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Self-Serving Use of Equity Rules in Bargaining with Asymmetric Outside Options $^{\bigstar}$

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Abstract

We experimentally investigate the relevance of (asymmetric) outside options in ultimatum bargaining. Building on the generalized equity principle formulated by Selten (1978) we derive three different equity rules. These equity rules can explain 43% of all offers. Our within-subject design allows us to show that proposers apply the equity rules in a self-serving manner, i.e., proposers tend to follow the rules that suggest the highest payoff for them. This tendency leads to high inefficiencies due to frequent rejections.

Keywords: Outside Options, Equity Principle, Ultimatum Game *JEL-Classification*: C71, C72, C78, C91, D63

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"Whatever I judge reasonable or unreasonable for another to do to me; that, by the same judgment, I declare reasonable or unreasonable, that I in the like case should do for him."

(Samuel Clarke, "A Discourse Concerning the Unchangeable Obligations of Natural Religion, and the Truth and Certainty of the Christian Revelation", London, 1706; 10th ed., 1749)

1. Introduction

Experienced negotiators are well aware of the fact that lucrative alternatives in the case of a bargaining breakdown strengthen the own bargaining position. Authoritative manuals of successful negotiation strategies even recommend that one should strive for such outside options before entering into a bargaining situation (Fisher and Ury, 1991; Malhortra and Bazerman, 2008). Although experts and common wisdom suggest that outside options constitute an important determinant of bargaining outcomes, there is only very limited systematic research into bargaining behavior when outside options are available. Why are outside options important for bargaining outcomes? How do bargainers take outside options into account? What happens if outside options are asymmetric, i.e., if different parties have outside options with different monetary values? Do different constellations of outside options trigger different distribution rules? If so, which distribution rules are applied, and do individuals apply them in a consistent manner? How does the constellation of outside options affect the outcome of a negotiation, and how does it affect the likelihood of reaching an agreement in the first place?

Think, for example, of a manager searching for a new job and an employer looking for a manager to run a new subunit. In the new job, the manager would generate a certain profit that could be divided between her and the new employer. The parties have asymmetric outside options; for example, the manager holds an offer from somewhere else and the employer could realize gains from outsourcing the planned activity. Let us assume that the sum of the outside options of the two parties is smaller than the profit that they could generate together, i.e., hiring the manager is efficient. Do the outside options have an influence on how the profit is divided? One might think of various arguments that suggest different divisions. For example, one could argue that the profit should be equally divided (*equal split*) because both parties are needed to generate the profit. Alternatively, one might guarantee the outside options for each party and divide the remainder equally (*split the difference*). A third method would be to divide the profit proportionally relative to the outside options (*proportional split*). Would the negotiators follow one of these rules? If yes, which one would they apply? Alternatively, consider two situations that differ in the outside options of the two parties. Let us assume that in the first situation, the manager has a much better outside option than the employer, and in a second situation, it is exactly the other way around. Would the manager consistently apply the same rule across both situations? These are the questions which we analyze in this paper.

In our analysis on bargaining with outside options, we concentrate on the three distribution rules discussed above (in the following, we call them equity rules), i.e., equal split, split the difference, and proportional split. One reason for this focus is that the relevance of these three rules has frequently been observed in previous studies (for a survey see Konow, 2003). A second reason is that all three rules follow a similar logic, i.e., all three can be derived from the generalized equity principle proposed by Selten (1978). In this paper, we refer to all of the three rules derived from the generalized equity principle as *equity rules*. The generalized equity principle relies on accepted positive weights (Selten refers to them as a 'standard of comparison') assigned to each party involved in the negotiation. The weights can reflect different characteristics of the bargaining situation, e.g., the number of people represented by one party or the magnitude of the outside options. The weight can be a measure of power or can reflect some contributions to a joint project in terms of money or effort. A final distribution (Selten calls it a 'standard of distribution') of an amount satisfies the generalized equity principle if the ratio between the individual payoff and the individual weight is equal for all involved parties.⁵ In section 3, we explain how the three equity rules can be derived from the generalized equity principle by employing different weights and by varying the amount to which the generalized equity principle is applied. To keep the bargaining situation, simple we employ the ultimatum game (Güth et al., 1982) as our workhorse.⁶ A proposer i and a responder j bargain over an amount of money a. The proposer makes an offer $a_j \leq a$ to the responder. If the responder accepts, she receives a_j and the proposer receives $a_i = a - a_i$. If the responder rejects the offer, both players receive their respective outside options, i.e., the proposer receives o_i and the responder receives o_j . In the standard ultimatum game, the outside options of both players are equal to zero, i.e., with regard to the outside options, both players have equal bargaining strength. A large number of experimental studies look into the behavior within the standard ultimatum game and find a clear predominance of equal payoff offers (see, for example, Güth and Tietz, 1990; Güth, 1995). In light of the generalized equity principle, this result does not come as a surprise because for the standard ultimatum game, all three equity rules discussed above suggest the same outcome, i.e., equal shares for both players.

In our experiment, each participant takes part in two ultimatum games with two different opponents. Proposer and responder bargain over a total amount of 240 points. In our main treatments, each subject

 $^{^{5}}$ The criterion of proportionality that underlies the generalized equity principle goes back at least to Aristotle, (Nicomachean Ethics, V, 5): "Let A be a builder, B a shoemaker, C a house, D a shoe. The builder, then, must get from the shoemaker the latter's work, and must himself give him in return his own. If, then, first there is a proportionate equality of goods, and the reciprocation takes place, the result will be 'equality.' If not, the bargain is not equal, and does not hold; for there is nothing to prevent the work of the one being better than that of the other; they must therefore be equated". Later, proportionality in exchange was prominently featured in many disciplines, for example, in philosophy (Soudek, 1952), sociology (Homans, 1958; Deutsch, 1975; Cook and Hegtvedt, 1983), social psychology (Adams, 1965; Walster et al., 1973; Messick, 1993) and economics (Young, 1995; Konow, 2000, 2003).

⁶Related empirical studies use the 'claims problem' (also called the 'bankruptcy problem') to study equity norms in bargaining (for example, Gächter and Riedl, 2005, 2006; Bosmans and Schokkaert, 2009; for an extensive discussion see also Gärtner and Schokkaert, 2012). In our ultimatum games the sum of outside options is always smaller than the total amount available and thus an agreement increases efficiency. In the claims problem the situation is different because the sum of claims exceeds the available amount.

takes part in a *symmetric* ultimatum game (i.e., with equal outside options of 30 points). Additionally, in these treatments, each subject participates in an asymmetric ultimatum game (i.e., with unequal outside options). Treatments vary the size of the higher outside option (either 150 or 90 points; the lower outside option is always 30 points as in the symmetric game) and the player who has the larger outside option, i.e., the proposer or to the responder.

The parameterization of the treatments guarantees that (i) the sum of the outside options is smaller than the total amount available, i.e., agreement increases efficiency, (ii) in the symmetric game the proportional split is applicable, i.e., the outside options are different from zero, (iii) for the asymmetric ultimatum games the three equity rules provide three different point predictions, and (iv) in some of the treatments, one outside option is larger than the equal split. We designed our treatments to investigate three important issues of bargaining with outside options. First, we analyze whether the generalized equity principle captures the behavior observed and, if so, which of the three equity rules are applied under the various outside option constellations. Second, we investigate whether individuals consistently apply the equity rules if they take part in two ultimatum games that differ in their outside option constellations. Finally, we study the interplay between outside options, equity rules and rejection behavior.

