would reject a payoff of ten . In the advanced course, only one person decided to reject an amount equal to four or larger, virtually no one rejected an amount of eight or larger.

systematic 2x3-factorial design relies on two players with exogenous agreement payoffs and one residual claimant whose agreement payoff is determined by the proposer's pie choice. What differs is whether the residual claimant is the responder Y or the dummy Z, whether the exogenous agreement payoffs do allow for general equality (treatment b) or not, and, in the latter case, whether proposer X gets more (treatment a) or less (treatment c) than the other player whose payoff is fixed.

We find that (i) equity seeking is indeed the only modal behavior when general equality is feasible (treatment b), and (ii) efficiency seeking dominates equity concerns if inequality of agreement payoffs is unavoidable (treatments a and b). Observation (i) questions drawing general conclusions from two-person generosity game experiments where proposers apparently do not mind getting less than the other player - even when equal agreement payoffs are feasible (Güth, Levati, and Ploner, 2009). Surprisingly, both, the coexistence of the two modes of behavioral concerns and the predominance of efficiency seeking, somewhat confirm earlier findings, but apparently require different preconditions and crowd in and out different reasons.

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V Appendix

Instructions for the Y-Game (a-,b- and c-variants)

Thank you for your participation in this experiment. You will interact with two other persons. We will not inform you about the identity of these two persons. Due to time constrains 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 weeks's lecture.

For the statistical analysis of the decision-making-process, it is essential that you make your decision independently from other participants. Therefore we ask you to refrain from contacting other participants; 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 persons - will each be randomly assigned one of three roles X, Y and Z. The tasks of these roles vary.

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

If the person in role Y accepts the offer,

- the person in role X receives a payoff of [a-variant: € 9, b-variant: € 6, c-variant: € 3]
- the person in role Y receives a payoff of [a-variant: € 3, b-variant: € 6, c-variant: € 9]
- the person in role Z receives a payoff of € B - 12 on the condition that the person in role Z accepts his or her amount.

If the person in role Z rejects his or her payoff, he or she loses the payoff. This has no effect on the payoffs of the persons in role X and Y.

But if the person in role Y rejects the offer, all three parties get nothing.

These are the rules for the interaction of the persons in role X, Y and Z. Which role you have to play, you will get to know soon.

First, we briefly summarize 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 or she accepts the offer or not.
- For every given payoff that Z will receive, Z has to decide whether he or she accepts or not.
- If Y accepts the decision of X, and if Z also accepts his or her payoff, the payoffs for the following roles are
  - X: [a-variant: € 9, b-variant: € 6, c-variant: € 3]
  - Y: [a-variant: € 3, b-variant: € 6, c-variant: € 9]
  - Z: € B - 12
- If Y accepts the decision of X, but Z rejects his or her payoff, the payoffs for the following roles are
  - X: [a-variant: € 9, b-variant: € 6, c-variant: € 3]
  - Y: [a-variant: € 3, b-variant: € 6, c-variant: € 9]
  - Z: € 0
- If Y rejects the decision of X, X, Y and Z get nothing (¤ 0).

Instructions for the Z-Game (a-,b- and c-variants)

Thank you for your participation in this experiment. You will interact with two other persons. We will not inform you about the identity of these two persons. Due to time constrains 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 weeks's lecture.

For the statistical analysis of the decision-making-process, it is essential that you make your decision independently from other participants. Therefore we ask you to refrain from contacting other participants; 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 persons - will each be randomly assigned one of three roles X, Y and Z. The tasks of these roles vary.

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

If the person in role Y accepts the offer,

- the person in role X receives a payoff of [a-variant: € 9, b-variant: € 6, c-variant: € 3]
- the person in role Y receives a payoff of € B - 12
- the person in role Z receives a payoff of [a-variant: € 3, b-variant: € 6, c-variant: € 9] on the condition that the person in role Z accepts his or her amount.

If the person in role Z rejects his or her payoff, he or she loses the payoff. This has no effect on the payoffs of the persons in role X and Y.

But if the person in role Y rejects the offer, all three parties get nothing.

These are the rules for the interaction of the persons in role X, Y and Z. Which role you have to play, you will get to know soon.

First, we briefly summarize 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 or she accepts the offer or not.
- Z has to decide whether he or she accepts his or her amount or not.
- If Y accepts the decision of X, and if Z also accepts his or her payoff, the payoffs for the following roles are
  - X: [a-variant: € 9, b-variant: € 6, c-variant: € 3]
  - Y: € B - 12
  - Z: [a-variant: € 3, b-variant: € 6, c-variant: € 9]
- If Y accepts the decision of X, but Z rejects his or her payoff, the payoffs for the following roles are
  - X: [a-variant: € 9, b-variant: € 6, c-variant: € 3]
  - Y: € B - 12
  - Z: € 0
- If Y rejects the decision of X, X, Y and Z get nothing (€ 0).