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## Respecting entitlements in legislative bargaining - A matter of preference or necessity?

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# Respecting Entitlements in Legislative Bargaining – A Matter of Preference or Necessity?

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## Abstract

In division problems with entitlements, we investigate whether fairness concerns overrule strategic behavior and inhibit full use of the decision-making power. In a lab experiment where entitlements are derived from costly contributions, we vary bargaining power by using either the majority rule or the dictator rule to find a division allocation. We apply very coarse measures for assessing whether entitlements are respected under both rules. For inexperienced subjects, we find a large number of proposals in which all partners receive positive amounts. With experience, however, over one third of proposers leave at most the crumbs for both partners (dictator) or one of them (majority bargaining). Past individual observations of such ‘extreme’ outcomes increase the likelihood of own ‘extreme’ proposals not only under the majority rule, but also under the dictator rule, where no learning of strategic behavior is expected. In heterogeneous groups, where partners bring in different contributions, about 50% of proposals do not reflect an ordinal comparison of the partners’ entitlements. Overall, this shows significant limits in people’s preferences for fairness.

**Keywords:** majority bargaining, dictator game, entitlements

**JEL:** C91, D01

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# 1 Introduction

Conflicts regarding the division of power or money within a group frequently appear in political as well as in economic contexts. The goal of a fair division of costs or benefits amongst stakeholders may stand in sharp contrast to their individual interests. The allocation of the decision-making power in the face of such a conflict defines the ‘legal’ property rights, while entitlements, which are rights as perceived by the individual, constitute ‘moral’ property rights (see Gächter and Riedl, 2005).<sup>1</sup> When parties make costly contributions towards the surplus that is to be divided, they feel more strongly entitled to see their moral property rights implemented.

In multi-party democracies, political parties decide on the formation of a government, dividing political power between the partners. In many business partnerships a committee decides on a performance-based bonus allocation to partners. Even if preferences for a fair distribution were absent, the repeated interaction in such partnerships would impede large distortions of a (perceived) fair division of the surplus, thus making it unlikely that a contributing partner remains with empty hands or just the crumbs. In one-shot decision-making of committees or partnerships, however, the degree to which moral property rights of stakeholders are taken into account may strongly depend on the allocation of decision power among the decision makers. Only if fairness preferences and norms are sufficiently important, they can restrict the utilization of unequal decision power and ensure that moral property rights of all contributors are taken into account.

While there is unambiguous experimental evidence that entitlements matter in bargaining (Cappelen et al., 2007; Karagözoglu and Riedl, 2015; Gantner and Kerschbamer, 2016), it is not clear whether this is due to a preference for rewarding contributions, or due to the necessity to respect entitlements when bargaining power is limited. In this study, we want to disentangle decision making power from moral aspects in order to understand their respective roles under less-than-unanimous decision rules. We systematically compare behavior in multilateral bargaining games with entitlements under two rules that represent important reference points for varying bargaining power: the majority rule and the dictator rule. We create an environment in the experimental lab, where subjects derive subjective entitlements from their contributions towards a jointly produced surplus in three-people groups. Groups then distribute the surplus according to one of the two rules: In the dictator game, the two responders have no choice but to accept the proposer’s allocation of the shares. In the majority bargaining game version of Baron and Ferejohn (1989), bargaining partners take turns in making proposals, and a proposal is implemented as soon as it obtains a majority. Assuming self-regarding behavior, the finite horizon version of the majority bargaining game predicts that players form minimum winning coalitions.

The majority rule plays an important role in democratic voting processes. Applying this rule to a division problem implies that a coalition consisting of the minimum number of players satisfying the majority rule (the minimum winning coalition) may distribute the entire surplus amongst themselves, leaving nothing for partners outside the coalition. On the other hand, such a proposal would require the approval of all chosen coalition partners. If sufficiently many people are fairness-oriented, such a proposal may not find

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<sup>1</sup>As Munzer (1990) states: ‘Moral property rights are justifiable under moral principles. Legal property rights are property rights that are recognized under a particular legal system’ (p. 39/40)

enough support. A proposer thus has to carefully consider whether to propose a minimum coalition at all, and how to split the surplus among the members of a coalition. Observing grand coalitions in which all partners obtain a significant share may thus be due to fairness preferences of the proposer, or it may be due to the necessity of finding sufficient support for a proposal. The fear of rejection of a minimum winning coalition proposal may drive proposers to make more generous offers to all partners.

Studies on less-than-unanimous group decision rules with entitlements are scarce. For majority bargaining, Merkel and Vanberg (2019b) find that in over 80% of proposals all parties receive a positive share of the surplus, where the average offer reflects the order of contributions.<sup>2</sup> Baranski (2016) applies majority bargaining to divide a surplus whose production relies on a voluntary contributions mechanism. He also observes few minimum winning coalitions; the modal allocation is a grand coalition, where partners with higher contributions obtain higher shares.

These results suggest that fairness motives following the ‘equity principle’ (Konow, 2003) are the main driver for the largely observed grand coalition outcomes in the presence of entitlements.<sup>3</sup> If this is true, then one would not only expect strategic behavior to be overruled by moral property rights under the majority rule, but under *any* decision rule. In particular, we should observe a large number of grand coalitions respecting entitlements also under the dictator rule. If, instead, strategic behavior is sufficiently important, we would expect outcomes in which entitlements are not respected to be more frequent in the dictator game, since the majority rule still requires the approval of some coalition partner. The dictator game is a useful benchmark for disentangling a preference for respecting entitlements from a mere necessity, since a proposer can refer to moral property rights or legal property rights for his decision without fear of rejection by the responders.

Evaluating moral property rights is not straightforward, since there are several competing fairness norms, and the context of subjective entitlements brings in further ambiguity as to which norms to apply. The goal of our study is not to evaluate outcomes regarding their closeness to precise fairness norms. Instead, we want to assess the fundamental role of property rights under different bargaining rules, by allowing for a large range of outcomes that could be considered as respecting entitlements. In fact, it seems easier to say which outcomes one would certainly *not* expect if moral property rights are respected: Most people would prefer to abstain from a partnership if they knew they would obtain a share of zero or close to zero after making a costly contribution. Therefore, the first measure we use in evaluating the respect of entitlements is the occurrence of such ‘extreme’ proposals, in which no more than the crumbs of the cake are assigned to partners whose consent is not needed under the two division rules. Our second and third measures for the role of entitlements then refer to the complementary set of ‘all-way splits’. We assess whether a minimal standard of *others’ entitlements* is respected in such proposals by considering an ordinal comparison of recipients’ entitlements. One measure is based on known fairness norms, while the other is based on subjects’ own fairness views. We directly compare

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<sup>2</sup>On the other hand, in a further study of the majority rule, where entitlements are not earned but derived from disagreement payoffs, Merkel and Vanberg (2019a) find between 40 and 60% minimum winning coalitions, implying that many individuals end up with empty hands.

<sup>3</sup>Discussing different ideas of justice, Konow (2003) interprets the ‘equity principle’ as one in which resources are distributed in a way that is proportional to effort or other variables under agents’ control. Note that this principle does not imply a unique fairness norm in our context.

behavior under the two decision rules using the three measures described, and we also compare behavior over time in order to allow for some learning under both rules.

Our results indicate that observing moral property rights seems to be a preference for only about one third of the individuals, who consistently respect entitlements independent of the decision rule or their level of experience. For the majority of individuals, respecting entitlements seems to be a necessity rather than a preference. Even with our coarse measures for others' entitlements, we find that these are often entirely ignored when agents contribute different amounts, and they are increasingly ignored with experience. The share of extreme outcomes increases over time to over one third under both division rules. Minimum winning coalitions are almost always addressed to the partner who has contributed the same amount as the proposer. Thus, entitlements are also ignored in the choice of a coalition partner under the majority rule.

An important conclusion of our study is that learning in this context includes not only a strategic but also a purely moral dimension. While strategic behavior, such as proposing a minimum winning coalition, often takes some rounds of learning (see, e.g., Baranski and Morton, 2020), this cannot explain the observed adjustments under the dictator rule. We find that the likelihood of extreme proposals increases with past observations of extreme outcomes on the individual level under both decision rules. Learning about the degree of others' tolerance and moral acceptance of outcomes ignoring entitlements thus not only reduces the risk of rejection of an extreme proposal in majority bargaining, but it also induces proposers to leave nothing but the crumbs for others because they know that others do so as well. A further conclusion is that increasing proposer power from a unanimity bargaining rule towards majority bargaining and dictatorship does not imply that the manifestation of fairness decreases accordingly. The fact that after some adjustment we find very similar and stable proportions of extreme proposals under both rules indicates that leaving nothing but the crumbs for others will not generally prevail as behavior overall. Rather, it may be observed in a non-negligible part of the population. For the majority, entitlements play a role in that they ensure that each contributor earns more than the crumbs, but they do not seem to generally support the ideas of the equity principle.

The paper proceeds as follows. In Section 2 we present the experimental design. Section 3 presents some relevant results from the literature and our hypotheses. Section 4 shows our results regarding the two division rules, behavior over time, behavior at the individual level and the determinants of extreme proposals. Section 5 concludes.

## 2 Experimental Design

In our experiment, subjects first perform an individual real effort task, from which they earn points according to performance. These points are brought into a partnership, determining the size of the surplus ('cake size') which is then to be divided amongst the partners according to a given decision rule.

For the real effort task, subjects are initially assigned to cohorts containing four individuals, within which they compete in answering 30 quiz questions.<sup>4</sup> Subjects are then

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<sup>4</sup>The real effort task follows that of Gantner et al. (2016), but with the appropriate adjustments, as

ranked within their cohorts according to the number of correct answers given, and the two highest-ranked players earn 4 points (we refer to them as H-types), while the two lowest-ranked (L-types) earn 2 points.<sup>5</sup> The points earned in the real effort task are a subject's contribution towards the joint surplus of a (newly created) partnership of three individuals, all of them coming from different cohorts of the quiz competition. We label the three partners  $A$ ,  $B$ , and  $C$ , and the size of the jointly created surplus is given by  $S = \text{points } A \cdot \text{points } B \cdot \text{points } C + 12$ , which is then available for division amongst the three partners. Entitlements may be considered as subjective, due to the non-linearity of the production function, due to the different competitions of cohorts in the real-effort task, and due to the task itself, in which luck may also partly determine a successful ranking.

Our treatment variation is the rule regarding the division of the surplus. Either the dictator game (treatment DICT) or the majority bargaining game (treatment MAJ) is played to obtain a final division. In both treatments, individuals play ten games under the same rule. In each of the ten games, individuals are randomly rematched into new three-player partnerships (groups). An individual's contribution in points earned from the real-effort task as well as the division rule are fixed throughout the ten games, but the size of the surplus may change due to changing partners. We thus have four possible group compositions regarding the partners' contributions, with the respective cake size in parenthesis: LLL (20), HLL (28), HHL (44), and HHH (76). No individual is matched with the same two partners more than once.