One of our main findings is that the generalized equity principle proposed by Selten (1978) reflects the behavior in our experiment remarkably well. Overall, 43% of the offers correspond to the point predictions of one or more of the three equity rules. In the symmetric games, most proposers offer the equal split. This behavior is predicted by all three equity rules. When comparing the behavior from the asymmetric ultimatum games across the treatments, it becomes evident that not one single equity rule is prevalent. The data suggest that a proposer tends to apply the equity rule that benefits her most.⁷ More precisely, the majority of proposers opt for a proportional division when they have the larger outside option of either 150 or 90. However, when the responder has the larger outside option, the proposers tend to suggest splitting the endowment equally. Regarding the rejection behavior of responders, we observe high rates of rejection in games with outside options of 150, i.e., in games in which the responder has an outside option that is larger than the equal split. Responders, too, tend to adopt the equity rule that favors them. This self-serving use of the equity rules by the proposers and responders often leads to rejections, i.e., inefficient bargaining outcomes.

In the next section, we will discuss the literature that is related to our work. Section 3 introduces the generalized equity principle by Selten (1978) and applies it to ultimatum bargaining with outside options. Section 4 introduces our experimental design and the procedure. In Section 5, we summarize our hypothesis. Section 6 presents our experimental findings, and Section 7 concludes the paper.

⁷The self-serving use of fairness in bargaining underlines the findings from related work (see, for example, Messick and Sentis, 1979; Babcock et al., 1995, 1996; Babcock and Loewenstein, 1997; Pillutla and Murnighan, 1995; Konow, 2000, 2005; Lange et al., 2010; Rodriguez-Lara and Moreno-Garrido, 2011; Rode and Menestrel, 2011).

2. Outside Options and Equity Rules

Our review of related studies is guided by our main research questions. How do outside options shape bargaining behavior in ultimatum games? Do different equity rules explain bargaining behavior?

There are only a very few studies that examine the effects of asymmetric outside options in ultimatum games (see Knez and Camerer, 1995; Schmitt, 2004; Kohnz and Hennig-Schmidt, 2005; Fischer, 2005). The results from these studies can be summarized as follows: proposers decrease their offers when they have a larger outside option than the responder and proposers increase their offers when responders have a larger outside option. In both cases, high rates of rejection are observed, suggesting that responders think that the offers are too low.

Different outside options appear to influence what the negotiators regard as reasonable divisions. Relatively little, however, is known about what these (incompatible) notions of reasonable divisions actually are that ultimately lead to the observed inefficiencies. Kagel et al. (1996) show that the subjects try to enforce different seemingly "fair" allocation rules. In these authors' ultimatum game experiment, they manipulate the exchange rates of the experimental currency unit for the two players. As a consequence, the players can divide the pie according to an equal dollar split or, alternatively, according to an equal chip split. Their results nicely show that the subjects with a lower exchange rate try to enforce an equal dollar split, which would make them better off compared to the equal chip split. However, the subjects that have been assigned the larger exchange rate try to adhere to the equal chip split. The authors observe that the disagreement over different distribution rules leads to frequent rejections.

The application of different distribution rules has also been investigated in other experimental games, e.g., in the *claims problem* and in the *dictator game*. The claims problem describes a situation where an amount of money can be distributed between players that have claims and where the amount to be distributed is smaller than the sum of these claims. Gächter and Riedl (2005; 2006) investigate the behavior of individuals in a claims problem when one player has a higher claim than the other. Claims are obtained by a quiz, i.e., players with the better performance receive the higher claim. After the quiz players engage in a negotiation in an open-form bargaining protocol. The results convincingly suggest that players agree most often on a proportional division, although other distribution rules are also feasible.⁸ Bosmans and Schokkaert (2009) study the claims problem by asking students what they think is the most desirable distribution. Their results indicate that proportionality is a widely held normative judgment across different variants of the claims problem. In sum, the studies on the claims problem provide insights that proportional divisions are a good predictor for normative judgments and actual bargaining behavior.

Different distribution rules are also relevant to studies employing the dictator game (Konow, 2000). In

⁸For example, one could distribute the total amount according to the equal split. Alternatively, the player with the smaller claim receives her full claim while the other subject receives the remainder (*constrained equal award scheme*).

the dictator game a proposer unilaterally decides how to split an amount of money. Rodriguez-Lara and Moreno-Garrido (2011) investigate the self-serving selection of justice principles in an experimental dictator game. Before the proposer can distribute the amount individuals take part in a quiz. A correct answer in this quiz enlarges the total amount. Subjects differ in the way their (correct) answers in the quiz enlarge the amount, i.e., they differ in their productivity. Ex ante, the authors identify three different division rules, that are based on a study of Cappelen et al. (2007). The egalitarian principle predicts that proposer and receiver end up with the same amount, irrespective of their productivity. The accountability principle holds subjects accountable for what they can control, i.e., they can control the number of correct answers, but not the productivity, which is exogenously and randomly induced. Thus, a subject should receive an amount proportional to the number of her correct answers. The *libertarian principle* suggests that a subject should receive what she has 'produced' in the quiz. This principle does not differentiate between what a subject can influence (the number of correct answers) and what the subject cannot influence (the productivity). The results highlight a self-serving bias in justice assessments. When a proposer has a lower productivity compared to the recipient, the proposer tends to rely on an egalitarian distribution. Contrarily, when the proposer's productivity is higher than that of the recipient the proposals can best be described by the libertarian principle or the accountability principle.

Taken together, the modest literature so far shows that different outside options appear to lead negotiators to disagree about what a 'fair' division might be. What the different notions of fair distributions in fact are and whether individuals are consistent in what they consider to be fair, is still not well understood. We extend upon this literature by applying the generalized equity principle of Selten (1978) to an ultimatum bargaining context with asymmetric outside options. The principle provides three distinct equity rules that follow an equity logic but lead to different distributions. Our approach deepens the understanding of how different equity notions are at work in bargaining situations. We are able to explore how different equity notions lead to inefficient bargaining outcomes. Our within-subject design also allows us to investigate whether an equity rule is consistently applied by individuals across different outside option constellations.

3. The Generalized Equity Principle in Ultimatum Bargaining with Outside Options

In the following, we exemplify how the three equity rules can be derived from applying the generalized equity principle (Selten, 1978) to bargaining with (unequal) outside options. We focus on two players: i (the proposer) and j (the responder), who negotiate about how to divide an amount a.

The generalized equity principle proposes to balance the players' shares according to individual weights. Let $r \leq a$ be the amount of money that is to be distributed. The non-negative weights w_i and w_j of players i and j reflect a certain characteristic according to which the players can be compared, e.g., their outside options, the number of people represented by a player, a measure of power, contributions in a joint project, etc. Selten (1978) calls the vector of weights the *standard of comparison*.

Distribution Rule		r	w_i	r_i	a_i
Equal Split	(EQ)	a	1	$\frac{r}{2}$	$\frac{a}{2}$
Split the Difference	(SD)	$a - o_i - o_j$	1	$\frac{r}{2}$	$o_i + \frac{1}{2} \cdot (a - o_i - o_j)$
Proportional Split	(PS)	a	o_i	$\tfrac{o_i}{o_i+o_j}\cdot r$	$rac{o_i}{o_i+o_j}\cdot a$
Sub-game perfect	(SP)	а	/	/	$r - o_j - 1$

Table 1: Overview of distribution rules from the perspective of player i

r is the amount to which the equity principle is applied; (r_i, r_j) is the standard of distribution, for player $i w_i$ denotes the standard of comparison, a_i stands for the amount the player i receives in the case of agreement, o_i represents her outside option.

A standard of distribution is a vector (r_i, r_j) , with $r_i, r_j \ge 0$ and $r_i + r_j = r$. The generalized equity principle requires that

$$\frac{r_i}{w_i} = \frac{r_j}{w_j}.$$
(1)

Thus, the standard of distribution with respect to player *i* is given by $r_i = \frac{w_i}{w_i + w_j} \cdot r$.

Depending on the amount r and the standard of comparison w_i and w_j there are at least three different distribution rules that can be derived for ultimatum bargaining with outside options. The candidates for the amount r are the complete amount, i.e., r = a, or the complete amount diminished by the respective outside options, i.e., $r = a - o_i - o_j$. Natural candidates for the weights are $w_i = w_j = 1$ (because, e.g., each bargaining party is constituted by one individual) or $w_i = o_i$ and $w_j = o_j$ (since, e.g., outside options are likely to be a major source of bargaining power).

Equal Split

The Equal Split (henceforth EQ) results from the generalized equity principle when one assumes that both players have the same weight $w_i = w_j = 1$ and that r is equal to the total amount a. According to this equity rule, every player receives the same amount, that is $a_i = a_j = a/2$.

Split the Difference

The distribution rule *Split the Difference* (SD) emerges from the generalized equity principle when $r = a - o_i - o_j$ and players apply $w_i = w_j = 1$. Player *i*'s amount is then determined by $a_i = o_i + 1/2 (a - o_i - o_j)$ and player *j*'s amount is $a_j = o_j + 1/2 (a - o_i - o_j)$. SD yields an unequal distribution if $o_i \neq o_j$.⁹

Proportional Split

The Proportional Split (PS) can be derived from the generalized equity principle by using a standard of comparison based on the relative magnitude of outside options, i.e., $w_i = o_i$ and $w_j = o_j$, and by assuming

 $^{^{9}}$ Assuming that the outside options can be regarded as threat points the distribution rule SD follows from Nash (1953) and the Shapley value (Shapley, 1953). For a discussion see Roth (1988); Chiu and Yang (1999); Anbarci and Feltovich (2011).

that r is equal to the total amount a to be distributed. Each player's share represents her proportional bargaining power induced by her outside option. Player i receives $a_i = ro_i/(o_i + o_j)$ and player j receives $a_j = ro_j/(o_i + o_j)$, This equity rule also leads to an unequal distribution if $o_i \neq o_j$.

Note, that EQ, SD and PS result in the same payoffs if, and only if, $o_i = o_j$.¹⁰ In the standard ultimatum game where $o_i = o_j$, the equal split appears to be prevalent (see Güth and Tietz, 1990; Güth, 1995). Our experiment is designed to separate the three equity rules and to investigate their role in ultimatum bargaining games with different outside options.

Distribution resulting from sub-game perfect equilibrium play

When the players' allocations are based on the assumption of common rationality and money-maximization, proposers offer at least the outside option to the responder. Thus, applying the sub-game perfect equilibrium outcome (SP) as a distributional rule yields a share $a_i = r - o_j - 1$ for the proposer, which will be accepted by the responder, who receives $a_j = o_j + 1$.¹¹

4. Experiment

Experimental Design

To systematically investigate the impact of outside options in bargaining and the relevance of the equity rules derived above, we let our subjects sequentially play two ultimatum games. Subjects are randomly assigned to the role of the proposer or the responder and they maintain their roles in both ultimatum games.¹² In both games, a is equal to 240 points, and subjects interact with different counterparts in the two games. 10 points are converted to $0.6 \in$; thus 240 points are worth $14.40 \in$. The proposer decides the amount she is willing to offer to the responder, while the responder simultaneously indicates the minimal offer she would be willing to accept. If the proposer's offer exceeds this minimum acceptable offer the 240 points are distributed according to the offer, otherwise subjects receive their respective outside options.

The constellations of players' outside options constitute our main treatment variation. We implement six different treatments (see Table 2). In four main treatments, each subject plays a symmetric ultimatum game with outside options of 30 points. Additionally, each subject participates in an asymmetric ultimatum game. The smaller outside option is always 30 points. We vary (i) the sizes of the larger outside option (either 150 or 90 points) and (ii) who is endowed with the larger outside option (either Proposer or Responder). To control for possible order effects we balance the order of the symmetric and the asymmetric ultimatum

 $^{^{10}\}mathrm{Note},$ that PS is not applicable if both outside options are equal to zero.

¹¹This result holds for the case that a is infinitely divisible. Typically in experiments, bargaining units are integers. Thus, an offer of $a_j = o_j$ can also be an outcome of a sub-game perfect equilibrium. This value is also counted as a 'hit' in our subsequent analysis.

 $^{^{12}}$ We use a neutral language in the instructions and on the computer screens, i.e., proposers are called "Player A" and responders are called "Player B" (see the Appendix for a translation of the instructions. The original instructions are provided in German).

Treatment	Order	$UG_{1st}\\[o_i;o_j]$	UG_{2nd} $[o_i; o_j]$	Obs.
P_{150}	(1)	[150;30]	[30;30]	24
	(2)	[30;30]	[150;30]	24
R_{150}	(1)	[30;150]	[30;30]	24
	(2)	[30;30]	[30;150]	24
P_{90}	(1)	[90;30]	[30;30]	24
	(2)	[30;30]	[90;30]	24
R_{90}	(1)	[30;90]	[30;30]	24
	(2)	[30;30]	[30;90]	24
PR_{150}	(1)	[150;30]	[30;150]	22
	(2)	[30;150]	[150;30]	22
PR_{90}	(1)	[90;30]	[30;90]	22
	(2)	[30;90]	[90;30]	22

Table 2: Overview of experimental treatments.

The outside option of the proposer is denoted by o_i and that of the responder by o_j .

games (see Table 2); in two additional treatments subjects are confronted with two asymmetric ultimatum games (treatments PR_{150} and PR_{90}) where we keep the sizes of the outside options constant across games and vary only the player who is endowed with the respective larger outside option.