We use the strategy method to collect complete division proposals.<sup>6</sup> In DICT, all subjects are asked how they would divide the available surplus in the current game among the three partners if they were the dictator. One partner is then randomly selected as the dictator, and the corresponding proposed allocation is implemented. In MAJ, all subjects are asked to submit a proposal for division. The three proposals in a group are displayed to all partners, who then have to vote on whether they approve or reject each of them. After the voting, one partner is randomly selected as the actual proposer, and the voting on this proposal is implemented. If it was approved by at least two of the three partners, the division is implemented accordingly, and the game ends. Otherwise, the surplus is reduced by 20% and the division game enters a new round: each player again submits a proposal for division of the now discounted surplus, and the partners vote on each proposal; again, a proposal is selected randomly and the voting on that proposal is implemented. The process continues until a proposal passes, or until the 10th period passes without finding an agreement. In the latter case, all partners receive a payoff of zero for the current game. The rules of the game are common knowledge.

Furthermore, subjects' fairness views are elicited, i.e. they are asked for their evaluation of what fair division would be in their opinion under each possible cake size. This question is asked *ex interim*, i.e. after they are informed about the relevant division rule but before they know their contribution and the relevant cake size.

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we decided to have only two (rather than three) possible contribution types.

<sup>5</sup>In case of a tie, the rank is randomly assigned.

<sup>6</sup>The choice of the method (strategy vs. direct response) may make a difference when dealing with behavior in 'hot' versus 'cold' emotional states (Brosig et al., 2003); however, since in our setting no punishment is involved, we do not expect that the choice of the method would make a big difference. This should also imply that the method should not lead to treatment differences (Brandts and Charness, 2009).



Table 1: Distribution of Initial Proposals Over Treatments and Groups

Group	Cakesize	# Obs. in DICT	# Obs. in MAJ	Total
LLL	20	240	240	480
HLL	28	360	360	720
HHL	44	360	360	720
HHH	76	240	240	480
Total		1200	1200	2400

We ran five sessions for each treatment, each of them with 24 subjects, thus we have a total of 240 participants. Over all games, each subject submits at least ten division proposals (in MAJ it can be more than 10, since the game enters another round of proposals if a suggestion does not pass).<sup>7</sup> Table 1 displays the the number of initial observations over group compositions and cake sizes in the two treatments.

The experimental sessions were programmed and conducted with z-Tree (Fischbacher, 2007) at the Innsbruck-EconLab for experimental economic research. Recruitment was done using ORSEE (Greiner, 2015). At the end of the experiment, two of the 10 games were randomly chosen, and subjects were paid out their earnings from these two games in Euros at a rate of 1:1. The duration of a session was 70-90 minutes, and average earnings were 17.10 Euros.

### 3 Relevant Literature and Hypotheses

Standard theoretical predictions rely on the assumption that all actors are exclusively interested in their own material payoff. For the predicted formation of minimum winning coalitions in majority bargaining, substantial experimental evidence can be found in the absence of entitlements (Frechette et al., 2003; Diermeier and Morton, 2005; Diermeier and Gailmard, 2006; Miller and Vanberg, 2013; Baranski and Morton, 2020). On the other hand, previous research on two-person dictator games in the absence of entitlements has shown that absolute decision power does not necessarily imply that it is utilized to its full extent (Camerer, 2003; List, 2007; Engel, 2011). According to Andreoni and Bernheim (2009), giving in the dictator game is not necessarily motivated by fairness concerns, but by a desire to signal that one is not entirely selfish. Correspondingly, introducing more recipients does not necessarily lead to larger amounts given (see Fisman et al., 2007, for three-player dictator games).<sup>8</sup>

<sup>7</sup>Given that subjects are reminded of their earned contribution points in each game and informed that only two games would be selected at random for real payouts, we do not believe that earned entitlements lost importance over the 10 games.

<sup>8</sup>In two-person games, the dictator gives away about 20% of the endowment, while in three-person games it is 25%. Furthermore, the dictator keeps at least 95% in 41% of the allocations in two-person games, and in 50% of the allocations in three-person games. Overall, Fisman et al. (2007) find that the two ‘others’ are treated symmetrically by the dictator, which reflects their similar position and the fact that there is no reason for the dictator to have a bias towards either one.

Introducing entitlements not only plays an important role for elicited fairness views of outside observers and stakeholders (e.g. Gächter and Riedl, 2006; Gantner and Kerschbamer, 2016), but also for actual divisions obtained through unanimous bargaining (see Karagözoglu and Riedl, 2015 for bilateral settings, and Gantner et al., 2016 for multilateral settings), showing that, despite a clear self-serving bias towards own claims, the shares of others typically reflect their relative entitlements.

To our knowledge, Merkel and Vanberg (2019b) conduct the only study that considers majority bargaining with earned entitlements, and they observe a large number of grand coalitions.<sup>9</sup> Baranski (2016) also studies majority bargaining, but here subjects are assigned initial endowments, from which they choose to make contributions towards the production of the surplus. A direct comparison is difficult, because contribution levels are voluntary and objectively measurable.<sup>10</sup> This is not the case in our experiment, where effort is subjective, the reward for effort (the points earned) may partly be due to luck, and contributions are not voluntary. This may result in different fairness judgments, even if all partners agree that a fair outcome has to be implemented.

The effect of earned entitlements in a dictator setting comparable to ours has, to our knowledge, only been studied with two-players.<sup>11</sup> Earning the role of the dictator leads to outcomes where dictators keep larger amounts to themselves (Hoffman et al., 1994). When recipients have exerted effort, dictators share more (Ruffle, 1998; Cappelen et al., 2007), while Cherry et al. (2002) find almost no sharing when only dictators earn the endowment, supporting their interpretation that bargaining over earned wealth makes ‘the (ab)use of the rules of the game’ more relevant.<sup>12</sup>

To study the role of bargaining power in games with entitlements, the cost of rejection (Rodriguez-Lara, 2016) or the punishment opportunity (Ridinger, 2018) has been varied in two-player ultimatum games with different contributions. Rode and LeMenestrel (2011) consider the division of a surplus to which only one of two players has contributed, and they vary decision power by using either a dictator rule or a unanimity rule for the division. Their results show that more power leads to higher gains, confirming earlier findings of a trade-off between self-interest and fairness (Babcock and Loewenstein, 1997; Messick and Sentis, 1997), and indicating that entitlements based on contributions are not generally respected.

We formulate our hypotheses taking into account theoretical predictions as well as results from the literature on fair divisions. For the (standard) theoretical prediction of outcomes, the assumption of individual money maximizing behavior implies that entitlements do not play a role, since any previous effort can be considered as sunk cost. We mainly use the

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<sup>9</sup>When subjects do not earn entitlements but are assigned disagreement payoffs, the observed number of all-way splits is smaller (see Merkel and Vanberg, 2019a). In a similar setting, Miller et al. (2018) observe that most subjects aim for minimum winning coalitions.

<sup>10</sup>In a similar setting with voluntary contributions, Baranski and Cox (2019) focus on communication among bargainers, but irrespective of the communication possibility, they observe a large number of proportional sharing.

<sup>11</sup>Stoddard et al. (2014) look at a multi-player dictator setting with entitlements. However, their setting differs from ours in some main points: Their surplus is produced by voluntary contributions, an outside dictator (whose payoff is independent of the division rule) chooses between three exogenously fixed division allocations, and groups are kept the same over rounds.

<sup>12</sup>Similar results are obtained by Carlsson et al. (2013) in two-player charity games: the proportion of players who share their earned endowment as well as the amount shared decreases when the decision maker earns the money.

qualitative properties of the equilibrium predictions as a benchmark, which correspond to keeping the entire available amount in the dictator game, and the proposer sharing the entire cake with only one of the two partners in the majority bargaining game.<sup>13</sup>

To evaluate the role of entitlements for bargaining outcomes, we consider that not only the equilibrium predictions can be regarded as ignoring entitlements, but also any allocation that leaves nothing but the crumbs to anyone who made a costly contribution to the provision of the surplus. We therefore consider ‘extreme’ proposals as those in which the proposer assigns at most 10% of the cake to the partner(s) whose approval is not necessary for an agreement. This includes all proposals in DICT where the dictator keeps at least 80% and each partner receives at most 10%, and all proposals in MAJ where one partner receives at most 10% (allowing for any possible division of the remaining 90% between proposer and coalition partner).<sup>14</sup>

Our first research question concerns the occurrence of such ‘extreme’ proposals. Assuming that proposers and responders in both treatments have similar chances of being fairness-oriented (due to random assignment to the treatments), there is then a non-zero probability that responders reject any outcome that does not assign significant shares to all three partners in MAJ. Proposers in MAJ are expected to take this into account, and therefore fewer extreme proposals are expected here,<sup>15</sup> as compared to DICT, where rejections are not possible, due to the rules of the game.

Considering outcomes over time, subjects are not expected to become inherently more selfish or more fair under the standard assumption of stable preferences. However, their behavior may change due to learning about the environment.<sup>16</sup> MAJ is more complex due to considerations about at least one partner’s approval. There is substantial experimental evidence that minimum winning coalitions increase with experience in the game without entitlements (see, e.g., surveys by Palfrey, 2016; Baranski and Morton, 2020), and Merkel and Vanberg (2019a) report that more extreme outcomes are observed with experience in the game with entitlements. In DICT, none of these considerations plays a role.<sup>17</sup>

***Hypothesis 1:*** A) *We expect to see more extreme proposals in treatment DICT compared to MAJ.* B) *Over time, we expect the increase in the number of extreme outcomes to be*

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<sup>13</sup>In the literature, the stationary subgame perfect equilibrium is typically considered for the majority bargaining game, where the proposer offers zero to one of the two partners, and to the coalition partner he offers the so-called continuation value, i.e. the amount this partner expects to receive in case the current proposal is rejected, to the other partner. If we assume that all players use the same strategy, the proposer would keep a share of 73% for himself and offer 27% to one of the two partners. Denoting the share offered to the coalition partner by  $s$  and using discount factor  $\delta = 0.8$ , we have  $s = \frac{1}{3} * 0.8 * (1 - s) + \frac{1}{3} * 0.8 * s$ , implying that  $s = 0.8 * \frac{1}{3} = 0.27$ .

<sup>14</sup>These allocations where partners receive comparably small amounts is similar to the ‘pittance coalitions’ identified in Diermeier and Morton (2005), just that in our case subjects were not constrained to propose integer allocations, hence the motivation behind such allocations may differ.

<sup>15</sup>As found in Bolton and Brosig-Koch (2016), strategic uncertainty regarding the acceptance threshold of responders makes predictions in multilateral bargaining difficult.

<sup>16</sup>One may object that our subjects may collect more information in MAJ, because they see others’ current proposals before they vote on each of them, while in DICT they only see the selected dictator’s proposal. Note, however, that subjects have no information regarding the acceptance of the two proposals that are not selected. Feedback regarding the outcome is only given for the randomly selected proposal in both treatments.

<sup>17</sup>One may argue that if past observed proposals signal preferences for fairness, this may create social pressure to behave fairly, but since individuals are rematched in a new group every period, this seems unlikely. In addition, it should not differ between the treatments.

*larger in MAJ than in DICT.*

Our second research question concerns the respect for entitlements among all-way splits. Consistent with our definition of extreme outcomes, we consider all-way splits as allocations in which each partner obtains a share of at least 10%.<sup>18</sup> The two measures we use below for whether all-way splits respect entitlements are defined very broadly in order to include several fairness standards, and they take into account the known self-serving bias of a proposer. That is, we focus on *others' entitlements*, and we compare these in a relative manner, evaluating them either based on *known fairness norms*, or based on their relative shares as stated in proposers' elicited *own fairness views*.

Expecting a larger number of extreme proposals in DICT implies that there will be fewer all-way splits. However, this does not necessarily imply that more proposals actually respect entitlements in MAJ, since this depends on how many all-way splits ignore entitlements. On the other hand, we have no reason to expect differences across treatments in this regard, and we thus remain with the expectation that more proposals respect entitlements in MAJ than in DICT. If a proposal in MAJ respects entitlements, this may be due to own fairness preferences or the necessity to take into account the assumed preferences of the responders. The latter is not expected to play a role in DICT due to the rules of the game. Other motives for respecting entitlements, such as creating an image of oneself that seems fair to others, are expected to be independent of the division rule. Over time, if subjects learn to behave strategically and propose extreme offers more frequently in MAJ, this may reduce the number of proposals respecting entitlements for a similar reasoning.

***Hypothesis 2:*** *A) Among all-way splits, we expect to find more proposals that respect entitlements in MAJ than in DICT. B) Over time, we expect the proportion of all-way splits that respect entitlements to decrease in MAJ, while we expect no change in DICT.*

Our third research question regards the proposer's role as a contributor, i.e. the effect of a proposer's relative contribution on observed proposals. We ask whether this affects the likelihood of proposing an extreme outcome and the choice of the coalition partner in MAJ. Given a fixed surplus for division, note that the possible gain from an extreme allocation compared to an all-way split that respects entitlements is relatively larger for a L-type contributor than for a H-type contributor in both treatments. L-types are thus expected to be more likely to propose extreme allocations.

***Hypothesis 3:*** *We expect that L-type proposers are more likely to propose an extreme division than H-type proposers.*

Regarding the choice of the coalition partner, different considerations point into different directions. First, theory predicts that the 'cheaper' coalition partner (i.e. the one whose continuation value is smaller) is chosen for a minimum winning coalition in MAJ. While contributions are considered a sunk cost and there is thus no cheaper coalition partner from a theoretical point of view, possible fairness concerns and aspirations give different indications. A partner who contributed more may also be more likely to expect a larger

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<sup>18</sup>In Baranski and Morton (2020), an all-way split is defined as a proposal in which all members receive shares greater than or equal to 5% of the cake to be divided. Given our focus on whether entitlements are respected, we consider 10% a more appropriate limit to identify a significant share and therefore refer to such allocations as all-way splits, in a slight abuse of the term.

share. Therefore, inviting the L-type partner into a coalition seems to be the ‘cheaper’ option. The preferred coalition partner would then be independent of the proposer’s type. Second, individuals may have a preference to share the surplus with the partner who ‘deserves’ it most. This would be the H-type partner, due to his larger contribution to the cake. Again, the preferred coalition partner would be independent of the proposer’s type. Third, it is also possible that identity plays a role. In this case, proposers would choose a coalition partner who contributed the same amount as they did. In this case, L-type contributors would choose L-types as coalition partner, and H-types would choose H-types. Our experiment was not designed to carefully test these different motives, but the data will allow us to gain some insight regarding which of the three seems to be dominant. In DICT, there is no reason to expect that the dictator should give only to one of the two receivers, as the results from Fisman et al. (2007) suggest.<sup>19</sup>

## 4 Results

### 4.1 Overview and The Role of Extreme Proposals

In our data analysis, we will mainly consider proposals in round 1 and discuss bargaining behavior in MAJ separately when it is relevant. This allows for a cleaner comparison between DICT and MAJ, since proposals in later rounds of MAJ may be dependent on the history of bargaining behavior. Note that all proposals in DICT and all accepted proposals in MAJ correspond to potential final outcomes (due to the random draw determining the actually implemented outcome). 89.5% (1074/1200) of all proposals in MAJ are accepted in the first round.

A first comparison between the two division rules shows that behavior consistent with the theoretical prediction (minimum winning coalition) is observed in 16.3% in DICT compared to 21.5% in MAJ (Wilcoxon rank sum test,  $p = 0.47$ )<sup>20</sup>. In terms of bargaining behavior, we observe similar proportions of rejections in MAJ when a minimum winning coalition is proposed compared to all other proposals (11.3% vs. 10.6%), suggesting that a minimum winning coalition is not considered unacceptable behavior.

Figure 1 displays the outcomes separated by treatment and by group composition. We pool observations from homogeneous groups (LLL and HHH), in which all partners contribute equally, and we pool observations from the heterogeneous groups (HLL and HHL), in which partners contribute different amounts. Note that in heterogeneous groups, partners may contribute the same (from a H-type proposer’s point of view in HLL groups, and for an L-type proposer in HHL groups), or they may contribute different amounts. For the latter, we indicate in the Figures which responder is of the same type as the proposer.<sup>21</sup> The qualitative theoretical predictions would imply observations at the proposer’s full-share vertex in DICT (top of the triangle), while in MAJ a minimum winning

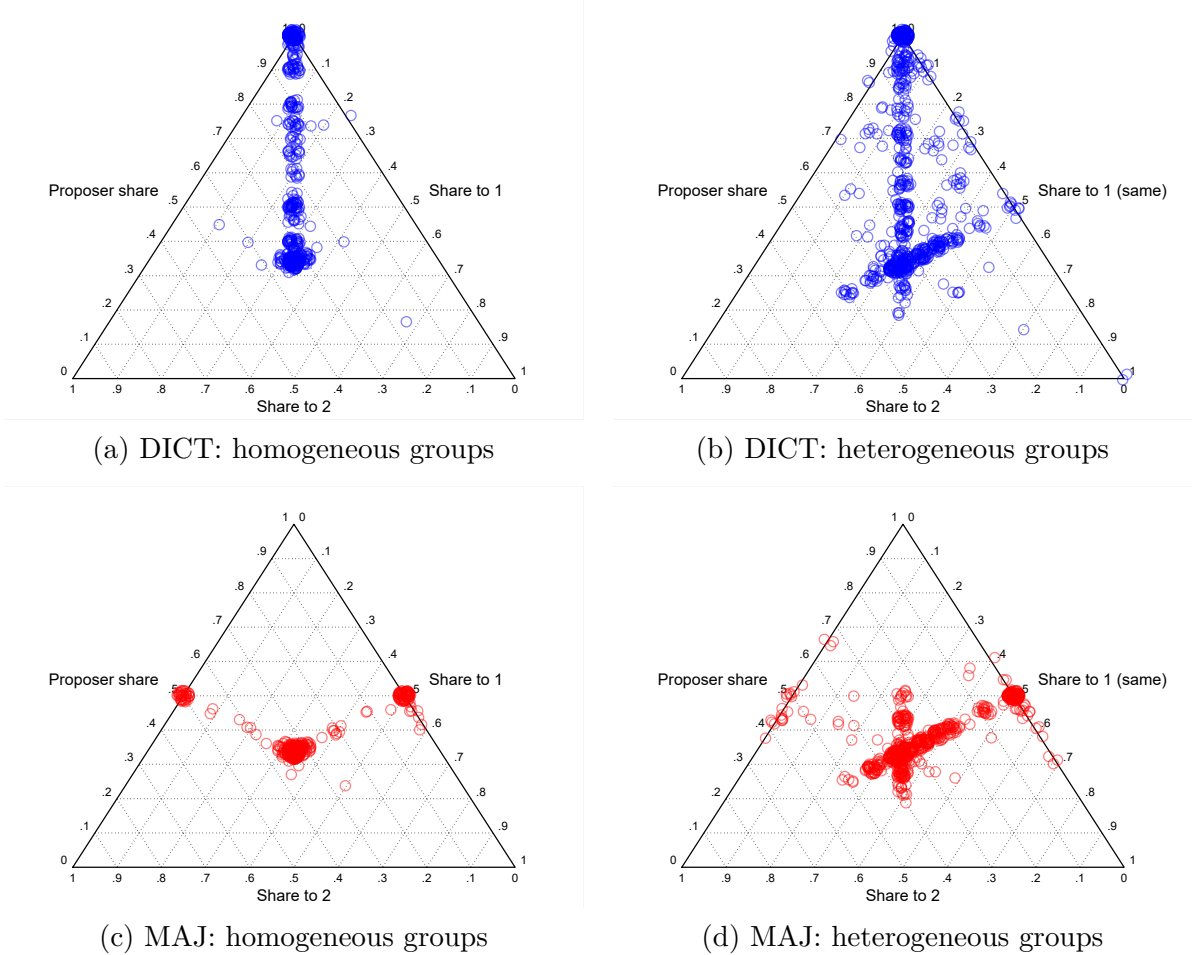
<sup>19</sup>Fisman et al. (2007) found that the two others are usually treated symmetrically.

<sup>20</sup>All non-parametric tests are done on the basis of 10 independent observations per treatment. We had five sessions of 24 subjects per treatment, each consisting of two subgroups (of 12 subjects each) which did not interact with each other. We use the corresponding mean for one such subgroup as one independent observation.

<sup>21</sup>Figures 7 in Appendix A further disaggregates Subfigures (b) and (d) regarding whether the proposer faced two partners of different types or of the same type.

coalition between the proposer and one of the two partners would imply observations either at the proposer’s edge of the triangle (excluding recipient 1) or recipient 1’s edge (excluding recipient 2).

Figure 1: Outcomes in treatments DICT and MAJ



Note: These plots show the relationship between the shares of the three players in a two-dimensional graph, where the horizontal lines display the increments for the proposer’s axis, the positively sloped lines correspond to the increments for recipient 1, and the negatively sloped line to recipient 2.

When one of the two recipients in a heterogeneous group is of the same type as the proposer, his share is always displayed as ‘share to 1’.

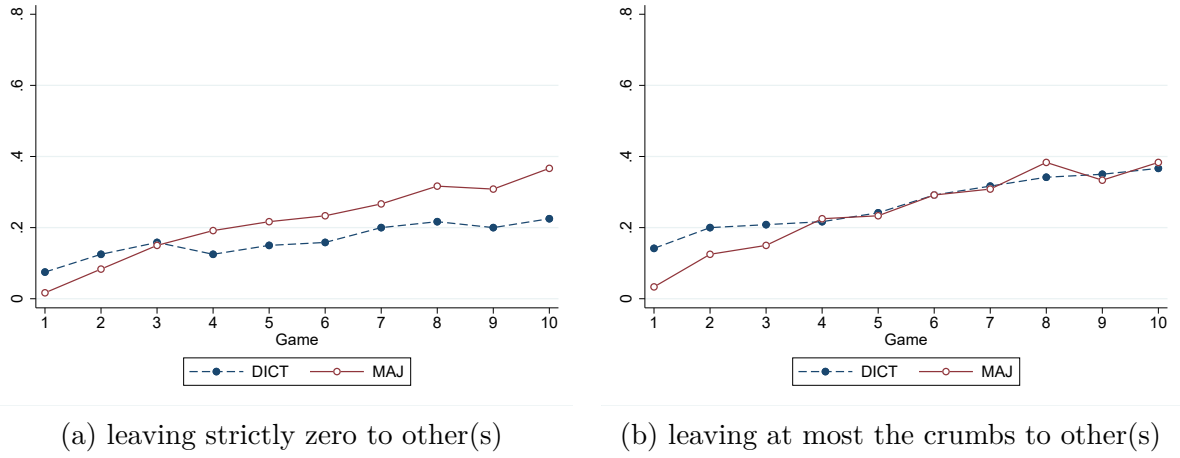
We observe a large number of outcomes at or around the equal split (midpoint of triangle) for all group compositions. Figure (a) displays the outcomes for homogeneous groups under the dictator rule. Virtually all deviations from the equal split are found along a suggested vertical line towards the proposer’s full-share vertex. This line represents divisions in which the two recipients receive the same amount, but the proposer takes a larger share.<sup>22</sup> For heterogeneous groups in DICT, shown in Figure (b), we find more deviations from the equal split, most of them indicating allocations in which the proposer either offers the same amount to the two partners (along the vertical line), or different amounts to the two recipients (along a positively sloped line). Figure 7 (a) and (b) in Appendix A show that, as conjectured, these allocations are indeed in line with the

<sup>22</sup>In DICT, the two recipients receive the same amount in 64% of all games.

corresponding group compositions where the proposer’s partners are either of the same type or of a different type.