Our parameterizations of the asymmetric ultimatum games have the advantage of allowing us to separate the outcomes between the distribution rules that we derived in the last section. The three equity rules and the sub-game perfect equilibrium lead to different point predictions (for an overview of the resulting distributions see Table 3). In particular, we are able to investigate their relevance when one of the outside options is below half of the total amount of 240 (i.e., 90) or when one of the outside options exceeds half of the total amount of 240 (i.e., 150). Previous experiments (Fischer, 2005; Anbarci and Feltovich, 2011) show that the focality of the equal split is less pronounced when one of the outside options exceeds the equal split. Another feature of our experimental setup is constituted by the fact that all subjects play two different ultimatum games. Thus, we are able to investigate whether individuals consistently apply one of the distribution rules across two ultimatum games with different constellations of outside options.

Procedural Details

Our experimental sessions involved 280 subjects, mainly undergraduate students, at the University of Bonn (51 % male, average age 24 years), Germany (September 2008; August 2010) who were recruited by the online recruiting system ORSEE (Greiner, 2003). Each participant was allowed to take part in only one of the treatments. The experiment was programmed with the software z-Tree (Fischbacher, 2007). Subjects earned 15.78 \in on average. At the beginning of the experiment we handed out instructions and control

Ultimatum Game	Е	Q	\mathbf{S}	D		Р	\mathbf{s}		S	Р
$[o_i;o_j]$	a_i	a_j	a_i	a_j	-	a_i	a_j	_	a_i	a_j
[150;30]	120	120	180	60		200	40		209	31
[90;30]	120	120	150	90		180	60		209	31
[30;30]	120	120	120	120		120	120		209	31
[30;90]	120	120	90	150		60	180		149	91
[30;150]	120	120	60	180		40	200		89	151
$egin{array}{c} [o_i; o_j] \ [150;30] \ [90;30] \ [30;30] \ [30;90] \ [30;150] \end{array}$	$ \begin{array}{r} a_i \\ 120$	a_j 120 120 120 120 120 120 120	$ \begin{array}{c} a_i \\ 180 \\ 150 \\ 120 \\ 90 \\ 60 \\ \end{array} $	a_j 60 90 120 150 180	-	a_i 200 180 120 60 40	a_j 40 60 120 180 200	-	a_i 209 209 209 149 89	a_j 31 31 31 91 151

Table 3: Point predictions for equity rules and sub-game perfect equilibrium for our ultimatum games.

questions to make sure that everyone had understood the rules of the games. Subjects sequentially made their decisions for two ultimatum games. They did not receive any feedback between the two games.

5. Hypothesis

Our main hypothesis is based on Selten's generalized equity principle. As shown, we can derive different reasonable distribution rules from the generalized equity principle in the ultimatum game with asymmetric outside options. Previous studies suggest that subjects self-servingly apply different distribution rules depending on the respective situation (e.g., having a larger or a smaller outside option or being the proposer or the responder). This leads us to our primary research hypothesis:

Hypothesis: Subjects frequently apply equity rules derived from the generalized equity principle. If they do so, they apply these equity rules in a self-serving manner.

With respect to our experiment, we expect players with a higher outside option to prefer either PS or SD over EQ. Players with a lower outside option are expected to opt for an egalitarian distribution, i.e., to prefer EQ over SD or PS.

6. Results

Average Offers and Rejections

We start by analyzing how the different outside options influence average offers and corresponding rejection rates (see Table 4).¹³ In the symmetric ultimatum games over all treatments proposers offer on average 103.2 points, which approximately to about 40 % of the pie. The average minimum acceptable offer (mao) is 93.25 points. The average rejection rate is 31%.¹⁴

 $^{^{13}}$ As mentioned above, to control for possible order effects the sequence of ultimatum games in every treatment is balanced. Because we find no systematic order effects, we pool the data from the same games in both positions in every treatment. A detailed summary can be found in Table 8. In Figures 2 and 3 in the Appendix, we display scatter plots of decision pairs of each individual subject for all treatments.

¹⁴When we compare the distribution of offers in the symmetric game across treatments, we find no significant difference (p=.2689, Kruskal-Wallis test, henceforth KW-test). A corresponding analysis for responders yields no significance either (for maos: p=.4017, KW-test; for rejections: p=.912, Fisher-test). The pairwise comparisons show a weak significant difference of offers from the symmetric game between R_{90} and P_{150} which might be a random effect of multiple testing (p=.0819, Mann-Whitney-U test, henceforth MWU-test). Throughout the paper all reported statistical tests are two-sided.

Comparing proposers' behavior in the symmetric ultimatum game with their behavior in the respective asymmetric ultimatum game leads to our first observation:

Observation 1: Outside options influence offer behavior. Offers are higher the larger the outside option of the responder. Analogously, offers are lower the larger the outside option of the proposer.

When proposers have an outside option that is larger than the responder, i.e., in the asymmetric ultimatum games of treatments P_{150} and P_{90} , the same proposers offer significantly less to the responder (56.88 in [150;30]; 80.29 in [90;30]) than they do when outside options are symmetric $(p=.0001 \text{ for } P_{150}; p=.0574,$ for P_{90} ; Wilcoxon-signed-rank test, henceforth, WSR-test). Comparing offers across subjects between both asymmetric ultimatum games shows that offers are lower when the outside option of the proposers are higher (p=.009, MWU-test). When responders have an outside option larger than the proposers, i.e., in the asymmetric ultimatum games of treatments R_{150} and R_{90} , the same proposers offer significantly more (135.7 and 116.7, respectively) compared to what they offer the respective symmetric game (p=.0007 for $R_{150}; p=.0014$ for R_{90} , WSR-test). Comparing the offers of both asymmetric situations when the responder has a larger outside option, we find that the larger the outside option of the responder the larger the offer of the proposer (p=.005, MWU-test).

Observation 2: Outside options influence rejection rates. Rejection rates are higher when the difference in proposers' and responders' outside options is (very) large.

A look at the average rejection rates reported in Table 4 shows that the fraction of rejected offers amounts to 58% when the difference in proposers' and responders' outside option is very large, i.e., when either the proposer or the responder has an outside option of 150. This fraction is considerably larger than the respective rejections in the symmetric ultimatum game (p=.0386; p=.1094, for P_{150} and R_{150} , respectively, McNemar change test, henceforth McN-test). No systematic differences can be found when comparing rejections between the symmetric and asymmetric ultimatum games of treatments P_{90} and R_{90} .¹⁵

After having established that outside options inflate individual demands and that large differences in outside options lead to high rejection rates we now take a closer look at why this actually happens. We do this by investigating whether players (consistently) apply the equity rules.

Offers and the Generalized Equity Principle

We first focus on the relevance of the equity in the four asymmetric ultimatum games of treatments P_{150} , R_{150} , P_{90} and R_{90} . We apply a rather strict point prediction rule to categorize subjects' offers: a subject

 $^{^{15}}$ Additional comparisons for responders' mao's can be found in 8 in the Appendix. The results from the non-parametric backing of Observations 1 and 2 are supported by additional regression results (see Table 10 in the Appendix for details).

R_{90}	P_{90}	R_{150}	P_{150}	Treatment			R_{90}	P_{90}	R_{150}	P_{150}	Treatment		
24	24	24	24	n			24	24	24	24	n		
> 103.20	98.38	V 101.7	112.70	Av. offer			116.7	×+++	$^{-+++}$ 135.70	56.88	Av. offer		
 33		.33	.25	Av. reject			.13	.41	.58	.58	Av. reject		
							.33	.17	.21	.04	offer	E	
.42	.42	.64	.54	offer		Sy	.12) O	.83	0	reject	Q	
					EQ(SI)	mmetric [3	0	.08	.13	.17	offer	s	Asymmeti
					0 PS	80;30]	.04	.17	.08	.46	reject	D	lic
.08	.08	.04	.13	reject			0	.25	0	.29	offer	- -	
							0 <		0	.67	reject	ŭ	
.04	.04	.04	0	offer	CO.		.08	.04	.21	.04	offer	0	
.79	.79	.96	.92	reject	Ϋ́Ρ		.71	.88	.42	.88	reject	Ρ	

Table 4: Descriptive statistics.

#reject. This is obtained after matching the respective offer with every level of minimum acceptance in this ultimatum game. Stars display the significance levels of a Plus signs display the significance levels of a Mann-Whitney-U test with the null hypothesis that the distributions of offers are equal (+ 10% level, ++ 5% level, +++ Notes: This table shows average offers (Av. offers) and average rejection rate (Av. reject) of the asymmetric ultimatum games of treatments P₁₅₀, P₉₀, R₉₀ and R₁₅₀. Fisher-test with the null hypothesis that frequencies are equally distributed (* 10% level, ** 5% level, *** 1% level). 1% level). The left part of the table displays the rel. frequencies of offers that can be classified as EQ, SD, PS or SP and their respective average rejection probability



Figure 1: Frequencies of offers and rejections derived from the equity principle and the sub-game perfect equilibrium. Notes: The gray bars illustrate the relative frequencies of offers that can be classified as EQ, SD, PS or SP from asymmetric ultimatum games of treatments P_{150} , P_{90} , R_{90} and R_{150} . The + signs indicate the average rejection rate from matching the respective offer with every mao in the same ultimatum game.

applies an equity rule if -and only if -she exactly chooses the distribution that is suggested by this rule. Considering the offers from all four asymmetric ultimatum games we observe that 41.6% (n=40) of these offers can be explained by the generalized equity principle. A fraction of 51% (n=49) of the same proposers offer EQ(SD/PS) when they are in the symmetric situation. Recall that in the symmetric situation all three equity rules suggest same distribution.¹⁶

To examine more closely the way in which the proposers apply the equity rules across different situations, we start with a between-subject comparison of the EQ, SD and PS choices.

Observation 3: Proposers frequently apply the generalized equity principle, however, they do so in a self-serving way. Proposers offer proportional splits more often when they have the larger outside option. However, they rely more often on equal splits when the responder has the larger outside option.

Statistical and graphical support can be seen in Table 4 (upper part) and Figure 1, where the relative frequencies of each distribution rule in the asymmetric ultimatum games of P_{150} , R_{150} , P_{90} and R_{90} are displayed. The number of PS offers is higher in the situations where the proposer has the larger outside

 $^{^{16}{\}rm The}$ sub-game perfect equilibrium (SP) predicts 3% off all offers in the symmetric and 9% in the asymmetric ultimatum games.

option (left panels of Figure 1) compared to the situations in which the responder has the same larger outside option (p=.009 for P_{150} vs. R_{150} ; p=.022 for P_{90} vs. R_{90} , Fisher-test). Although, we also see more SD offers when the proposer has the larger outside option and more EQ offers when the responder has the larger outside option the Fisher test yields no statistically significant difference.¹⁷ These findings on the self-serving use of the generalized equity principle are in line with proposers' overall tendency for self-serving offers.¹⁸

The prevalence of EQ in symmetric ultimatum games (see the lower part of Table 4) does not come as a surprise in light of the generalized equity principle. All of the proposed division rules coincide in one point, i.e., a 50-50 split. In the symmetric ultimatum games, therefore, we are unable to distinguish whether a proposer offering 120 points has a preference for EQ, SD or PS. In observation 3, we stated that proposers are self-serving when they offer a PS in P_{150} , P_{90} and an EQ in R_{150} or R_{90} . One might, however, argue that these subjects are consistently motivated by a preference for PS, SD or EQ, respectively. To identify whether PS-players from P_{150} or P_{90} and EQ-players in R_{150} and R_{90} have a preference for consistently choosing the very same equity rule we conducted two further treatments - PR_{150} and PR_{90} - employing two asymmetric ultimatum games.¹⁹ In a within-subject setup we kept the sizes of the two asymmetric outside options constant across games and varied the player who is endowed with the respective outside option.

Observation 4: Proposers consistently offer EQ only when outside option differences are small. When outside option differences are large proposers tend to apply PS if this is advantageous for them. Proposers tend to apply SP when PS is to their disadvantage.

The statistical support for this observation can be seen in Table 5. Here, we show relative frequencies of the equity rules for the treatments PR_{150} and PR_{90} . The McN-test is used to test the null hypothesis that the distributions of the respective equity rule choices are equal between the two ultimatum games of one treatment. There appear to be no significant differences in the frequency of EQ between the two ultimatum games in PR_{90} . Proposers who offer PS when they have the larger outside option (in [150;30] and [90;30]) significantly change their behavior (p=.0082; p=.0833, McN-test) when they are exposed to the other ultimatum game where the responder has the larger outside option. In PR_{150} we find a mildly significantly higher use of EQ (p=.0833, McN-test) in [30;150] than in [150;30]; in [30;150] SP is applied significantly more often than in [150;30] (p=.0339, McN-test).

¹⁷Interestingly, two proposers in P_{150} make an offer that represents a *deal me out* solution (Anbarci and Feltovich, 2011), i.e., the proposer keeps her outside option (150 points) and offers the remainder to the responder (90 points). Note, that this sharing rule is not in line with the generalized equity principle.

¹⁸The amounts that proposers offer to responders with the larger outside option (R_{150} = 135.70; R_{90} =116.7) are significantly lower than the amounts (P_{150} =240-56.88=183.12; P_{90} =240-80.29=159.71) that proposers with the larger outside option demand for themselves (P_{150} vs. R_{150} : p=.001 and P_{90} vs. R_{90} : p=.001, MWU-test). Although we find no statistically significant difference of SP choices between the treatments, SP seems to be particularly pronounced when the responders' outside option exceeds the equal split (in R_{150} : 21%).

 $^{^{19}}$ We focus on choices according to our different distribution rules; the descriptive statistics for the treatments can be found in Table 9 in the Appendix.

		PR_{150}				PR_{90}	
Distribution Rule	[150;30]		[30;150]	[90;	30]		[30;90]
EQ	.0	<×	.14	.3	2	<	.41
$^{\mathrm{SD}}$.09	>	.0	.0	5	>	.0
$_{\rm PS}$.32	$>^{\times \times \times}$.0	.1	4	$>^{\times}$.0
SP	.05	$<^{\times \times}$.32	.()	=	.0

Table 5: Descriptive statistics of proposers' offer behavior in PR_{150} and PR_{90} .