For outcomes under the majority rule, Figure (c) shows that almost all observations for homogeneous groups are either closely around the equal split or on the edges correspond to minimum winning coalitions. For heterogeneous groups in MAJ, Figure (d) shows deviations from the equal split towards increasing shares of two players at the cost of the third. Some deviations are to the benefit of the proposer, where he/she and one of the recipients obtain larger shares (to the right of the equal split), but we also see allocations in which the two recipients obtain larger shares than the proposer (to the left of the equal split), suggesting divisions that reflect relative contributions.

Figure 2: Proportions of extreme outcomes



We turn to an overview over time, by dividing our observations into ‘early’ and ‘late’ games: games 1-3 and games 8-10 (see also Figures 8 and 9 in Appendix A).<sup>23</sup> First, we observe significantly more outcomes as predicted by standard theory in late games: In MAJ, only 8.3% of all outcomes are minimum winning coalitions in early games, while it is 33.1% in late games (Wilcoxon matched-pairs signed rank test (WSR):  $p < 0.01$ ); see also Figure 2(a). In DICT, the proportion of dictators keeping the entire amount rises from 11.9% in early games to 21.4% in late games (WSR:  $p = 0.08$ ). Second, a comparison between the two division rules shows that behavior consistent with the theoretical prediction is more frequent in MAJ compared to DICT in late games (one-sided t-test,  $p = 0.10$ ).

As stated in our hypotheses, we are interested in the observation of extreme proposals, which include allocations that leave only the crumbs to partners whose consent is not needed. Over all games, there is no difference in the two proportions between the treatments (MAJ: 24.7%; DICT: 26.8%; Wilcoxon rank sum:  $p = 0.76$ ). The development of extreme proposals over time is illustrated in Figure 2(b). For both treatments, we observe a significant increase in extreme proposals in late games: in MAJ, there are 10.3% extreme proposals in early games and 36.7% in late games (WSR:  $p < 0.01$ ); in DICT, there are 18.3% in early games and 35.3% in late games (WSR:  $p < 0.01$ ). While in early games, the difference in the occurrence of extreme outcomes between DICT and MAJ

<sup>23</sup>This is the smallest number for early and late games where we have all possible group compositions represented.

is significant (t-test:  $p = 0.06$ ), the difference vanishes in late games ( $p = 0.42$ ). This is not what was expected and formulated in Hypothesis 1. We expected an increase in extreme proposals in MAJ due to the higher complexity of strategic behavior that helps exploit bargaining power. Instead, we observe learning not only in MAJ, but also in DICT. These findings are confirmed by a panel logit regression, see Table 3 in Appendix A. Our findings show that for more than one third of the subjects the procedure does not matter for the use of bargaining power: they use (almost) as much as the procedure allows for.<sup>24</sup>

**Result 1:** *Extreme outcomes leaving at most the crumbs to those whose approval is not needed are similarly frequent in DICT and MAJ. Over time, their occurrence increases in both DICT and MAJ and accounts for over one third of all outcomes in late games, independent of the decision rule.*

## 4.2 The Role of Others' Entitlements

Considering ways to understand the role of entitlements, we do not want to present a precise count of allocations that coincide with known fairness norms. In such a count, the proportional norm, for example, would not include allocations in which the proposer claims more than a share proportional to his/her contribution. However, such a self-serving bias of proposers has already been shown to play an important role in previous experimental studies on fair division.<sup>25</sup> Acknowledging that the self-serving bias induces distortions in a division between the proposer and the recipients, we consider that entitlements still play a basic role if a proposal reflects the ordinal comparison of the recipients' entitlements (labeled 'others' entitlements').<sup>26</sup> In the following, we therefore focus on the role of others' entitlements, which can be seen as a very basic extent to which moral property rights are acknowledged. To assess the role of others' entitlements, we use the complementary set to the already discussed extreme proposals. That is, one condition for a proposal to respect entitlements is that each partner is assigned more than 10%.<sup>27</sup>

We then propose two measures for others' entitlements. The first measure is derived from known fairness norms. The second measure is based on subjects' own fairness views.<sup>28</sup> Using subjects' own fairness assessments as a measure for others' entitlements

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<sup>24</sup>One may argue that excluding one or both partners (almost) entirely from the division allocation is only one aspect of measuring unfairness, while another aspect would be to consider the share the proposer keeps to himself. Figure 10 in Appendix A shows that the mean share kept by the proposer over all outcomes is larger in DICT than in MAJ in each of the 10 games ( $p < 0.01$  for each game). Furthermore, the dictators' mean share increases steadily over time, from about 48% in early games to 68% in late games, while the proposer's mean share in MAJ changes little.

<sup>25</sup>Proposers' fairness views display a significant self-serving bias in the presence of entitlements by claiming a larger share than others would assign to them (Gantner et al., 2016), and furthermore, the application of norms is used in a self-serving way (Feng et al., 2013; Rodriguez-Lara and Moreno-Garrido, 2012; Ubeda, 2014).

<sup>26</sup>It is debatable if our definition captures a sufficient condition for fairness in outcomes. As we will show, even this weak condition is frequently violated in all-way splits.

<sup>27</sup>For example, we consider that a division assigning less than 10% to one partner entirely ignores the entitlements of this partner, even if the remainder is allocated as a 50-50 split among two partners and thus seems generous towards the favored partner. Such a division selectively respects only *some* entitlements.

<sup>28</sup>Recall that these were solicited *ex-interim*, i.e. when subjects were already informed about the



avoids imposing an external fairness norm on behavior. Both measures are coarse due to their ordinal character, as we will describe below, but they help us to identify how the two division rules compare with respect to some minimal requirements for the role of entitlements.

#### 4.2.1 Others' Entitlements Based on Fairness Norms

The most prevalent fairness norms in a division context are the egalitarian norm and norms that take agents' contributions into account, such as the proportional or libertarian norm.<sup>29</sup> We define others' entitlements based on fairness norms to be respected if (i) the ordinal comparison of the recipients' shares in a proposal is consistent with the order of their contribution points, or (ii) recipients' share are consistent with the equal split.<sup>30</sup> Note that this definition includes all proposals consistent with the egalitarian, proportional and libertarian norm, but it further includes proposals in which a proposer's self-serving bias distorts the allocation with respect to the contribution order if all partners' shares are considered.

Figure 3 displays the proportions of all proposals that respect entitlements based on fairness norms, separated by treatment and over time. Due to the importance of the egalitarian norm, we report equal-split proposals separately from those respecting others' contribution order; note that for homogeneous groups the latter include the former, while this is not the case for heterogeneous groups. We further identify the proportion of 'inconsistent' proposals, i.e. all-way splits that ignore entitlements based on fairness norms, and the class of extreme proposals. Overall, the proportion of proposals that respect others' entitlements based on fairness norms in MAJ (60.1%) and DICT (56.2%) does not differ (t-test:  $p = 0.42$ ). An important observation is that entitlements are increasingly ignored with experience: Under both decision rules, offers that respect others' entitlements based on fairness norms occur more often in early than in late games, even though the difference is only significant in MAJ (MAJ: early 72.2%, late 50.8%, WSR,  $p = 0.01$ ; DICT: early 61.4%, late 51.6%, WSR,  $p = 0.25$ ). This trend is aggravated for heterogeneous groups, where under both rules, entitlements are respected in less than 50% of the late games (DICT: 65.0% in homogeneous vs. 39.2% in heterogeneous groups, WSR,  $p < 0.01$ ; MAJ: 57.1% vs. 43.0%, WSR  $p = 0.01$ ). This observation shows that (perceived) differences in entitlements not only allow for a multiplicity of fairness standards, but they seem to induce a majority of subjects to ignore relative entitlements entirely.

A notable difference between the two division rules occurs in homogeneous groups: In MAJ, proposals respecting entitlements based on fairness norms are almost all egalitarian, while in DICT only about half of them are egalitarian. For the other half, the proposer

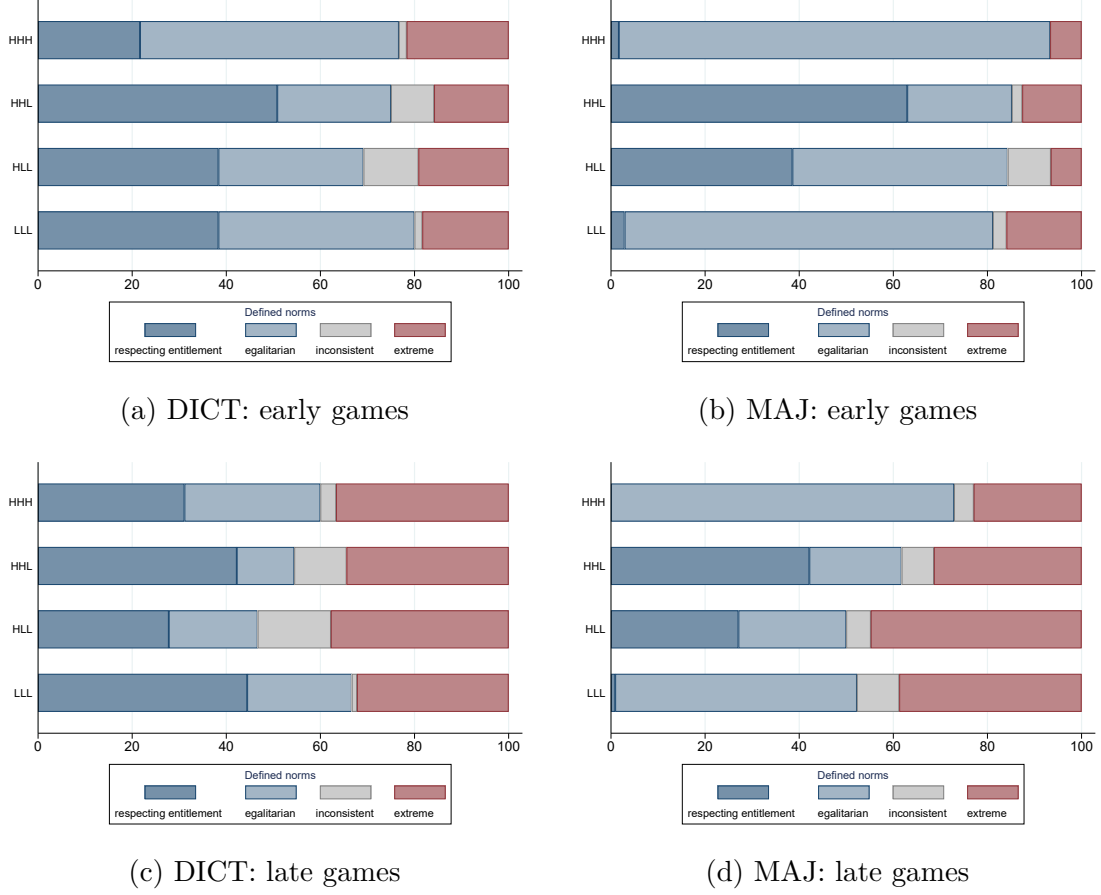
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division procedure, but not yet about individual contributions and available cake size.

<sup>29</sup>The proportional norm divides the entire surplus proportionally to each agent's contribution; the libertarian norm divides the part of the surplus that can be attributed to agents' contribution in a proportional way, while the remainder (i.e. the constant of 12 in our function determining cake size  $S$ ) is divided equally among agents.

<sup>30</sup>In order to take into account possible rounding of numbers, we allow for a difference of at most 1 point of the cake size in the proposed shares to the two partners in homogeneous groups, and for a difference of at least 1 point of the cake size in the proposed shares in heterogeneous groups.

Figure 3: Respecting entitlements derived from fairness norms: early vs. late games



Note that for homogeneous groups, all egalitarian proposals also respect others' contribution order, but not vice versa.

treats his partners equally, but keeps the larger share to himself. Proposals under DICT thus show a larger self-serving bias in this respect.

**Result 2.1:** *When fairness norms serve as a reference for others' entitlements, we find that the share of proposals respecting entitlements does not differ between MAJ and DICT. In late games, entitlements are not respected in almost 50% of all games under both decision rules, and this is further aggravated for heterogeneous groups.*

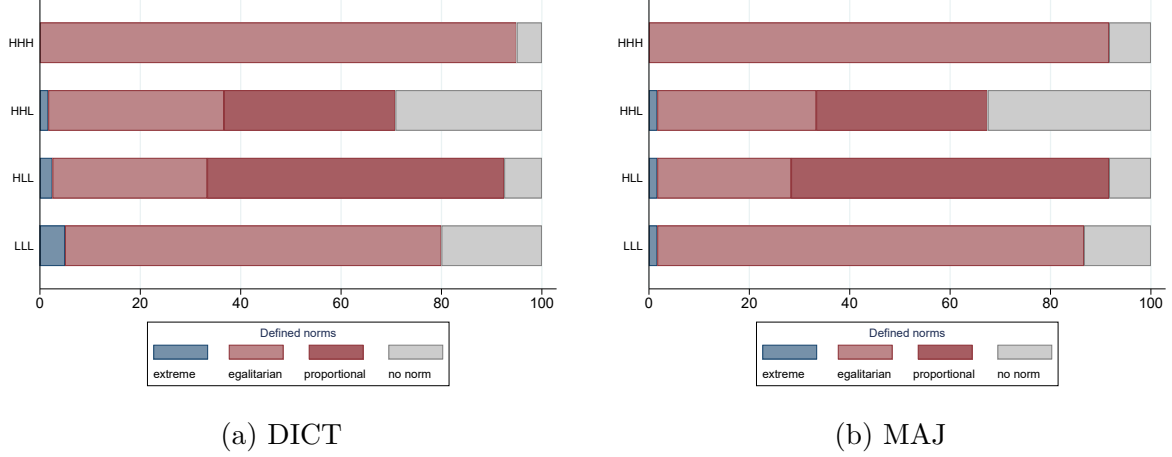
#### 4.2.2 Others' Entitlements Based on Own Fairness Views

Before we define others' entitlements based on subjects' own fairness views, we briefly present these fairness views with respect to important norms that they potentially follow. Figure 4 shows to which degree extreme proposals and the egalitarian norm play a role in subjects' fairness views. Furthermore, we display the share of proposals following a (broadly defined) proportional norm that includes all divisions as long as they are consistent with the order of contribution points and are different from extreme proposals.<sup>31</sup>

<sup>31</sup>Precisely, we count all proposals towards a proportional norm in heterogeneous groups if they assign any payoff from 4-8 to L and 12-20 to H in HHL, and from 6-12 to L and 16-19 to H in HLL. Numbers

Since in homogeneous groups the egalitarian and proportional norm coincide, we assign the corresponding proposals to the egalitarian norm. Finally, all observations that do not satisfy the criteria for any of the three norms described are assigned to the class ‘no norm’.

Figure 4: Norms represented in subjects’ fairness views



Note that for the homogeneous groups, all egalitarian proposals are also proportional.

Extreme outcomes play virtually no role in the fairness views under either division rule (MAJ: on average 1.3%; DICT: on average 2.1%). Furthermore, we note that fairness views do not differ significantly between the two treatments (DICT vs. MAJ,  $\chi^2$ -test,  $p = 0.40$ ).

**Auxiliary Result:** *When subjects’ fairness statements are compared with respect to the occurrence of extreme and egalitarian proposals and a broadly defined proportional norm, no differences are found between the two division rules.*

This result suggests that the general view people hold regarding the role of entitlements and fairness is independent of the actual procedure used to divide the endowment. Hence, if subjects’ own fairness views determine whether others’ entitlements are respected in the actual division, then it should not matter which of the two procedures is implemented.

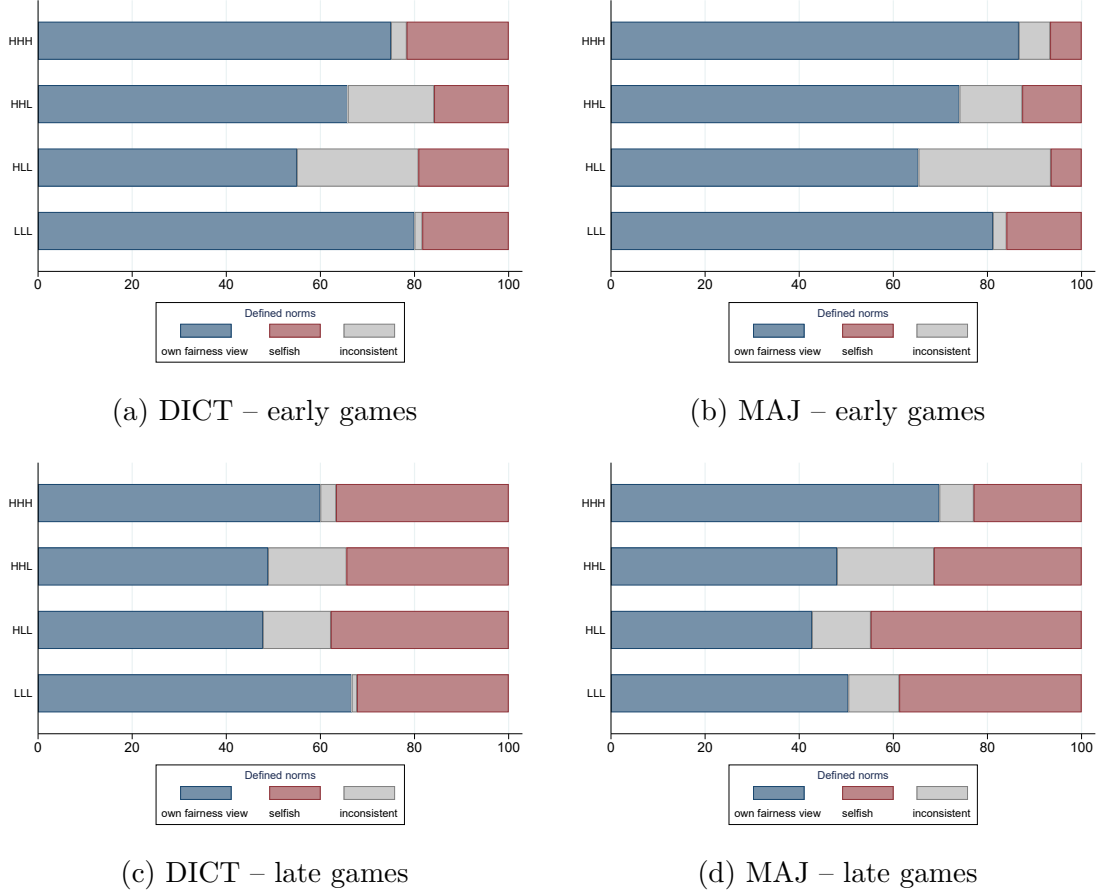
For our second measure of entitlements, we define others’ entitlements based on fairness views to be respected if the ordinal comparison of shares to the two partners in a subject’s proposal is consistent with the one in this subject’s own fairness statement.

Figure 5 displays the proportion of all proposals respecting others’ entitlements based on subjects’ own fairness views, the proportion of extreme proposals, and ‘inconsistent’ proposals (classifying the remainder), separated by treatment and over time. A comparison between MAJ and DICT shows that, on average, others’ entitlements are respected in a similar share of all proposals in the two treatments (MAJ: 65.7%, DICT 68.5%, t-test:  $p = 0.66$ ).

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outside these intervals would interfere with the selfish or egalitarian norm, taking into account our allowed deviation of at most 1 point.

Figure 5: Proposals respecting others' entitlements derived from subjects' own fairness views



When comparing early and late games, the results are similar to those for entitlements from fairness norms. Under both division rules, the role of others' entitlements diminishes from early to late games (MAJ: early 83.3%, late 55.8%, WSR:  $p < 0.01$ ; DICT: early 72.8% vs. late 59.7%,  $p = 0.02$ ). This trend is aggravated for heterogeneous groups, even though the differences between homogeneous and heterogeneous groups is only significant for DICT (DICT: 66.3% in homogeneous vs. 55.0% in heterogeneous groups, WSR:  $p = 0.02$ ; MAJ: 57.1% vs. 52.5%, WSR:  $p = 0.17$ ).

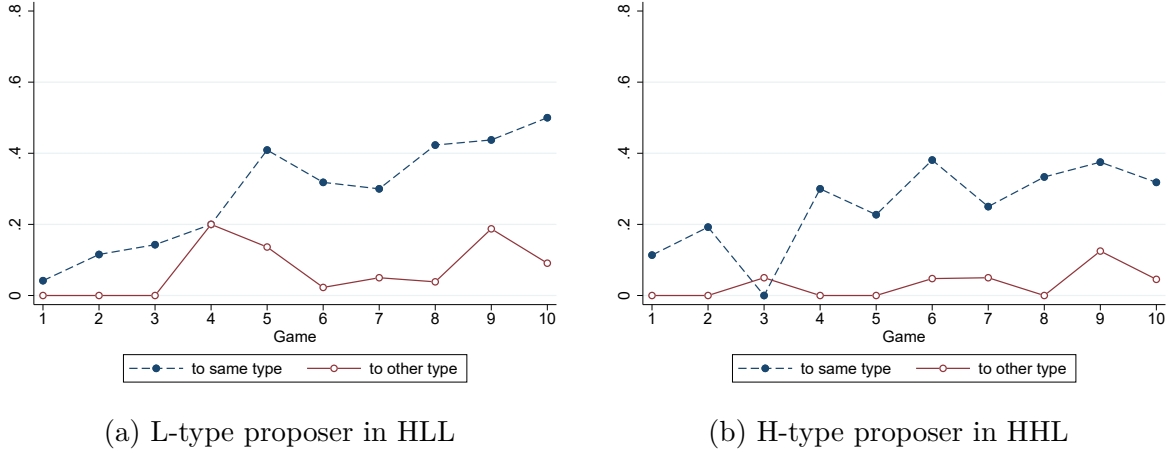
**Result 2.2:** *When subjects' own fairness views serve as a reference for others' entitlements, we find no major differences between the treatments. In late games, entitlements are not respected in more than 40% of all games under both rules, and this is further aggravated for heterogeneous groups.*

### 4.3 The Role of Different Types in Heterogeneous Groups

We now investigate whether the proposer's relative contribution affects proposals to better understand behavior in heterogeneous groups, where entitlements were found to be ignored more frequently.