Notes: This table shows the rel. frequencies of offers that can be classified as EQ, SD, PS or SP from ultimatum games of treatments PR_{150} and PR_{90} . We use a McNemar change test (McN-test) to test the null-hypothesis that the frequency of subjects choices are equally distributed between the ultimatum games. (\times 10% level, $\times \times$ 5% level, $\times \times \times$ 1% level)

So far we have looked at whether proposers' behavior is in line with the generalized equity principle. The findings show that the three equity rules can explain approximately 43% of all offer decisions (across all ultimatum games and treatments).²⁰ To summarize, the data suggest that the equity rules have different predictive power depending on the specific outside option constellation. Proposers offer a proportional division when they have the larger outside option. When outside options are to the benefit of the responder, proposers tend to rely on the equal split (when outside option differences are mild) or on the sub-game perfect equilibrium offer (when the outside option of the responder is very large). Taking these results together, the equity rules can be regarded as being used self-servingly.

Rejections and the Generalized Equity Principle

Having discussed the impact of different outside option constellations on proposers' offer behavior, we now turn to rejection rates induced by responders' choices. How do responders choose their respective mao in different situations and how does this affect rejection rates? We find that rejection rates are higher when players' outside options differ more. Our findings can be summarized in the following observation:

Observation 5: Responders are more likely to reject PS offers when proposers have the larger outside option.

Table 4 displays the rejection rates for the different equity rules across treatments P_{150} , R_{150} , P_{90} and R_{90} . Rejection rates are calculated as follows: in each ultimatum game, we match all of the mao retrieved from responders with the offer associated with the respective equity rule of the same ultimatum game. This calculation results in a rejection rate for every equity rule in our experiment.²¹ Comparing the treatments we find that the responders are significantly more likely to reject a PS offer when proposers have the larger

 $^{^{20}}$ The corresponding number of SP-choices is 6%.

²¹In Figure 4 in the Appendix, we graphically display residuals of probit estimations of rejection probabilities for the different ultimatum games, which basically confirms the hypothetical rejection rates.

outside option (p=.0001 for P_{150} vs. R_{150} and P_{90} vs. R_{90} , Fisher-test). On the other hand, responders are more likely to reject EQ, when they themselves have the larger outside option (comparison of P_{150} and R_{150} p=.0001). A division resulting from SD is also significantly more likely to be rejected in P_{150} than in R_{150} (p=.008, Fisher-test). Although rejection rates point in the same direction in the comparison of P_{90} and R_{90} we find no statistical significant difference here. Note that offering exactly the outside option of the responder leads to high rejection rates across all ultimatum games.

Our analysis highlights that differences in outside options tend to result in the application of different equity rules and thereby hamper agreements. Proposers tend to follow an equity rule that favors them most. Responders, however, seem to be reluctant to accept lower offers from proposers with higher outside options, but responders do claim higher shares when they have the larger outside option.

Efficiency and Profits

We conclude our results section by investigating the impact of different outside option schemes on efficiency and players' profits. In the following section, two questions are considered: (1) How do outside options affect efficiency? (2) Is it profitable for an individual player to have a (specific) outside option?

In our setup, efficiencies can only differ between treatments due to cases of rejection because the amount distributed in cases of agreement is constant across treatments. Because the sum of outside options in our treatments is always smaller than the agreement amount, reaching an agreement is always efficient. The loss in efficiency due to rejection is smaller the higher the sum of the outside options.

Observation 6: Asymmetric outside options lead to lower efficiency due to frequent disagreement.

In the symmetric ultimatum game, we observe an average efficiency of 183.75 points. The respective average values in the asymmetric ultimatum games are higher: 205 for P_{150} , 205 for R_{150} , 190 for P_{90} and 205 for R_{90} (see Table 7). However, comparing distributions of average efficiencies for matching groups between symmetric and asymmetric outside option constellations yields (almost) no systematic differences. We have mild evidence for an increase in mean efficiency when responders have an outside option of 90 compared to the symmetric game (p=.1014, WSR-test). Efficiency increases by only about 20 points in the asymmetric ultimatum games where the outside option of one player is increased by 120 = 150-30. Similarly, the increase in efficiency is only about 20 points when the responder has an increase in the outside option of 60 = 90-30. When the proposer has an increase in the outside option of 60 the efficiency increases only about 6. Thus, a one point increase in outside options enhances efficiency by far less. This must be due to a higher number of rejections in the asymmetric ultimatum games. Recall that in our design, an increase in the sum of outside options always goes hand in hand with an increasing asymmetry between both players, which leads to higher rates of rejection (see Observation 2).

	(1)	(2)
	π_p	π_r
Player has outside option of 150	58.94^{***}	76.96***
	(6.42)	(5.67)
Player has outside option of 90	30.47***	32.44 * * *
	(9.89)	(4.59)
Opponent has outside option of 90	-4.805	-17.16**
	(10.19)	(6.91)
Opponent has outside option of 150	-45.82***	-31.58***
	(6.81)	(5.04)
Constant	95.57* [*] *	66.30* [*] *
	(5.01)	(4.07)
	× ,	· · · ·
Observations	192	192
R-squared	.315	.5
Sample	Proposer	Responder

Table 6: Explaining Profits from treatments P_{150} , R_{150} , P_{90} and R_{90} .

Notes: This GLS regression models explain profits π_i . As independent variables we include dummies for every ultimatum game. The reference category is symmetric ultimatum game [30;30]. Standard errors are robust and displayed in parentheses. Stars display significance levels (* 10% level, *** 5% level, *** 1% level).

We conclude our analysis by addressing the question of how outside options influence players' profits. In Table 11, we regress the profits on the outside options a player or the opponent (with the outside option of 30 being the reference category). For both players we find that profits increase [decrease] with the player's [the opponents] outside option. For both players, however, a one point increase in outside options does not translate into a similar increase in profits. For proposers (Model 1) we find that increasing the outside option by 120 [60] points increases proposers' profits by 58 [30] points (holding the outside option of the responder constant at 30). Thus, a one point outside option increase yields roughly a .5 increase in profits. Having a higher outside option by [60] 120 points increases profits by 76 [32] points. Moreover, we observe that when the opponent has an outside option of 150 [90] the player's profits seem to go down (lower part of Table 6). Table 13 reveals that responders typically earn significantly less than proposers in almost all of our ultimatum games.

7. Conclusion

In this study we provide evidence that outside options are a major determinant in ultimatum bargaining. Moreover, we investigate the impact of unequal outside options on offers, rejections, overall efficiency and final payoffs. In line with the literature, we find that asymmetric outside option constellations make it harder for bargainers to reach an agreement. We extend upon the existing literature by tracing different notions of what participants consider to be suitable allocations. With the help of the generalized equity principle (Selten, 1978), we identify three different equity rules that are clearly distinguishable by our experimental design. We find strong evidence that proposers' offers are in line with these simple equity rules - taken all

Treatment	Symmetric [30;30]		Asymmetric UG
	Efficiency	-	Efficiency
P ₁₅₀	195	<	205
R_{150}	180	<*	205
P_{90}	180	<	190
R_{90}	180	<	205

Table 7: Average efficiency of matching groups reached in ultimatum games from treatments P_{150} , R_{150} , P_{90} and R_{90} . Notes: In our experiment four players (two proposers and two responders) formed a matching group. In every matching group all players kept their role but switched the opponent for the other ultimatum game. Averaging efficiencies of the same ultimatum games within one matching group allows us to non-parametrically test differences in the distributions of efficiencies between the two ultimatum games within one treatment. Stars display the significance levels of a Wilcoxon-signed-rank test with the null hypothesis that the distributions of profits are equally distributed (* 10% level, ** 5% level, *** 1% level).

games together, we find that 43% of all offer decisions can be explained by the generalized equity principle. All of the equity rules entail some notion of equality. Thus, our findings provide firm evidence that the desire to back distributions with equity arguments is deeply rooted in behavior. The high number of proposers who try to solve the asymmetric outside option bargaining conflict by implementing an equitable outcome is remarkable given standard game-theory and authoritative negotiation handbook guidelines.