L-type proposers tend to propose an extreme allocation more often than H-type proposers

Figure 6: MAJ: Allocation of significant shares in extreme proposals



in MAJ, but the difference is not significant (28.7% vs. 20.8%, t-test:  $p = 0.12$ ); in DICT no difference for proposer types is found (L-type proposers: 26.7% vs. 28.0%, t-test:  $p = 0.44$ ). We therefore cannot corroborate our hypothesis that L-types are generally more likely to propose extreme allocations.

Regarding the question to whom a minimum winning coalition is addressed in MAJ, Figure 6 shows a clear result for groups in which the proposer faces different-type partners: In extreme proposals, the same-type partner is offered a significant amount, while the partner with a different contribution type is excluded, independently on whether the proposer is a low or high contributor.<sup>32</sup> Furthermore, this tendency becomes stronger over time. It is then not the “cheaper” coalition partner that the proposer is looking for, considering that the partner who contributed less may be willing to accept a smaller piece, but rather a partner who is in a similar position. Altogether, this is further evidence for neglecting the role of entitlements: Proposers do not seem to generally consider that the partner who contributed more deserves to receive a larger piece of the cake.

Excluding one of the partners is not expected in DICT. In fact, this is only observed in 3% of the cases.

Regarding the effect of the proposer’s contribution in all-way splits of heterogeneous groups, Figure 11 in Appendix A shows that differences in shares assigned to a H- and L-type contributor are smaller when the proposer is a L-type, than when the proposer is an H-type, in both DICT and MAJ. This is further evidence for a self-serving bias and a systematic effect of the proposer type for the neglect of entitlements.

**Result 3:** *We only find a tendency in MAJ for L-types to propose an extreme outcome more often than H-types; no difference is observed in DICT. When the proposer’s partners differ in their contributions, extreme allocations largely favor the same-type partner in MAJ.*

<sup>32</sup>In the HHL groups, the H-type proposes to share the cake with the other H-type in his group in 90.2% of all extreme offers. In the HLL groups, the L-type proposes to share the cake with the other L-type in his group in 81.1% of all extreme offers; see also the random effects logit regressions in Table 4 in Appendix A.

## 4.4 Behavior on the Individual Level

We turn to investigating behavior on the individual level. We find that, over all ten games, about one third of the subjects consistently offers proposals respecting entitlements under one of the two decision rules (DICT: 34.2% (41/120) MAJ: 35.0% (42/120)). This indicates that for these subjects moral property rights overrule legal property rights, irrespective of the bargaining power and the possibility to learn about strategic behavior. 7.5% of subjects consistently propose to keep (almost) everything under the dictator rule, while subjects who consistently propose an extreme allocation are virtually nonexistent under the majority rule (0.8%). For the remaining majority of the subjects, we observe a learning process over time, leading to an increasing number of extreme proposals in later games.

Regarding the determinants of extreme proposals over time, Table 2 shows the results of panel logit regressions, in which we use several factors to explain the dependent variable *extreme*, denoting the occurrence of an extreme proposal as defined in Section 3.1. Our explanatory variables are whether the proposer has seen an extreme proposal in any of the previous games or rounds (*extreme seen*), whether he or she has made an extreme proposal in any of the previous games or rounds (*extreme self*), a dummy variable for whether the proposer faces partners of different types (*mixed others*), and a variable that controls for experience (*game*).

Having seen an extreme proposal from a partner in any game before leads to a significant increase in the likelihood for an extreme proposal in the current game in both treatments.<sup>33</sup> This is an important finding in order to understand why we do not only observe the expected increase in extreme proposals in MAJ, but also in DICT. Learning in this environment does not only refer to understanding the more complex strategic behavior in MAJ, but it also relates to what others do and what seems to be morally acceptable in this setting. Extreme proposals in a previous game also increase the likelihood of an extreme proposal, pointing towards subjects' observation that such proposals are acceptable and the lack of some fairness in proposals is tolerated by others under both rules.

Experience *per se*, i.e. after controlling for other factors such as *extreme seen*, has a positive effect in MAJ but not in DICT (significant coefficient of *game* over all games, while for DICT, a post-estimation test ( $\text{Game} + \text{Dict} \times \text{game} = 0$ ,  $p = 0.28$ ) shows no effect.)

The regression allows to conclude that subjects need some time or experience to find out to which degree such extreme outcomes are tolerated, which points towards learning along a moral dimension, in addition to the cognitive one. If fairness preferences were strong and stable, we would not observe the shift towards more extreme outcomes with experience.

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<sup>33</sup>65% of the individuals have seen a selfish proposal by period 4, therefore we only include games 2-5 in column (1); however, results do not change qualitatively when we look at games 2-10, see column (2).

Table 2: Extreme proposals explained: Random-effects logistic regression (standard errors adjusted for 10 clusters per treatment)

	(1)	(2)
	Game 2-5	Game 2-10
	Dep. variable: extreme proposal	
Extreme seen	1.01*	1.05*
	(2.26)	(2.19)
Extreme self	2.45***	1.82***
	(5.27)	(4.65)
Game	0.03	0.10 <sup>+</sup>
	(0.24)	(1.94)
Mixed others	0.24	0.59*
	(0.73)	(2.09)
Dict	0.51	-0.38
	(0.56)	(-0.62)
Dict x Extreme seen	0.29	0.68
	(0.52)	(1.09)
Dict x Extreme self	1.17 <sup>+</sup>	0.41
	(1.80)	(1.18)
Dict x game	-0.34	-0.03
	(-1.50)	(-0.45)
Constant	-3.52***	-4.33***
	(-6.01)	(-8.34)
Observations	1047	2310

Notes:  $t$  statistics in parentheses; <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

## 5 Conclusion

Our experimental study used two division procedures, the dictator game and the majority bargaining game, as representatives for the assignment of unequal distribution of power of decision rules. Our aim was to find out whether entitlements – constituting moral property rights – can overrule the use of legal property rights, which are derived by the rules of the respective game.

Our main finding is that moral property rights are often not respected under both decision rules. Differences in the use of bargaining power disappear when we consider extreme proposals, which denote allocations that leave at most the crumbs for the partners whose consent is not needed for an agreement. After some rounds of learning, subjects make extreme proposals in over one third of the observations in both treatments. We consider this definition of leaving at most the crumbs to other(s) appropriate for assessing unfair behavior, because it is known that subjects in the dictator game like to signal that they are not entirely selfish by at least giving a small amount, but not due to motives of fairness (Andreoni and Bernheim, 2009). In majority bargaining, proposers need a coalition partner by rule of the game, which already requires some sharing, hence they may not feel obliged to give to a third partner, not even a small amount.<sup>34</sup>

We also use two very coarse measures for the respect of entitlements among all-way splits, which only take into consideration the order of others' entitlements and thus allow for various fairness norms to be included. We find 40-50% of proposals that are not consistent with these measures for experienced subjects.

The observed development over time indicates that people learn about the procedure and the preferences of others. Our regression results show that extreme proposals are more likely to occur when such proposals have been observed in the past, suggesting that people learn from others' behavior that being selfish is 'morally' acceptable. This is further supported by our observation that extreme proposals are no less likely to be accepted than proposals yielding a all-way split in majority bargaining. Increasingly extreme proposals are also observed in DICT, where no 'legal' approval of others is needed.

Therefore, our main conclusion is that entitlements may play a smaller role than what could be expected from previous experimental studies, in particular for more experienced stakeholders. While a vast majority of inexperienced subjects seems to respect entitlements, a closer look at a division problem that is more 'complex' – in the sense that entitlements are earned, but they may differ from one another and not objectively comparable – shows that moral property rights do not ensure that each stakeholder receives a minimally fair share. Respecting others' entitlements may be much less likely than one would hope for.

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<sup>34</sup>Such behavior that aims at satisfying some minimal criteria for one's own moral self-image is also found in consumers' behavior by Engel and Szech (2020): If agents feel that they fulfill one ethical aspect, this suffices for their moral self-image, and they use it as an excuse to ignore further related ethical aspects.