By our within-subject design, we are able to show that equity rules, however, are not applied in a consistent manner but rather self-serving. More specifically, proposers are inclined to offer proportional splits when these serve their own interest. However, proposers tend to offer equal distributions when the responder would benefit from a proportional split. At the same time, we observe that responders are reluctant to accept proportional divisions when they are to their disadvantage in comparison to an equal split. Responders tend to accept proportional distributions when they benefit from them. Thus, equity rules seem to be attractive to guide behavior by adhering (or maybe pretending to adhere) to some equity considerations. However, the problem appears to be that equity rules are rather chosen in a self-serving manner. In this sense our study also contributes to the literature on *moral wiggle room* (Dana et al., 2007), i.e., the moral wiggle room to select the 'right' equity rule.

Our empirical findings strongly underline doubts about a clear predominance of one specific fairness rule which is sometimes suggested by normative models of distributive justice. In our experiment we employ outside options as a rather self-evident and exogenously provided standard of comparison. In bargaining situations outside the laboratory it will quite often be the case that a plethora of standards of comparison are available. Think, for example, of the negotiation about the manager compensation from the introduction. When the manager and the potential employer bargain over the split of the profits outside options might not be the only reasonable standard of comparison but also the efforts and investments both parties may contribute in the future. Likewise, in a merger between two companies the standard of comparison for the distribution of future gains could be based on other factors than outside options, such as the pre-merger market share or the invested amounts.

In the light of our results on the self-serving usage of equity rules, one might think that bargaining parties will not only strive for the equity rule that is most beneficial for them but rather for a standard of comparison that leads to a justifiable (self-serving) distribution. Therefore, we consider our results as a lower bound for self-serving behavior. The room for disagreement in bargaining outside the laboratory might also be larger because the standards of comparison are likely to be not so self-evident in the field.

Future research needs to explore how the observed imbalances in the application of equity notions might be mitigated by, e.g., explicitly taking the perspective of the other negotiator or by investigating into other procedures to harmonize the perception of relevant notions of equity (Bhatt and Camerer, 2005; Costa-Gomez and Crawford, 2006). One step in this direction might be further research into why equity rules are adopted. Are they primarily employed because of self-image concerns or because of the (maybe unwarranted) hope that the opponent in the negotiation might be more ready to agree if an equity norm is applied?

8. References

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9. Appendix

Treatments	(Order)	n	-	Av. offer	r	1	Av. mac)
			[30;30]		Asym.	[30;30]		Asym.
P_{150}	pooled	24	112.71	>***	56.88	97.92	>***	61.00
R_{150}	pooled	24	101.67	<***	135.71	96.29	<***	152.54
P_{90}	pooled	24	100.04	>*	80.29	88.33	>	83.17
R_{90}	pooled	24	98.38	<***	116.71	90.46	<***	109.21
P	(1)	12	115.42	>***	62.92	87.58	>***	54.00
P_{150}	(2)	12	110.00	>***	50.83	108.25	>**	68.00
D	(1)	12	95.00	<**	125.00	100.00	<***	153.00
R_{150}	(2)	12	108.33	<***	146.42	92.58	<***	152.08
D	(1)	12	106.67	>***	78.00	73.92	>	70.08
P_{90}	(2)	12	93.43	>	82.58	102.75	>	96.25
D	(1)	12	92.50	<***	117.08	81.00	<***	106.75
<i>п</i> 90	(2)	12	104.24	<	116.33	99.92	<	111.67

Table 8: Summary statistics of treatments P_{150} , R_{150} , P_{90} and R_{90} .

Notes: Av. offer [Av. mao] indicates the average offer [mao] of proposers [responders] in the respective treatment. Stars display significance levels of a Wilcoxon-signed rank test comparing the distribution of players decisions between the symmetric and corresponding asymmetric ultimatum game (* 10% level, ** 5% level, *** 1% level). Pairwise comparisons of distribution of offers and mao between both orders yield no systematic difference for the asymmetric as well as for the symmetric ultimatum game. We find, however, that mao in the asymmetric ultimatum game of P_{90} are weakly significantly higher when subjects played the symmetric game before (p=.084, MWU-test).

(Order)	n		Av. offe	r		Av. mao)
		$[o_i; 30]$		$[30; o_j]$	$[o_i; 30]$		$[30; o_j]$
pooled	22	55.86	<***	145.68	68.00	<***	155.18
pooled	22	90.91	<***	116.73	81.00	<**	98.82
(1)	12	57.00	<***	140.92	75.00	<***	154.58
(2)	10	54.50	<***	151.40	56.60	<***	155.90
(1)	12	93.33	<**	120.83	84.33	<*	99.42
(2)	10	88.00	<***	111.80	77.00	<*	98.10
	(Order) pooled (1) (2) (1) (2)	(Order) n pooled 22 pooled 22 (1) 12 (2) 10 (1) 12 (2) 10 (1) 12 (2) 10	$\begin{array}{c cccc} ({\rm Order}) & {\rm n} & & & \\ \hline & & & & & \\ pooled & 22 & & 55.86 \\ pooled & 22 & & 90.91 \\ \hline & & & & \\ (1) & 12 & & 57.00 \\ (2) & 10 & & 54.50 \\ (1) & 12 & & 93.33 \\ (2) & 10 & & 88.00 \\ \hline \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Table 9: Summary statistics of treatments PR_{150} and PR_{90} .

Notes: Av. offer [Av. mao] indicates the average offer [mao] of proposers [responders] in the respective treatment. Stars display significance levels of a Wilcoxon-signed rank test comparing the distribution of players decisions between the symmetric and corresponding asymmetric ultimatum game (* 10% level, ** 5% level, *** 1% level). Pairwise comparisons of distribution of offers and mao between both orders yield no systematic difference. We find that mao in the asymmetric game [150;30] of treatment PR_{150} are weakly significant smaller, when the asymmetric game [30;150] was played first (p=.0589, MWU-test). Different n between orders are due subjects that had registered for the experiment, but did not show up.

	(1)	(2)	(3)
	(1)	(2)	(3)
	oner	mao	reject
[150:30]	-48.96***	-34.58***	0.273^{**}
[100,00]	(6.38)	(6.01)	(0.11)
[90; 30]	-22.03***	-7.633	0.109
	(7.60)	(6.30)	(0.11)
[30; 90]	14.85^{***}	17.35^{***}	-0.0227
	(4.09)	(4.13)	(0.11)
[30; 150]	32.93***	57.78***	0.273**
	(7.15)	(6.23)	(0.11)
Constant	103.2***	93.25***	. ,
	(3.27)	(3.98)	
Observations	192	192	192
R-squared	.336	.339	.042

Table 10: Explaining players decisions from treatments P_{150} , R_{150} , P_{90} and R_{90} .