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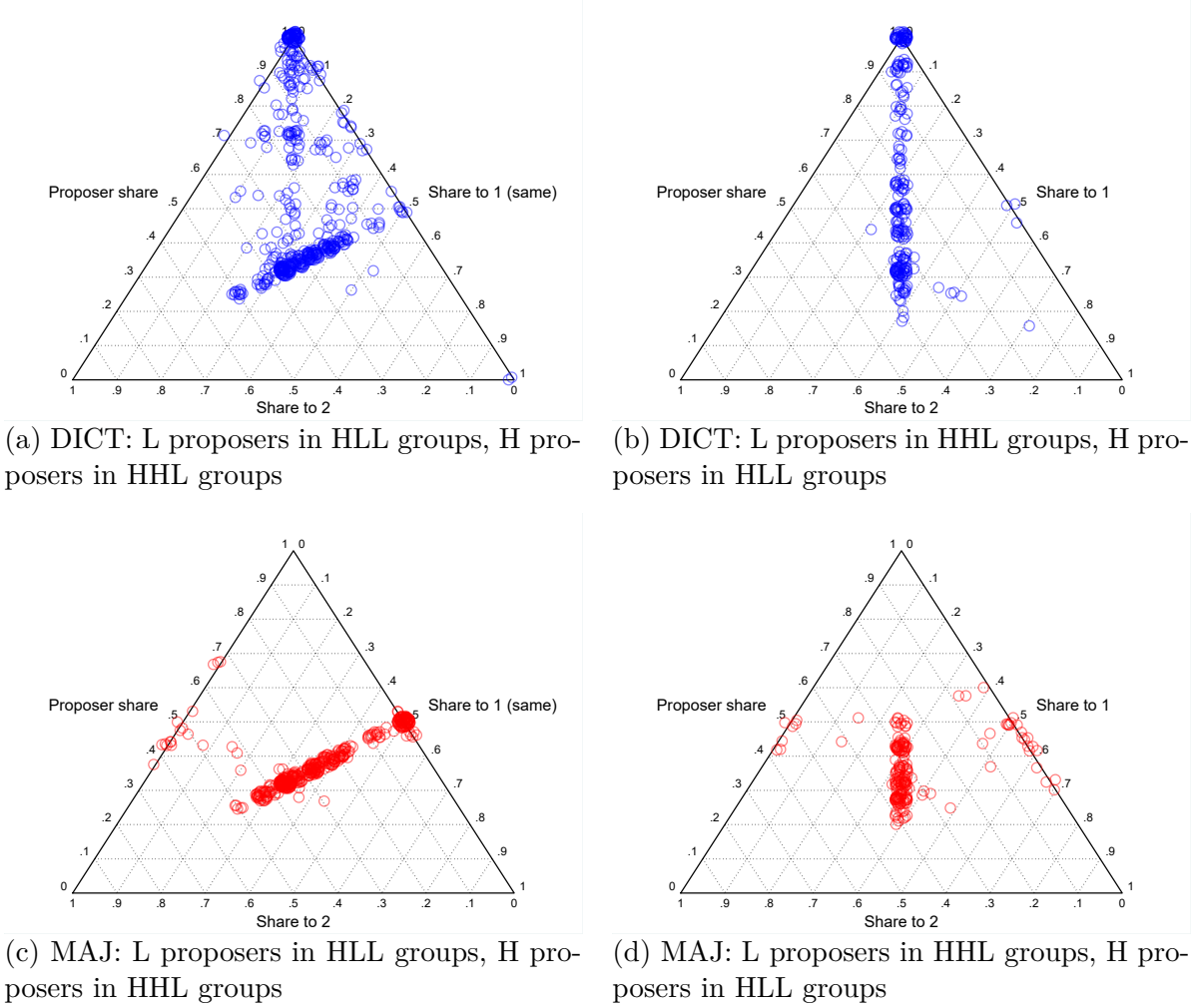
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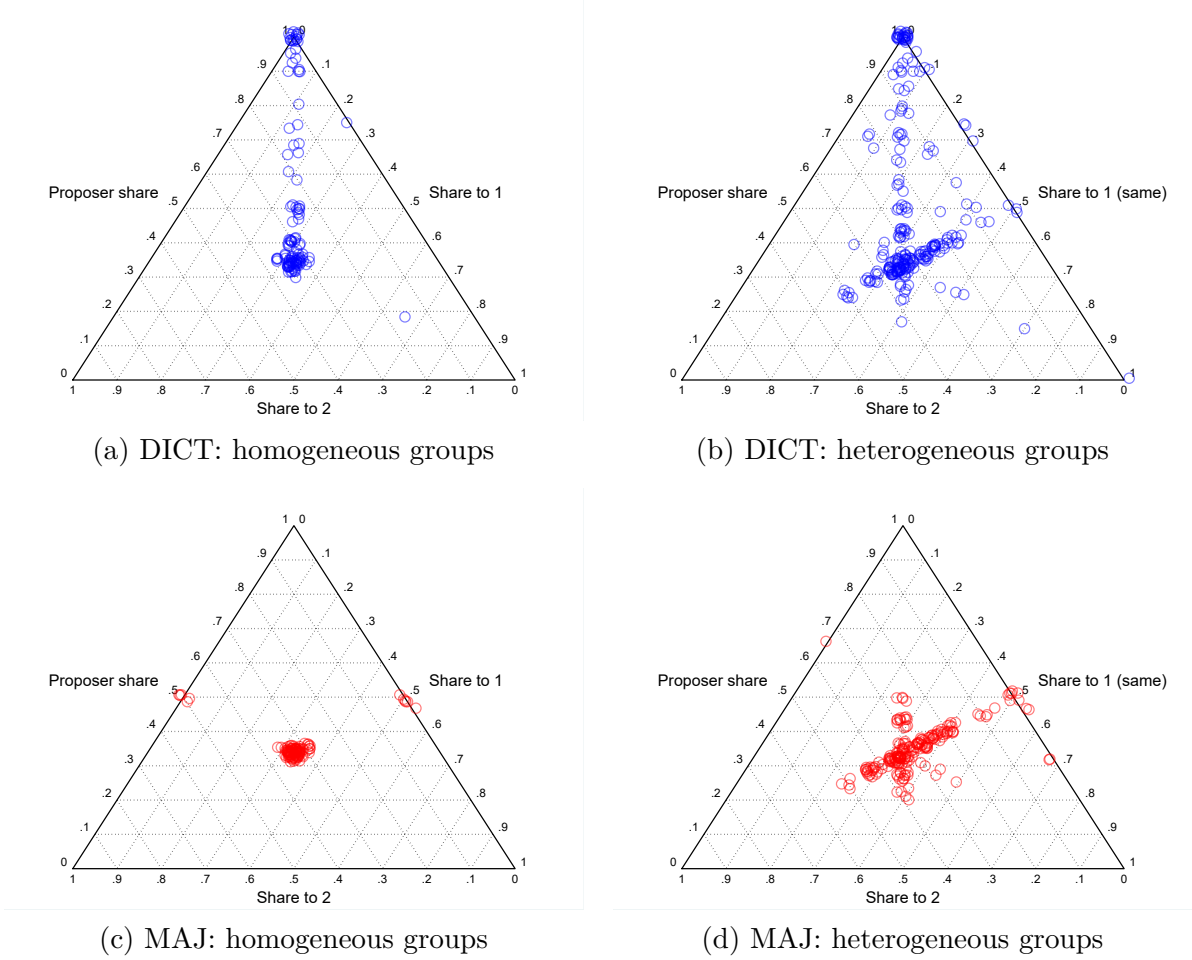
## A Additional Figures and Regressions

Figure 7: Outcomes in heterogeneous games in treatments DICT and MAJ



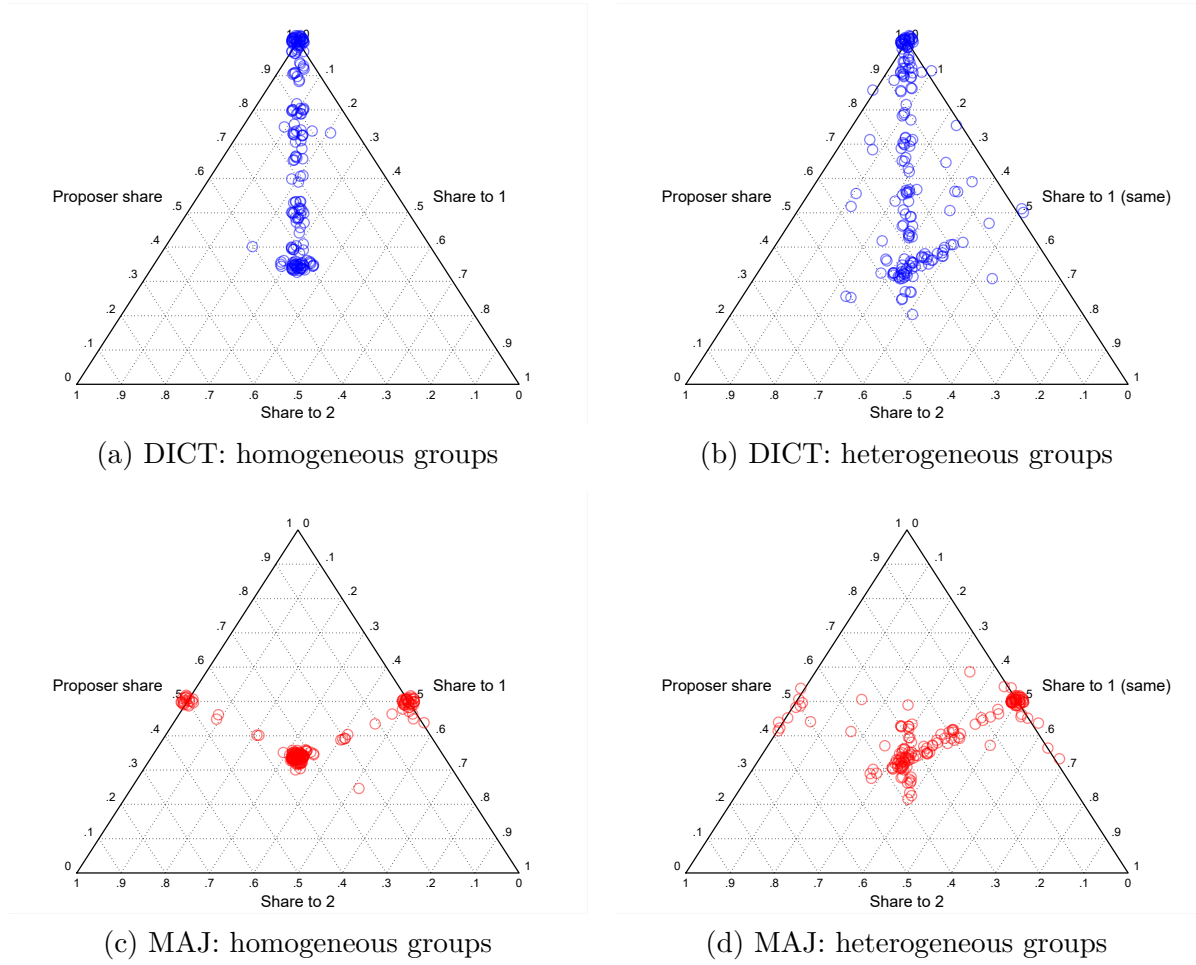
Note: These plots show the relationship between the shares of the three players in a two-dimensional graph, where the horizontal lines display the increments for the proposer's axis, the positively sloped lines correspond to the increments for recipient 1, and the negatively sloped line to recipient 2.

Figure 8: Outcomes in *early* games in treatments DICT and MAJ



Note: These plots show the relationship between the shares of the three players in a two-dimensional graph, where the horizontal lines display the increments for the proposer's axis, the positively sloped lines correspond to the increments for recipient 1, and the negatively sloped line to recipient 2. When one of the two recipients in a heterogeneous group is of the same type as the proposer, his share is always displayed as 'share to 1'. 'Early' games indicate the games 1-3.

Figure 9: Outcomes in *late* games in treatments DICT and MAJ



Note: When one of the two recipients in a heterogeneous group is of the same type as the proposer, his share is always displayed as 'share to 1'. 'Late' games indicate games 8-10.

Figure 10: Proposer's share over time

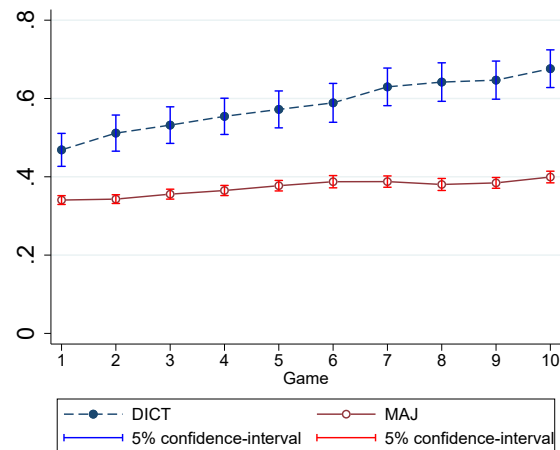


Table 3: Difference in extreme proposals over treatments over time

	(1)
Dep. variable: extreme outcome	
DICT	-0.09 (-0.11)
early	-3.50*** (-5.74)
DICT x early	1.50* (2.16)
Constant	-1.38* (-2.14)
Observations	1440

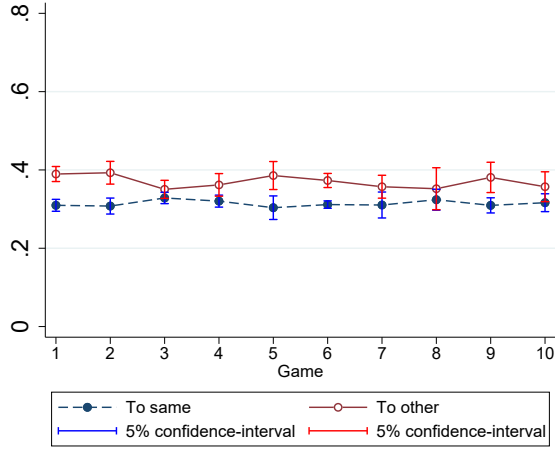
Notes:  $t$  statistics in parentheses;  $^+ p < 0.10$ ,  $^* p < 0.05$ ,  $^{**} p < 0.01$ ,  $^{***} p < 0.001$ .