Notes: This regression models explain proposers offer (Model 1, GLS regression) and responders level of minimum acceptance (mao) (Model 2, GLS regression) and rejections (Model 3, Probit regression with marginal effects). As independent variables we include dummies for every ultimatum game. The reference category is the symmetric ultimatum game [30;30]. Standard errors are robust and displayed in parentheses. Stars display significance levels (* 10% level, ** 5% level, *** 1% level).

	(1)	(2)	(3)	(4)
	π_p	π_p	π_r	π_r
[150; 30]	58.94^{***}	36.34^{***}	-31.58***	-39.21***
	(6.42)	(8.69)	(5.04)	(7.61)
[90; 30]	30.47 * * *	26.21***	-17.16**	-18.68**
	(9.89)	(10.14)	(6.91)	(8.45)
[30; 90]	-4.805	-11.35^{**}	32.44***	21.37^{***}
	(10.19)	(4.74)	(4.59)	(4.60)
[30; 150]	-45.82***	-47.10***	76.96***	50.87***
	(6.81)	(4.42)	(5.67)	(9.86)
Constant	95.57***	126.0***	66.30***	83.28***
	(5.01)	(2.96)	(4.07)	(4.64)
Observations	192	117	192	117
R-squared	.315	.399	.5	.312
Sample	Proposer	Proposer	Responder	Responder
	All	Accepted	All	Accepted

Table 11: Explaining Profits from treatments P_{150} , R_{150} , P_{90} and R_{90} .

Notes: This table shows a GLS regression model explaining the profits. The dependent variable is the profit a subject made in the respective ultimatum game. We include dummy variables for every outside option constellation of an ultimatum game. The reference category is the symmetric ultimatum game [30;30]. Model (1) explains the profits for all proposers, while model (2) only the proposers whose offers have been accepted. Model (3) and (4) do the same for the responders. Standard errors are robust and displayed in parentheses. Stars display significance levels (* 10% level, ** 5% level, *** 1% level).



(a) Offer in symmetric and asymmetric ultimatum game



(b) Offer in both asymmetric ultimatum games

Figure 2: Note: In this scatter plots we display decision pairs of proposers (\circ) in both ultimatum games. The size of the bubbles represents relative frequencies.



(a) Level of minimum acceptance in symmetric and asymmetric ultimatum game



(b) Level of minimum acceptance in both asymmetric ultimatum games

Figure 3: Note: In this scatter plots we display decision pairs of responders (\diamond) in both ultimatum games. The size of the diamonds represents relative frequencies.



Figure 4: Graphically explaining rejections with offers.

Estimated rejection probability according to a bi-variate probit regression with a rejection-dummy as dependent variable and offer as independent variable.

					щ	EQ		$^{\mathrm{SD}}$	1	PS		SP
Treatment	UG	u	Av. offer	Av. reject	offer	#reject	offer	#reject	offer	#reject	offer	#reject
DR	[150; 30]	22	55.68 ^+++	.55	0. ×	0 ***	60.	.55	.32	.82	.05 ^ × ×	
OGTAF F	[30;150]	22	145.68	, 45	.14	.82	, 0.	, .04	0.	0	.32	.55
	[90;30]	22	90.91	.32	.32	0	.05		.14		0	77.
1 190	[30;90]	22	116.73	.14		.05	0	0	0	0	- 0	.55

Table 12: Descriptive statistics.

Notes: This table shows average offers (Av. offers) and average rejection rate (Av. reject) of the asymmetric ultimatum games of treatments PR_{150} and PR_{90} . Plus level). Stars display the significance levels of a Fisher-test with the null hypothesis that frequencies are equally distributed (* 10% level, ** 5% level, *** 1% level). \times signs display the significance levels of a McNemar change test with the null hypothesis that the distributions of offers are equal (\times 10% level, $\times \times$ 5% level, $\times \times \times 1\%$ signs display the significance levels of a Mann-Whitney-U test with the null hypothesis that the distributions of offers are equal (+ 10% level, ++ 5% level, +++ 1% level).

Treatment	Symmetric [30;30]			Asymmetric UG		
	π_p		π_r	π_p		π_r
$P_{150} R_{150}$	99.79	>++	71.71	154.58	>+++	35.33
	92.5	>++	68.79	49.70	<+++	143.54
$P_{90} \ R_{90}$	126	>++	61.33	92.91	>+++	48.58
	97.08	>++	63.38	90.79	<	98.42

Table 13: Average profits by player type.

Notes: Stars display significance levels of a Wilcoxon-signed rank test comparing the distribution of players decisions between the symmetric and corresponding asymmetric ultimatum game (* 10% level, ** 5% level, *** 1% level).

10. Instructions (translated from German)

Welcome to the experiment!

You are participating in an economic experiment and you have the possibility to earn a certain amount of money, which varies according to your decisions. Please read thoroughly the following descriptions.

During the experiment we will talk about "Taler" and not \in . Hence, your payout will be initially calculated in "Taler". The achieved total amount of money of "Taler" will be converted into \in at the end of the experiment and then we will give you a cash payout, whereas

10 Taler = 0,6 €

holds true.

The decisions in the experiment

At the beginning of the experiment all participants have been randomly divided into two groups – **players in the role of A and players in the role of B** – which will interact with each other during the experiment. You will get to know neither before nor after the experiment with whom you are interacting. At the beginning of the experiment you will be informed of whether you are player A or B which was determined **randomly** by drawing the cabin number.

The experiment is about splitting 240 "Taler" among player A and B. Player A makes a proposal of how to split the 240 "Taler" among player A and player B. Player B decides from which amount of money he is willing to accept the proposal of player A. After both players have made their decisions, the decisions will be compared.

If the proposal of allocation of player A is in the **area of acceptance** of player B, then

• the 240 "Taler" will be split in accordance to the decisions.

If the proposal of allocation of player A is not in the area of acceptance of player B, then

• player A and player B will each get a guaranteed amount of money, which can be identical or different for player A and player B. Both player A and player B know the two guaranteed money amounts before the decisions are made.

Every player A interacts in two different, sequent games with two different players B.

Every player B interacts in two **different**, sequent games with two **different** players A.

If you are player A you will see this screen:



The decisions of player A and player B are made **simultaneously**. This implies for player B that he makes his decision **before knowing** which proposal player A will actually make.



If the proposed amount of money of player A for player B is **greater than or equal** to the lowest amount of money player B is willing to accept, then the proposal **will be accepted**. Vice versa the **proposal** of player A will be **rejected**, if the proposed amount of money of player A is **smaller** than the lowest amount of money player B is willing to accept.

Before the experiment starts we would like you to answer a couple of control questions. These questions will help you familiarize with the decision situation. **At the end** of the experiment we would like you to answer some further questions.

In the course of the experiment any form of communication with the other participants is forbidden. Please read now once again the instructions thoroughly to make sure that you understood everything. If there are any uncertainties left, please put your hand up. We will then come to you and answer your questions.