Table 4: Extreme proposals to the respective type

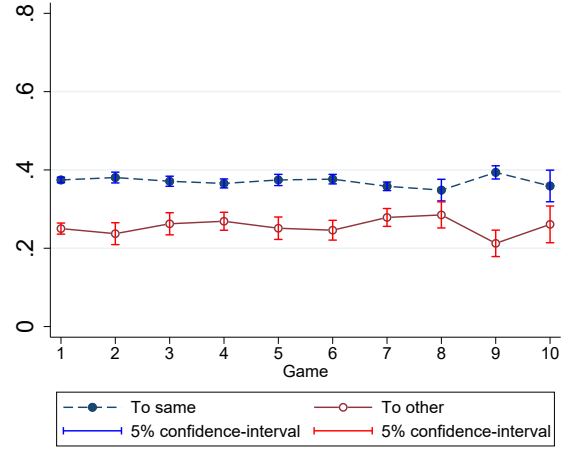
	(1)	(2)
Dep. var: Extreme prop. to L-type		to H-type
L-type	5.94*** (4.11)	
H-type		5.94*** (4.11)
Constant	-3.59*** (-4.11)	-2.34* (-2.53)
Observations	143	143

Notes:  $t$  statistics in parentheses;  $^+ p < 0.10$ ,  $^* p < 0.05$ ,  $^{**} p < 0.01$ ,  $^{***} p < 0.001$ .

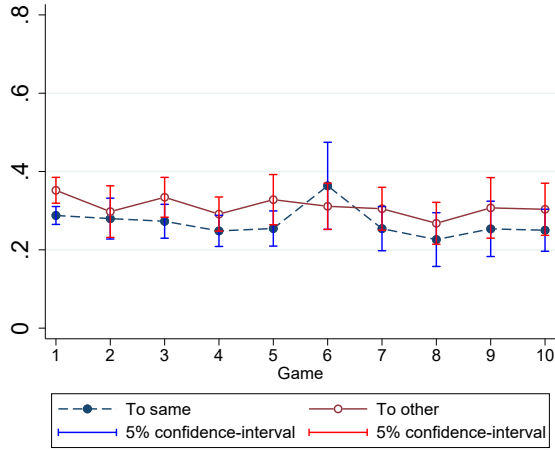
Figure 11: Proposed mean share to same-type partner and different-type partner in heterogeneous groups



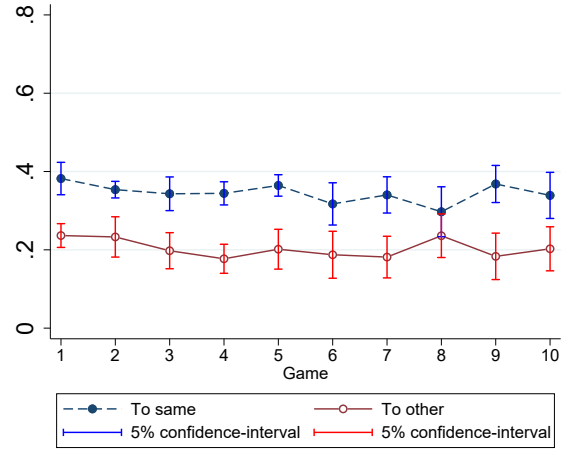
(a) MAJ: L-types in HLL



(b) MAJ: H-types in HHL



(c) DICT: L-types in HLL



(d) DICT: H-types in HHL



## B Instructions

[[[Instructions for the majority bargaining are given in brackets]]]

Dear participants,

Welcome to today's experiment. Please read the instructions for the experiment carefully. For better comprehensibility, from now on we use only male designations. These are to be understood in a gender-neutral way.

All statements in the instructions are true and all participants receive exactly the same instructions. The experiment and the evaluation of the data is done anonymously. Your payout depends on your own decisions and decisions of other participants.

Your earnings from the experiment will be paid to you in cash at the end of the experiment. Overall, the experiment will take about 70[90] minutes; In addition to the payout from the experiment, you will receive 4 Euros, which you have earned by being on time for the experiment.

From now on, we ask you to stop talking to other participants and to use only those tools provided by the instructors. Please switch off all electronic devices. Also, only functions that are necessary for the experiment may be used on the computer. If you violate these rules, you will not be paid out in this experiment and you will be excluded from future experiments.

In this experiment, you are a member of a group of three people. These three members, by participating in a knowledge-quiz, contribute to providing an amount, which is subsequently divided among the three.

Below are detailed instructions. Thank you for your attention and your participation in today's experiment. If you have a question, please raise your hand. Your question will then be answered privately.

## Description of the experiment

The experiment consists of 2 parts.

In Part 1, you answer quiz questions on general knowledge. There are always 4 possible answers, and only one is correct. The number of correct answers is compared with that of other participants. From this, a score is derived, which you take from the quiz for the rest of the experiment.

In Part 2, you form triplets. Then, within the group of three, you negotiate/bargain about the distribution of a total amount in euros. The total amount is calculated from the points that the respective members of the group have obtained from the quiz.

### Part 1: The quiz and your score

For the knowledge quiz, 12 participants are divided into 3 equal cohorts at the beginning, in cohort A, cohort B and cohort C (in each cohort there are 4 participants). All participants receive the same general knowledge questions that appear one after the other on the computer. Click the answer you think is correct, and then click OK. After your input, a new question will appear – until 5 minutes have elapsed.

At the end of the quiz, a ranking is created within each cohort. Rank 1 is the highest rank you can achieve; Rank 4 is the lowest rank. A person gets a higher rank the more correct answers she has given. If 2 participants have exactly the same number of correct answers, then the lot decides which of the two gets the better rank. Then, depending on the rank they have achieved in their respective cohort, they receive points. These are allocated as follows:

rank in cohort	points of this person
1	4
2	4
3	2
4	2

After the quiz is over, you will be told how many of your answers were correct, what rank you achieved, and how many points you earned.

### The fairness questions

Before you see your quiz result, you will be asked on the screen to tell us what you think would be a fair distribution of different total amounts to the members of your group. Your answer has no consequences for the rest of the experiment, and no consequences for your payout. In particular, the actual allocation of the total amount does not depend on the answers to this question.

You see your result from the quiz and your score only after answering the fairness questions.

### Part 2: Calculation and distribution of the total amount

Part 2 of the experiment consists of 10 ‘distribution-rounds’. Prior to each distribution-round, you will be randomly assigned to two other participants from other cohorts, with whom you will then form a triplet for this distribution-round. Each triplet consists of

one person from cohort A (hereafter called member A), one person from cohort B (= member B) and one person from cohort C (= member C).

Before each distribution-round, new triplets are formed. Each group of three must split a total amount among themselves.

### **The total amount**

In order to determine the total amount, which the group of three has to distribute among themselves, the points of the three group members obtained from the quiz are multiplied, and 12 is added to it. That is, the total amount is calculated as follows:

$$\text{Total amount} = 12 + (\text{points member A}) \cdot (\text{points member B}) \cdot (\text{points member C})$$

*Example:* Member A has rank 2 in his cohort, member B has rank 1 in his cohort, and member C has rank 4 in his cohort. Rank 1 and 2 each give 4 points, rank 4 gives 2 points. Then the total amount is  $12 + 4 \cdot 4 \cdot 2 = 44$  points. Every point is worth one euro. That is, in this case, the three members would divide 44 euros among themselves.

You will be informed at the beginning of each distribution-round how many points the other two members of your group have scored and what is the total amount available for distribution to your group.

### **The distribution of the total amount**

One of the three members determines the distribution of the total amount. The procedure is as follows: Each of the three members proposes how to divide the total amount among the three members. The sum of the proposed shares must be the total amount. You have a calculator available on the screen.

Once each member has made a proposal, one of the three proposals will be selected at random. This determines the distribution of the total for this round, and you will be informed about it. The members see only the result of the selected proposal; they receive no information about the other two suggestions.

There are a total of 10 distribution-rounds. In each new distribution-round, the group is composed by different members.

[[[[To split the total amount, a negotiation takes place between the three group members. The decision is made according to the principle of majority according to the following rules:

Each of the three members proposes how to divide the total amount among the three members. The sum of the proposed shares must be the total amount. You have a calculator available on the screen.

Once each member has made a suggestion, you will see the three suggestions from the members of your group on the screen. Then you have to indicate which proposal you accept and which proposal you want to reject. You can also accept or reject all suggestions. Next, one of the suggestions of the three members is randomly selected. If at least two of the three group members have agreed to this proposal, the proposal is accepted. This determines the distribution of the total amount for this round, and you will be informed about the end of the negotiation. The members see only the result of the selected proposal. There is no information about the voting over the other two proposals.

If less than two of the three group members have agreed to the randomly selected proposal, then the negotiation goes into a new period, with the same members. The total amount will be reduced by 20%. (Example: If the total amount to be split in the first period was 20 points, then in the second period it is only 16 points, in the third only 12.8, etc.)

In each new period exactly the same rules apply: Each of the three members again makes a distribution proposal; You see the three proposals and indicate which proposals you agree with and which ones you want to reject. Next, again one of the three proposals will be randomly selected. If this proposal has been approved by at least two of the three group members, the proposal is accepted; otherwise the negotiation goes into another period. Again, the total amount is reduced by 20% and a new period follows with the same rules. If the group members have not reached agreement after 10 periods, the distribution-round will end without any agreement, and each member will receive 0 points in that distribution-round.

There are a total of 10 distribution-round, each of which can consist of several periods (if there is no agreement in the first period). During a distribution-round, the members of a group of three remain unchanged. In each new distribution-round, the group is composed by different members.]]]]

### **The payout**

At the end of the experiment, a ball is pulled out of a bag. The bag contains 10 balls, numbered 1 through 10. The drawn ball determines the distribution round, from which your share is paid to you 1: 1 in euro.

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Anita Gantner, Regine Oexl

Respecting Entitlements in Legislative Bargaining - A Matter of Preference or Necessity?

**Abstract**

In division problems with entitlements, we investigate whether fairness concerns overrule strategic behavior and inhibit full use of the decision-making power. In a lab experiment where entitlements are derived from costly contributions, we vary bargaining power by using either the majority rule or the dictator rule to find a division allocation. We apply very coarse measures for assessing whether entitlements are respected under both rules. For inexperienced subjects, we find a large number of proposals in which all partners receive positive amounts. With experience, however, over one third of proposers leave at most the crumbs for both partners (dictator) or one of them (majority bargaining). Past individual observations of such 'extreme' outcomes increase the likelihood of own 'extreme' proposals not only under the majority rule, but also under the dictator rule, where no learning of strategic behavior is expected. In heterogeneous groups, where partners bring in different contributions, about 50 % of proposals do not reflect an ordinal comparison of the partners' entitlements. Overall, this shows significant limits in people's preferences for fairness.

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